Transport and Accessibility Impact Assessment

Melrose Park High School

Prepared for School Infrastructure NSW

28 January 2025

231605

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Your Partner in Engineering

Revision Register

Rev	Date	Prepared by	Reviewed by	Approved by	Remarks
P1	29/11/24	M. Partadinata E. Cowdery	M. Mulholland	M. Babbage	Issued as draft
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Executive Summary

This Transport and Accessibility Impact Assessment (TAIA) accompanies a Review of Environmental Factors pursuant to Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act), for the construction and operation of a new high school in Melrose Park (MPHS).

The new high school is intended to be constructed over two stages to provide an ultimate capacity of 1,000 students, with an initial Stage 1 construction providing a capacity of 560 students. The school is expected to operate with 52 staff in Stage 1, through to 79 staff in the full Stage 2 capacity. Transport behaviours at and around the site are expected to change over time as the population of the school grows (noting that this will be the case whether the development is physically constructed in stages, or entirely delivered in a single stage) which has been considered throughout the development of a transport strategy for this site.

The holistic transport strategy for the school prioritises active transport (i.e. walking and cycling) and public transport over private vehicle movements. This is consistent with NSW state government policy and is a core part of School Infrastructure NSW's (SINSW) ongoing commitment to sustainable transport across its portfolio of projects. In addition, the development is located in Melrose Park Precinct is underpinned by a Transport Management and Accessibility Plan (TMAP). The TMAP has been endorsed by Transport for NSW (TfNSW) and is required to be used as a supporting technical document for all new developments within Melrose Park Precinct. The MPHS proposal has reviewed and made reference to the TMAP throughout. The proposal is aligned with the overall transport strategies and objectives set out in the TMAP. The overall transport strategy across all elements of the school have also been discussed with City of Parramatta Council (CoP) and TfNSW during a pre-lodgement consultation stream of Transport Working Group (TWG) meetings.

For cyclists, on completion of Stage 2, a minimum of 100 on-site bicycle storage spaces will be provided for students (meeting 10% of total students) and 8 spaces for staff (meeting 10% of total staff). For Stage 1, 56 on-site bicycle parking spaces will be provided for students and 6 bicycle parking spaces for staff. MPHS will provide 2 unisex shower and change rooms for staff, with lockers to be provided. These provisions are broadly in line with Green Star requirements and the NSW Planning Guidelines for Walking and Cycling and would meet future demand levels with a shift to more sustainable transport modes.

Public transport will be a substantial part of MPHS operations. Existing bus stops located along Wharf Road are intended to be utilised. The proposal also includes the consolidation of bus stop facilities along the southern side of Hope Street. Proposals to extend the 513 bus service to accommodate the school and facilitate students from the northern part of the school catchment to MPHS have been considered and discussed with TfNSW as part of this proposal. In addition, as part of the TMAP trigger points Melrose Park Precinct is currently chartering a private shuttle bus during morning and afternoon peak periods to transport residents and employees of the Melrose Park Precinct to Meadowbank Wharf and train station, the frequency of this service is intended to increase to 12 services during peak hours by 2027. It is intended more frequent bus services provided by TfNSW will be implemented to facilitate service needs of the growing Melrose Park population, this will provide additional public transport options for staff travelling to / from the site.

Major public transport infrastructure works being completed as part of Melrose Park Precinct is Parramatta Light Rail Stage 2 (PLR Stage 2) with an anticipated completion date of 2036. Enabling works for PLR Stage 2 are currently underway, which involve the first 1.3km of new light rail alignment, including a 320m bridge over the Parramatta River between Wentworth Point and Melrose Park. It is anticipated by 2036 the delivery of significant new infrastructure, these new public transport options will directly connect both students and staff travelling to MPHS to the cores of the Eastern and Central CBD's, enhancing accessibility and reducing travel times.

MPHS proposes an on-site servicing / waste collection area and an on-street loading zone. The school will be serviced by a loading dock with capacity for vehicles up to and including 10.8 metre waste truck, which will be sufficient for all potential deliveries and service vehicles coming to the site, including waste collection. The loading dock is located at the staff carpark, with controlled access at a secure access point, with intercom facilities to the main administration building. The loading dock has a head height of 4.5m to ensure the waste truck can operate without any head obstruction. An on-street loading zone is also proposed along Hope Street which can accommodate vehicles up to and including an 8.8 metre Medium Rigid Vehicle (MRV).

Drop-off and pick-up by car ("kiss & ride") will also be catered for at the site, however, is a low priority mode in the sustainable transport hierarchy. Therefore, it will be discouraged and is supplemented by active and public transport options. The proposal includes one zone on the new local road on the site's western boundary, known as (NSR-4) and one zone on Wharf Road. The zones are approximately 68 metres and 60 metres in length. Additionally, the school will provide 2 accessible parking bays to provide transport functionality for the special education learning units (SELU), which will be located along NSR-4, close to the main access. These accessible parking spaces will be designed in accordance with AS 2890.6.

Car parking is the lowest priority travel mode for the project, however it is understood some staff may travel to / from the site via private vehicle, and therefore parking provisions have been allowed for. The car park will be constructed in 2 stages with some parking located on the MPHS site and overflow parking provided on the Melrose Park Public School (MPPS) site. The proposed MPPS staff car park is located approximately 200 metres south of MPHS. The proposed shared car park is part of the MPPS redevelopment and is assessed under a separate application. A detailed breakdown of the proposed car park provision is provided below:

Stage 1 – 29 staff parking spaces provided:

- 5 staff parking spaces, including 1 accessible space within MPHS car park
- 24 staff parking spaces within the MPPS car park

Stage 2 – 44 staff parking spaces provided

- 5 staff parking spaces, including 1 accessible space within MPHS car park
- 39 staff parking spaces within the MPPS car park

This provision is designed to accommodate 55% of staff during Stage 1 and Stage 2, it is anticipated this level of provision will adequately serve staff demands given the significant redevelopment of Melrose Park Precinct and the improved public transport infrastructure. In the event additional vehicles exceed the demand of the on-site car park, as detailed in Section 2.5 whilst not recommended, there is an abundance of unrestricted spare capacity within the surrounding streets, this may be utilised in the interim until Melrose Park Precinct is fully developed, following which there will be sufficient levels of public transport to accommodate staff travelling to site via other travel modes.

An assessment of the proposed traffic impact has also been completed for the worst-case scenario. This involves adopting the maximum student and staff capacity in Stage 2 and applying the baseline travel mode splits for students and staff. Analysis completed in Section 11 confirms as a worst-case scenario MPHS will generate a total of 448 vehicle trips (259 inbound, 189 outbound) during the AM peak period and 67 vehicle trips (35 inbound, 3 outbound) during the commuter peak period. It is understood that detailed Aimsun and SIDRA traffic modelling was completed as part of the TMAP and updated Melrose Park North Street Network Traffic Report. This report considered the traffic generation of a school on the MPHS site with 417 vehicle trips (213 inbound, 204 outbound) during the AM peak period and 89 vehicle trips (40 inbound, 49 outbound) during the commuter PM peak period. When compared to the updated assessment for MPHS, as a worst-case scenario it is assumed MPHS may generate an additional 31 vehicles during the morning peak period and a reduction of -22 vehicles in the commuter peak period when compared to the previously modelled 'primary school' traffic volumes as part of Melrose Park North Internal Street Network, Traffic Report.

It is understood the traffic generation of MPHS would be accommodated within the local road network at year of opening and 2036, operating at a satisfactory LOS. While the AM traffic generation would increase slightly (31 additional vehicle trips), the increase would have no material impact on the surrounding road network. Further analysis is provided in Section 11.

To ensure the safety of pedestrians in the vicinity (particularly children, at both the new high school and existing primary school) while maintaining appropriate vehicular traffic flows, a package of public domain works will be provided as part of this development. These include two new pedestrian crossings along Wharf Road and Hope Street, footpath widening on Wharf Road and consolidation of the existing bus stops on the southern side of Hope Street into a single 63-metre bus zone. Installation of a raised pedestrian crossing and footpath widening along NSR-4 are also being completed by Sekisui developer as part of the Melrose Park North Precinct.

It is proposed that the implementation of a School Transport Plan (submitted separately as part of this REF), and the provision of active and public transport infrastructure such as end-of-trip facilities for staff, will assist in shifting staff and student travel behaviour as the school population grows over time (such as targeting staff car driver mode split to 50%). This shift to a lower car driver mode split is a deliberate strategy as part of the sustainable transport goals. It has been implemented for a number of reasons including provision of acceptable and sufficient quantities of on-site play space, reductions in hardstand space to avoid urban heat island effects, limiting vehicle movements to reduce congestion, and reducing the carbon emissions of staff travel to and from the site. This shift over time is expected to coincide with gradual growth of the school population over time, regardless of whether the development is physically constructed in multiple stages or a single stage.

Overall, the transport provisions of this project across all travel modes have been selected and developed in order to provide a sustainable, safe, and efficient site. These provisions include physical infrastructure works on- and off-site, along with management measures to be implemented during operation of the school. While school sites generate significant volumes of travel demand in short periods of time, the proposed transport strategy is considered an appropriate balance and is demonstrated to provide appropriate outcomes for the site.

Contents

Section 1 Introduction

1.1 Introduction

This Transport and Accessibility Impact Assessment (TAIA) has been prepared by TTW on behalf of the Department of Education (DoE) to assess the potential environmental impacts that could arise from the construction and use of the new Melrose Park High School project (the **Activity**) at 37 Hope Street, Melrose Park. This report supports the assessment of the proposed Activity under Part 5 of the *Environmental Planning and Assessment Act 1979*. The Activity is proposed by the DoE to meet the growth in educational demand in the Melrose Park Precinct.

This report has been prepared to assess and address the traffic and transport impacts of the proposed Activity and define the key traffic-related design elements of the proposal. This TAIA has been prepared in support of a Review of Environmental Factors (REF).

A School Transport Plan (STP) and a Construction Traffic Management Plan (CTMP) have been prepared and included as part of this REF. These plans are considered preliminary in nature and would be finalised post-approval as a mitigation measures.

1.2 Summary of the Activity

The proposed activity involves the construction and use of a new high school, known as Melrose Park High School (MPHS) in two stages for and ultimate capacity of approximately 1,000 students.

Stage 1 of the proposed activity includes the following:

- Site preparation works.
- Construction of Block A – a six-storey (with additional roof/plant level) school building in the south-western portion of the site containing staff rooms and General Learning Spaces (GLS).
- Construction of Block B – a one storey (double height) hall, gymnasium, canteen and covered outdoor learning area (COLA) building in the south-eastern portion of the site.
- Construction of Block C – a single storey plant and storage building at the north-eastern portion of the site.
- Associated landscaping.
- Construction of on-site car parking.
- Provision and augmentation of services infrastructure.
- Associated public domain infrastructure works to support the school, including (but not limited to):
    - Provision of kiss and drop facilities along Wharf Road, and widening of the Wharf Road footpath.
    - Raised pedestrian crossings on Wharf Road and Hope Street.
    - Consolidation of 2 bus zones on the southern side of Hope Street

Stage 2 of the proposed activity includes the following:

- Construction of Block D – a five-storey (with additional roof/plant level) school building in the north-western portion of the site containing staff rooms and GLS:
- Additional open play spaces within the terrace areas of Building D.
- Minor layout amendments to Block A.

The Review of Environmental Factors prepared by Ethos Urban provides a full description of the proposed works.

1.3 Site Description

The site is located at 37 Hope Street, Melrose Park within the Parramatta Local Government Area (LGA). The site covers an approximate area of 9,500m^2 and is generally rectangular in shape. The site is currently cleared and vacant. The site is located approximately 8 kilometres east of the Parramatta CBD.

1.4 Significance of Environmental Impacts

Based on the identification of potential issues, and an assessment of the nature and extent of the impacts of the proposed development, it is determined that:

- The extent and nature of potential impacts are low and will not have significant impact on the locality, community and/or the environment.
- Potential impacts can be appropriately mitigated or managed to ensure that there is no significant impact on the environment.

1.5 REF Reporting Requirements

The NSW Guidelines for preparing a REF were reviewed to ensure the traffic and parking requirements were met in this report. Table 1 below identifies the typical requirements that need to be met for a school planning submission and identifies where they have been addressed in various sections of this report.

Table 1: Planning Submission Requirements

Requirements	Section Reference
Transport and Accessibility Impacts	
An analysis of the existing transport network, including the wider state network and local network, speed and parking restrictions, and any pedestrian, bicycle or public transport infrastructure.	Road hierarchy – Section 2.2 Pedestrian and cyclist infrastructure – Section 5 Public transport – Section 7 Parking restriction – Section 2.5
An analysis of the likely demand for parking having regard to target mode share for car parking, bicycle parking, and end-of trip facilities	Vehicular access – Section 3 Pedestrian & cyclist access – Section 5 Cyclist analysis and facilities - Section 6 Parking analysis and facilities - Section 10
An assessment of the expected demand of the private vehicle pick up and drop off and the assessing the capacity of the proposed private vehicle pick up / drop off to accommodate the demand	Drop-off and pick-up zones –Section 9
An assessment of the expected bus pick up and drop off demand based on the expected target mode share and an assessment of the capacity of the existing and proposed bus pick up and drop off to accommodate the demand	Bus demand analysis and provision –Section 7
An assessment of the access arrangement for service vehicle (i.e garbage and other deliveries) and emergency vehicles	Vehicular access – Section 3 Service vehicles – Section 8 Swept path analysis – Appendix B

Requirements	Section Reference
An analysis of the impacts of the proposed development (including justification for the methodology used), including predicted mode share split, a forecast of additional daily and peak hour multimodal network flows as a result of the development (using industry standard modelling), predicted distribution across local road network potential queuing in drop-off/pick-up zones and bus bays during peak periods, identification of potential traffic impacts on road capacity, intersection performance and road safety (including pedestrian and cyclist conflict) and any cumulative impact from surrounding approved developments.	Forecast modal split – Section 4 Public transport – Section 7 Drop-off and pick-up zones – Section 9 Car parking – Section 10 Traffic impacts – Section 11 Cumulative impact – Section 11.5
Measures to mitigate any traffic impacts, including details of any new or upgraded infrastructure to achieve acceptable performance and safety, and the timing, viability and mechanisms (including proposed arrangements with local councils or government agencies) of delivery of any infrastructure improvements in accordance with relevant standards.	Infrastructure upgrades –Section 3 Mitigation measures – Section 12
Measures to reduce car-based travel for employees, students and visitors by setting out achievable targets for mode shift with supporting explanation and evidence and including provisions for the monitoring and review of the plan	Refer to the Preliminary School Transport Plan
A preliminary construction management plan that details management and mitigation measures to minimise impacts and ensure the safety of road users and pedestrians	Refer to the Preliminary Construction Traffic Management Plan

1.6 Transport Assessment Basis

For the purposes of the design and assessment of all traffic and transport elements of the activity, the future student and staff capacities as a result of the activity are the primary inputs and main assessment criteria.

As shown in Table 2, it is anticipated that approximately 560 students and 52 staff members will be accommodated in Stage 1 with an ultimate maximum capacity of 1,000 students and 79 staff as part of Stage 2 works. SINSW enrolment forecasts estimate in opening year, 2027 MPHS enrolments will be close to 560 students and 52 staff. The school capacity will be reached gradually with an anticipated maximum capacity year of 2036.

Table 2: Proposed Development Capacity

	Stage 1	Stage 2
Students	560	1,000
Staff	52	79

As shown in Table 2, the maximum number of students and staff will be in Stage 2. To provide a conservative assessment, the traffic assessment has been completed using the Stage 2 full capacity student and staff numbers.

1.7 School Catchment

The proposed school catchment boundary is shown in Figure 1. The school site is located on the eastern side of the catchment. Future residential growth areas are located within the immediate vicinity of the site as shown in the Melrose Park Precinct. The proposed catchment area has an approximate radius of 2km, meaning a number of students will be within relatively close proximity to the site.

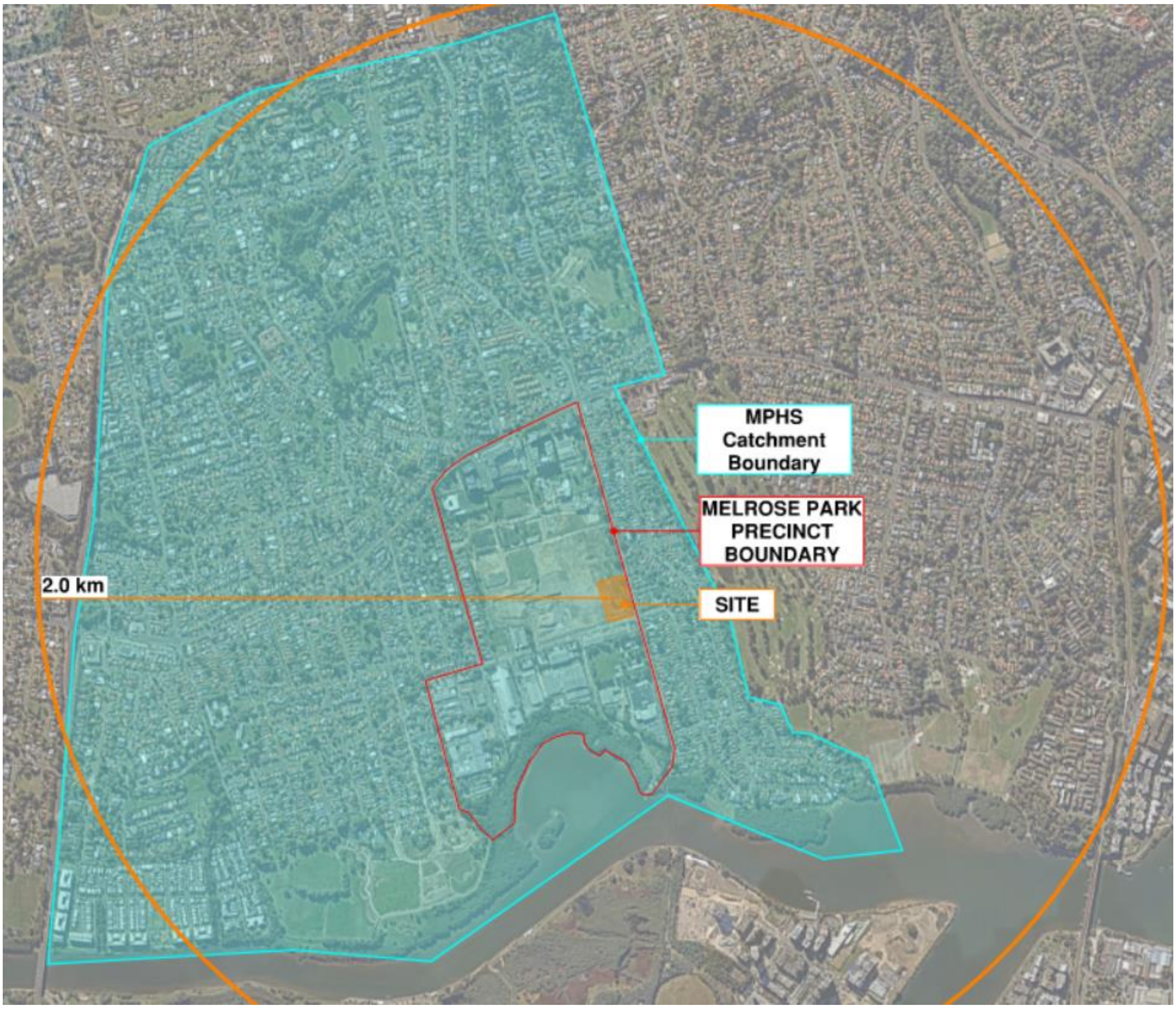


Figure 1: Proposed School Catchment Boundary
Source: Modified from Nearmap

1.8 Strategic Planning Context

1.8.1 Environmental Planning Instruments

Table 3 outlines the relevant environmental planning instruments related to the traffic and transport assessment of the activity.

Table 3: Relevant Environmental Planning Instruments

<table>
<tr><th>Document</th><th>Comment</th></tr>
<tr><td>Parramatta Local Environmental Plan 2023</td><td>This legal document applies to land within the City of Parramatta LGA and provides the framework for planning in the LGA. It contains development standards and is referred to as ‘Parramatta LEP’ within this report.</td></tr>
<tr><td>Parramatta Development Control Plan 2023</td><td>This document is to supplement the Parramatta LEP 2023 and provide more detailed provisions to guide development. This document general controls and design guidelines for all developments within the City of Parramatta LGA and is referred to within this report as ‘Parramatta DCP’.</td></tr>
<tr><td>Parramatta DCP 2023 – Part 8 Centres, Precincts, Special Character Areas & Specific Sites</td><td>Within the Parramatta DCP, Part 8.2.6 Melrose Park Urban Renewal Precinct relates specifically to development on the land in Melrose Park shown in the Figure 2 below. This document is referred to within this report as ‘Parramatta DCP, Part 8.2.6 Melrose Park Precinct’.

The Melrose Park Precinct is being developed on rezoned industrial land between Victoria Road and the Parramatta River. The majority of land within the north precinct has been rezoned, where the south precinct is still predominantly zoned as general industrial land. The Melrose Park Precinct is guided by the Melrose Park Structure Plans, which are discussed in Section 1.8.2

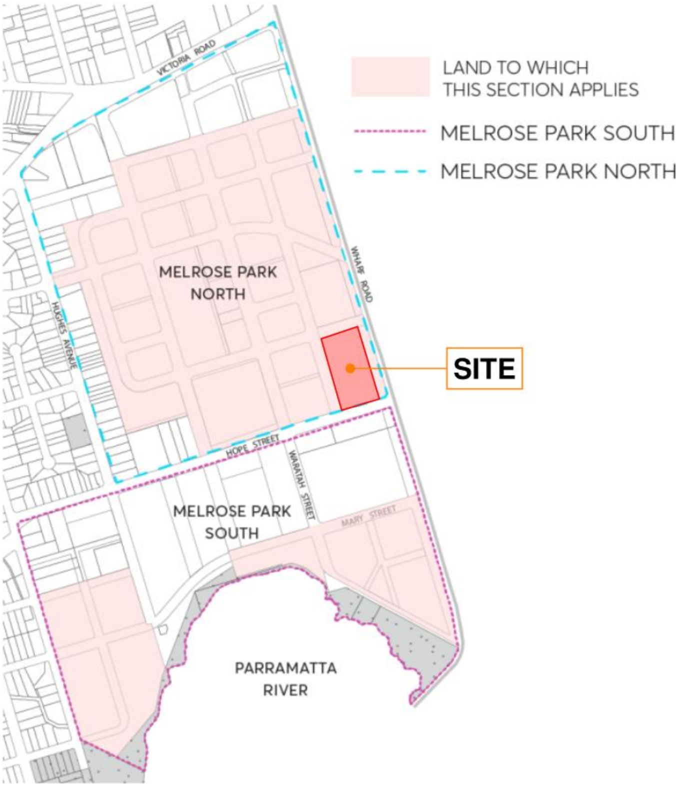


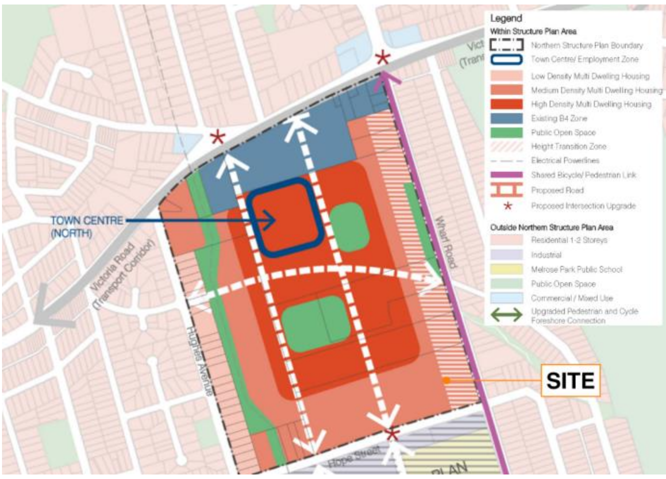
Figure 2: Melrose Park Precinct
Source: Parramatta DCP 2023</td></tr>
</table>

Document	Comment
Draft Parramatta Bike Plan 2023	The draft Parramatta Bike Plan outlines the vision to continue advocating, planning and delivering both infrastructure and programs to support riding in the City of Parramatta LGA.
Greater Sydney Commission's Central City District Plan	Greater Sydney Commission is implementing the Region Plan through five district plans, which detail district-specific directions, place-based outcomes, and the actions to achieve these. The Central City District Plan (CCDP) covers MPHS and nominates Greater Parramatta, Blacktown, Castle Hill, Rouse Hill and Merrylands as strategic centres. The CCDP describes how integrated land use and transport planning can help achieve the 30-minute city by encouraging the growth of strategic and local centres to reduce the need for people to travel long distances to access jobs, education and services. The school development is consistent with the vision outlined in the Greater Sydney Commission's CCDP, as it would provide much-needed school infrastructure conveniently located near existing public transport services and opportunities to co-share facilities with the local community.
Future Transport Strategy	The Future Transport Strategy sets the strategic direction for Transport for NSW (TfNSW) to achieve world-leading mobility for customers, communities, businesses, and our people. It is part of a suite of government strategies, policies and plans that integrate and guide land use and transport planning across NSW. It replaces *Future Transport 2056: Shaping the Future*, which was published in 2018. The Future Transport Strategy was developed in collaboration with other government agencies to ensure the State's overarching strategies align and complement each other. Transport used a 'vision and validate' approach for Future Transport. This approach starts with a long-term vision and establishes the outcomes we need to deliver that vision for customers and communities. The Future Transport Strategy will provide the direction for TfNSW based on three outcomes that form this strategy ▪ Connecting our customers' whole lives ▪ Successful places for communities ▪ Enabling economic activity. The Future Transport Strategy considers every part of NSW transport system from planning to operations to ensure a fully integrated approach. It sets the direction for localised plans and strategies, policy direction and prioritisation. Further details in relation to the proposed Parramatta Light Rail Stage 2 is provided in Section 1.8.2.

1.8.2 Melrose Park Precinct Planning Documents

The Melrose Park Precinct is located within the Parramatta LGA, approximately 7km to the east of the Parramatta CBD. The precinct is made up of two sub-precincts, Melrose Park North and Melrose Park South as shown in Figure 2. The planning documents and development plans within the Melrose Park Precinct that are relevant to this traffic and transport assessment are shown in Table 4.

Table 4: Melrose Park Precinct Planning Documents

Document	Comment
Melrose Park Northern Structure Plan 2016	The Melrose Park Structure Plans guide the precinct's urban renewal, ensuring a coordinated approach to redevelopment by CoP, landowners, and State agencies. The Structure Plans provide an overview of where density and supporting infrastructure should be located. In December 2016, COP adopted the Northern Structure Plan as shown in Figure 3.  **Figure 3: Melrose Park Northern Structure Plan** *Source: City of Parramatta Council (2016)*
Melrose Park Southern Structure Plan 2019	In December 2019, Council adopted the Southern Structure Plan as shown in Figure 4.  **Figure 4: Melrose Park Southern Structure Plan** *Source: City of Parramatta Council (2019)*

Document	Comment

Melrose Park Transport Management and Accessibility Plan	The Melrose Park Transport Management and Accessibility Plan (TMAP) was prepared in 2019 by Jacobs for the entire Melrose Park Precinct (both north and south precincts).
	
	The purpose of the TMAP was to assess at a masterplan level the traffic and transport implications of the proposed development of approximately 11,000 dwellings. The assessment was tailored specifically to address stakeholder comments through the Project Coordination Group (PCG) consisting of CoP, TfNSW, Department of Planning & environment (DPE) and Parramatta Light Rail (PLR). The TMAP provided a framework for the implementation of a range of measures designed to achieve a sustainable transport outcome for the Melrose Park structure plan.
	
	The assessment process included analysis focused around achieving the targets defined with the PCG of encouraging more people to use public transport (40%) and reduction of private vehicles (50%) over the next 20 years. Initiatives to increase public transport use have guided the planning process for the Melrose Park structure plan and are fundamental to the development of the precinct.
	
	The TMAP also includes an in-depth analysis of the projected traffic generation for the Melrose Park Precinct. Detailed Aimsun traffic modelling was conducted during the TMAP's development to assess the performance of the surrounding road network at full development (2036), including the need for road infrastructure improvements (intersection upgrades and road widening), public transport improvements and other traffic-related upgrades necessary to support the forecast growth. Details of the proposed staging and trigger points for major infrastructure and services include:
	
	▪ **Stage 1A: Delivered at approximately 1,100 total dwellings (2021)**
	  ▪ Widening of Wharf Road south of Victoria Road
	  ▪ Left in/left out access from Victoria Road to NSR-2 (i.e. at Kissing Point Road)
	▪ **Stage 1B: Delivered at approx. 1,800 total dwellings (2022)**
	  ▪ Upgrade of Victoria Road/Wharf Road intersection to provide:
	  ▪ Additional dedicated left turn lane on eastern Victoria Road approach
	  ▪ 4 lanes on Wharf Road approach - 1 left, 1 through, 2 right
	  ▪ Removal of slip lane on western Victoria Road approach and realignment of stopline to allow for more efficient 'diamond' signal phasing
	  ▪ Additional through lane on Marsden Road approach
	▪ **Stage 1C: Delivered at approx. 3,200 total dwellings (2024)**
	  ▪ Upgrade of the Victoria Road/Kissing Point Road intersection
	  ▪ Fully signalised intersection allowing all turning movements
	  ▪ New signalised pedestrian crossings on the northern, southern and western intersection legs

Document	Comment

Melrose Park Transport Management and Accessibility Plan	▪ **Throughout Stage 1**
	  ▪ Provide shuttle buses to service the public transport demand from Melrose Park to Meadowbank Station. Provision of this service will commence with one shuttle bus, with further shuttles to be brought into service in line with delivery of dwellings with a total of 4 buses providing an ultimate Stage 1 frequency of 12 shuttles per hour in the peak periods.
	  ▪ Staged improvements to frequency of M52 bus services on Victoria Road as to provide ultimate frequency of 18 per hour in peak direction. (Noting that Melrose Park demand accounts for 5 of the additional 12 hourly services)
	  ▪ Staged delivery of internal road network and associated pedestrian and cycling infrastructure to provide access to development
	▪ **Stage 2: Delivered at approximately 6,700 total dwellings (2028)**
	  ▪ New public transport and active transport bridge over the Parramatta River between Melrose Park and Wentworth Point. The bridge will be designed to cater for both bus and light rail vehicles.
	  ▪ Public transport services as described in section 6.4.6 of the TMAP, including maintaining Stage 1 M52 service improvements and also providing services over the new bridge either via Parramatta Light Rail Stage 2 or high frequency bus connections.
	  ▪ Staged delivery of internal road network and associated pedestrian and cycling infrastructure to provide access to development.
	Figure 4 provides an overview of the road infrastructure upgrades detailed in the TMAP.
	
	Figure 5: Victoria Road Upgrades Identified in TMAP
	Source: Melrose Park TMAP (Jacobs, 2019)

<table>
<tr><th>Document</th><th>Comment</th></tr>
<tr><td>Melrose Park Transport Management and Accessibility Plan</td><td>The key conclusions of the TMAP are:
Subject to the intersection upgrades detailed above, the additional traffic demands as a result of Melrose Park development on the surrounding local road network fall within acceptable capacity thresholds
A new active and public transport bridge across Parramatta River will provide substantial connectivity improvements between Melrose Park, Rhodes and Sydney Olympic Park before light rail is implemented
Parramatta Light Rail Stage 2 (PLR Stage 2) would provide a direct link to the Parramatta CBD, and connect to Sydney CBD via the broader rail and metro networks
The TMAP recommends a total off-street parking supply of 9,441. A total on-street parking supply of approximately 700 and 500 spaces is being proposed for the northern and southern precincts respectively. It is proposed to initially provide levels of parking in accordance with Parramatta DCP, and gradually decrease parking provision as the public transport initiatives are implemented
The TMAP has been endorsed by TfNSW and is required to be used as the supporting technical document within the precinct. Therefore, the assessment of traffic implications of MPHS specifically references the TMAP and align with the overarching objectives.</td></tr>
</table>

1.8.3 Melrose Park Precinct Development Plans

Redevelopment of the Northern Precinct is more advanced than the Southern Precinct, due to landowner arrangements. Approximately 85% of the land in the Northern Precinct, is owned by the developers Sekisui. The major landowner in the Southern Precinct is Holdmark, who own just under 50% of the land. The relevant development applications (DA) within the Melrose Park Precinct are summarised in Table 5.

Table 5: Melrose Park Precinct Relevant Development Plans

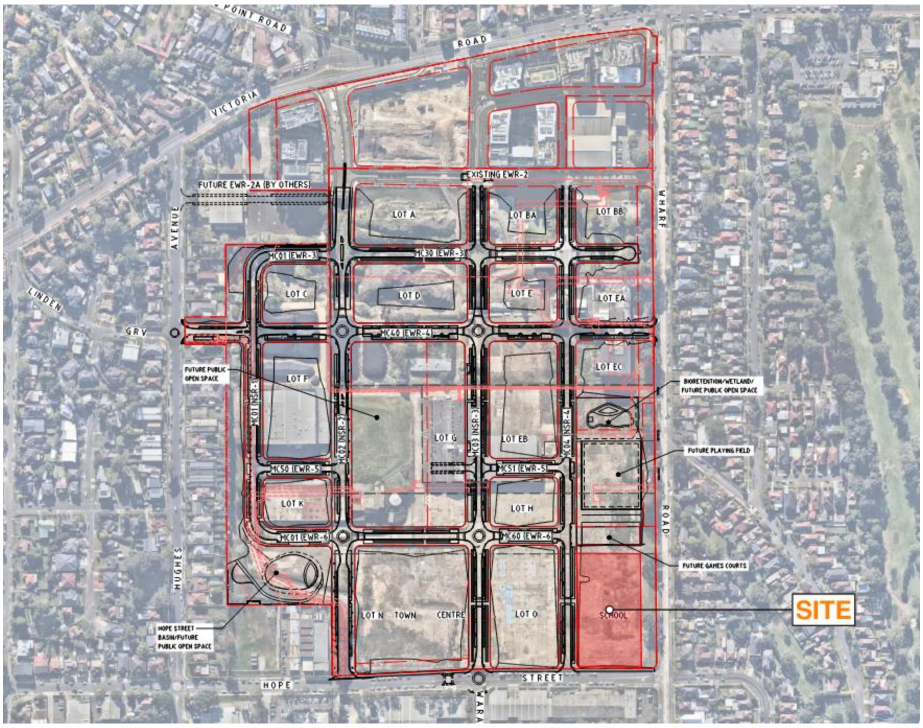
<table>
<tr><th>Document</th><th>Comment</th></tr>
<tr><td>Melrose Park North Internal Street Network (DA/1100/2021)</td><td>
Following Planning Proposal approval (PP-2020-1983) a DA for the Melrose Park North street network (DA 1100/2021), including roads, footways, street trees, landscaping, drainage, services and associated infrastructure was approved in December 2023, with construction works currently underway at the time of writing. The approved civil engineering general arrangement plan is shown in Figure 6.
Notably, the works include:
▪ New road (NSR-4) in the north-south direction to the west side of the proposed MPHS site boundary
▪ Raised zebra crossing on NSR-4
▪ 2 metre footpaths on both sides of NSR-4
▪ Upgrade of Hope Street / Waratah Street / NSR-3 intersection to a roundabout


Figure 6: Melrose Park Infrastructure Works
Source: DA Civil Engineering Package (Northrop, 2023)
Information provided by Sekisui the internal road network will be completed by early 2026.
</td></tr>
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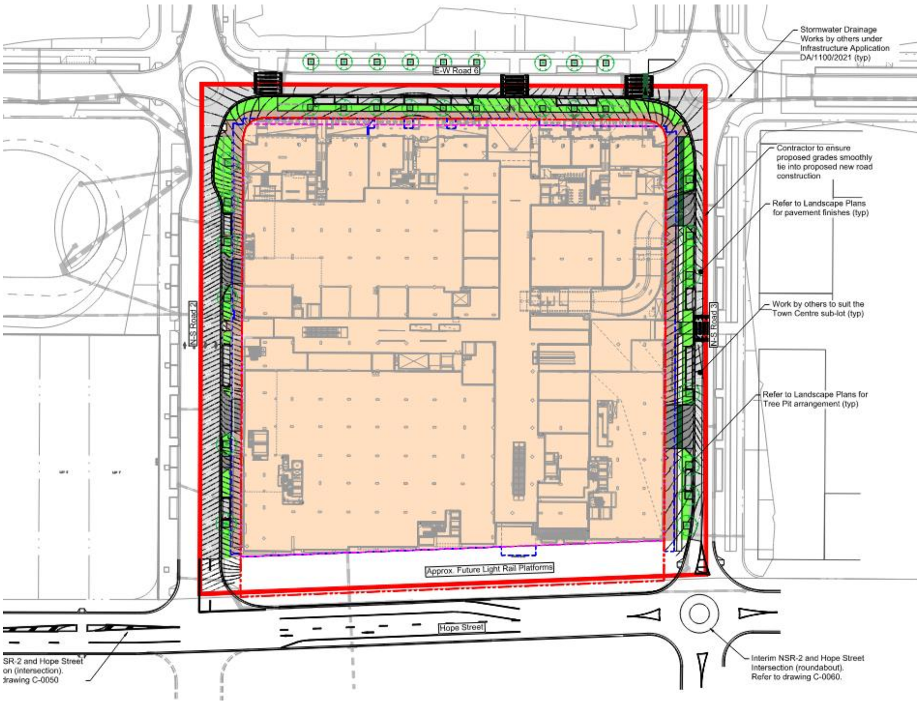
<table>
<tr><th>Document</th><th>Comment</th></tr>
<tr><td>Melrose Park Town Centre (DA/764/2022)</td><td>A separate DA was also approved for the Melrose Park Town Centre (DA/764/2022), including a 5-storey commercial podium and 6 x 6-24 storey shop-top housing towers (consisting also of retail, business, office, medical centre, childcare and an indoor recreation facility), 494 residential apartments, 1,412 car parking spaces and public domain works. This DA was approved in December 2023, with construction works currently underway at the time of writing. The approved civil engineering general arrangement plan is shown in Figure 7.


Figure 7: Melrose Park Town Centre
Source: DA Stamped Civil Plans (Mott Macdonald, 2023)</td></tr>
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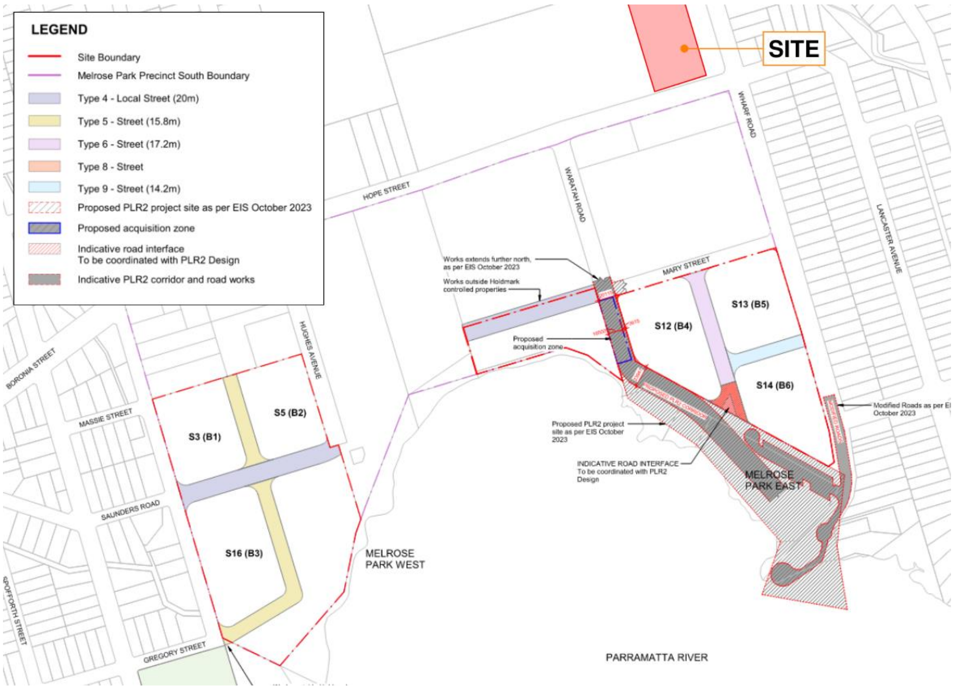
Document	Comment
Part Melrose Park South Street Network (DA/75/2024)	Following Planning Proposal approval (PP-2020-4038), this DA is for part of the Melrose Park South street network, including roads, footways, street trees, landscaping, drainage, services, and associated infrastructure. This DA was lodged in February 2024 and is currently under assessment by CoP. The concept civil engineering roadworks plan is shown in Figure 8.  **Figure 8: Melrose Park South (Holdmark Sites) Concept Drawing** *Source: DA Concept Plan (COX, 2023)*

Document	Comment
Wharf Road Gardens Linear Path (DA/459/2024)	A separate DA was also approved for the Melrose Park North playing field and the Wharf Road Gardens linear path (DA/459/2024). The DA includes construction of a park, recreation area, recreational improvements to the approved 'wetlands', playing field and ancillary amenities. This DA was approved in December 2024. The approved landscape architect plan is shown in Figure 9.  **Figure 9: Melrose Park North Playing Field and Wharf Road Gardens** *Source: DA Landscape Architectural Plans Package (Aspects Studios, 2024)*

1.9 Codes, Standards & References

The traffic and transport strategy for the activity has been prepared in the context of a variety of relevant codes, standards, and references listed below:

- Parramatta Development Control Plan 2023 (Parramatta DCP)
- Parramatta Local Environmental Plan 2023 (Parramatta LEP)
- Melrose Park Transport Management and Accessibility Plan Final Report Jacobs, 2019 (TMAP)
- Traffic Report for Melrose Park North Internal Street Network, Pentelic Advisory, 2022 DA 1100/2021 (Melrose Park North Internal Street Network, Traffic Report)
- Melrose Park Town Centre Transport Assessment JMT Consulting, 2023 DA 764/2022 (Town Centre, Traffic Report)
- Transport Assessment Holdmark Sites, Melrose Park South Planning Proposal, Ason Group, 2022 (Melrose Park South PP TA)
- Melrose Park South – Infrastructure DA Preliminary Construction Traffic Management Plan TTPP, 2023 (Melrose Park South Infrastructure CTMP)
- Parramatta Light Rail Stage 2 Environmental Impact Statement, Chapter 9, 2022 (PLR2 EIS)
- Technical Paper 2 Transport and Traffic, Parramatta Light Rail Stage 2 Environmental Impact Statement GHD, 2022 (PLR2 EIS, Transport and Traffic)
- Australian Standards, including:
    - AS2890 – Parking facilities
    - AS1742 – Manual of uniform traffic control devices
    - AS1428 – Design for access and mobility
- Austroads Guidelines, including:
    - Guide to Traffic Management
    - Guide to Road Design
    - Guide to Road Safety
- RTA Guide to Traffic Generating Developments (RMS Guide)
- NSW Planning Guidelines for Walking and Cycling
- Educational Facilities Standards and Guidelines (EFSG)
- Greenstar Building Guidelines, V1 Rev B 2021 (Greenstar Building Guidelines)

1.10 Consultation

This report has been prepared following consultation between the design team and relevant stakeholders, including CoP, City of Ryde Council (CoR) and TfNSW. Consultation events and outcomes are identified in Table 6.

Table 6: Consultation Summary

Date	Attendees	Discussions	Outcomes
13 Dec 2023	Transport Working Group (CoP & TfNSW)	▪ A teleconference meeting was held with representatives from CoP and TfNSW. ▪ The project's general transport strategy and strategic context was introduced. The meeting discussed key transport considerations for the project, and transport infrastructure upgrade opportunities.	▪ CoP highlighted the need to emphasise public transport and consider this in the traffic assessment, as many students will live outside walking distance in opening year. ▪ TfNSW encouraged the project to prioritise bike parking and opportunities for future expansion. ▪ Project to consider student safety during construction of Melrose Park North and PLR Stage 2
11 Sep 2024	Transport Working Group (CoP, CoR & TfNSW)	▪ A teleconference meeting was held with representatives from CoP and TfNSW ▪ The project team reported on updates and progress from the previous meeting. ▪ The project team was seeking feedback from the authorities regarding the proposed on- and off-site provisions.	▪ CoP discussed the potential for a roundabout upgrade at Hope Street / Wharf Road intersection, but CoR are considering restricting this to a left turn only. ▪ CoP highlighted the importance for safe crossing points along Victoria Road for students travelling from the north. ▪ TfNSW confirmed that PLR Stage 2 enabling works includes construction of the bridge over Parramatta River, which will run buses once constructed. Stage 2 main works is not yet funded, but NSR-3 / Hope Street / Waratah Street will be signalised as part of the main works (2028 – 2029) ▪ TfNSW raised no concerns about the proposed extension of bus route 513, but diverting bus route 523 will be difficult.

27 November 2024	Consultation with Council prior to REF submission	▪ A meeting was held for SINSW to present draft application documents for the new MPHS project. ▪ Following the meeting Council provided a formal letter dated 19/2024. The letter detailed a number of traffic and parking items, including: ▪ Provision of additional on-site bicycle spaces located close to the Wharf Road site access ▪ Upgrade of existing pedestrian refuge on Hope Street at the Hope Street / Wharf Road / Lancaster Avenue intersection to a combined raised pedestrian and cyclist crossing ▪ Implementation of new crossings at the intersection of Hope Street / Wharf Road / Lancaster Avenue are likely to create issues with road safety and traffic flow. Council have requested an interim roundabout be installed to improve pedestrian safety and traffic flow ▪ Request for new traffic count data at the Hope Street / Wharf Road / Lancaster Avenue intersection and completion of updated traffic modelling	▪ Additional bicycle parking spaces have been provided, however given on-site constraints these can not be located close to the Wharf Road site access. Further details are provided in Section 6. ▪ The existing Hope Street pedestrian refuge at the Hope Street / Wharf Road / Lancaster Avenue intersection will be retained. As part of TTW's student location analysis, findings showed proposing a raised crossing further west on Hope Street was more desirable for student and staff accessing the MPPS car park and bus services on the southern side of Hope Street. Further details and analysis are provided in Section 5.2 ▪ Based on TTW's traffic impact assessment included in Section 11 the requirement for Hope Street / Wharf Road / Lancaster Avenue to be upgraded to a roundabout is not warranted. This intersection will continue to operate at a satisfactory LOS with minimal delay during both the morning and afternoon peak periods. ▪ New traffic counts would not provide accurate background traffic volumes given Melrose Park Precinct is currently in construction. New traffic counts would capture construction vehicle traffic and some but not all of the Melrose Park Precinct data. This would result in a number of assumptions to try and reflect background conditions. ▪ The TMAP's objective was to provide a consolidated detailed traffic and transport study which has been endorsed by TfNSW. It is required to be used as a supporting technical document for all Planning Proposals within the precinct. Council has also approved traffic modelling for the Melrose Park North Precinct. Therefore, utilising the approved

Date	Attendees	Discussions	Outcomes
			2036 background traffic volumes in the Melrose Park North Precinct traffic report. Is the most appropriate methodology. Further details are provided in Section 11.
11 December 2024	Transport Working Group (CoP & TfNSW)	▪ A teleconference meeting was held with representatives from CoP and TfNSW ▪ The project team provided a recap on the previous TWG and previous transport discussion ▪ The project team was seeking feedback on the updated public domain upgrades and traffic strategy ▪ CoP provided comments that the approved Melrose Park North Precinct traffic report underestimated the existing traffic volume and requested updated traffic counts were completed.	▪ TfNSW and CoP raised no concern on the consolidated bus stop along the southern side of Hope Street and the relocation of the raised crossing along Hope Street. ▪ The meeting ran out of time and it was agreed a detailed assessment of traffic impacts would be included within this TAIA report. ▪ As per above, TTW argues new traffic counts would not provide accurate background traffic volumes given Melrose Park Precinct is currently in construction. No new traffic counts have been completed and reliance of the approved 2036 background traffic volumes in the Melrose Park North Precinct traffic report have been adopted.

Section 2 Existing Conditions

2.1 Site Overview

The site is located at 37 Hope Street, Melrose Park within the Parramatta LGA. The school covers an approximate area of 9,500m^2 and is generally rectangular in shape. The site is currently cleared and vacant. The site is located approximately 8km east of the Parramatta CBD.

The site is bordered by Wharf Road along the eastern boundary and Hope Street along the southern boundary. The northern and western boundaries are currently bordered by undeveloped land. Melrose Park Public School (MPPS) is an existing primary school, located at 110 Wharf Road, to the south of the proposed MPHS site.

An aerial view of the site and the surrounding road network is shown in Figure 10.

Figure 10: Site Location
Source: Modified from Nearmap

2.2 Road Hierarchy

2.2.1 Existing Road Network

The key roads in the local network are described in Table 7 and Figure 11.

Table 7: Existing Road Network

Road name	Classification	Speed Limit	Road Geometry	Parking Restrictions
Victoria Road	State Road	70km/hr	▪ Three lanes in each direction ▪ 18m divided carriageway	No parking
Wharf Road	Local Road	50km/hr School Zone 40km/hr 8-9:30am 2:30-4pm School Days	▪ One lane in each direction ▪ Kerbside parking on both sides ▪ 12.3m undivided carriageway	Unrestricted parking & western kerbside of Wharf Road at MPPS 'No Parking' 8-9:30am 2:30-4pm School days
Hope Street	Local Road	50km/hr School Zone 40km/hr 8-9:30am 2:30-4pm School Days	▪ One lane in each direction ▪ Kerbside parking on both sides ▪ 12.5m undivided carriageway	Unrestricted parking
Lancaster Avenue	Local Road	50km/hr	▪ One lane in each direction ▪ Kerbside parking on both sides ▪ 9m undivided carriageway	Unrestricted parking
Waratah Street	Local Road	50km/hr School Zone 40km/hr 8-9:30am 2:30-4pm School Days	▪ One lane in each direction ▪ Kerbside parking on both sides ▪ 11m undivided carriageway	Unrestricted parking & eastern kerbside at MPPS 'P15 8-9:30am 2:30-4pm' School days
Mary Street	Local Road	School Zone 40km/hr 8-9:30am 2:30-4pm School Days	▪ One lane in each direction ▪ Kerbside parking on both sides ▪ 10m undivided carriageway	Unrestricted parking & northern kerbside at MPPS 'P15 8-9:30am 2:30-4pm' School days

Table 7 provides a general summary of the state and local road network, including parking restrictions on each of the above roads, further details of on-street parking restrictions are provided in Figure 25.

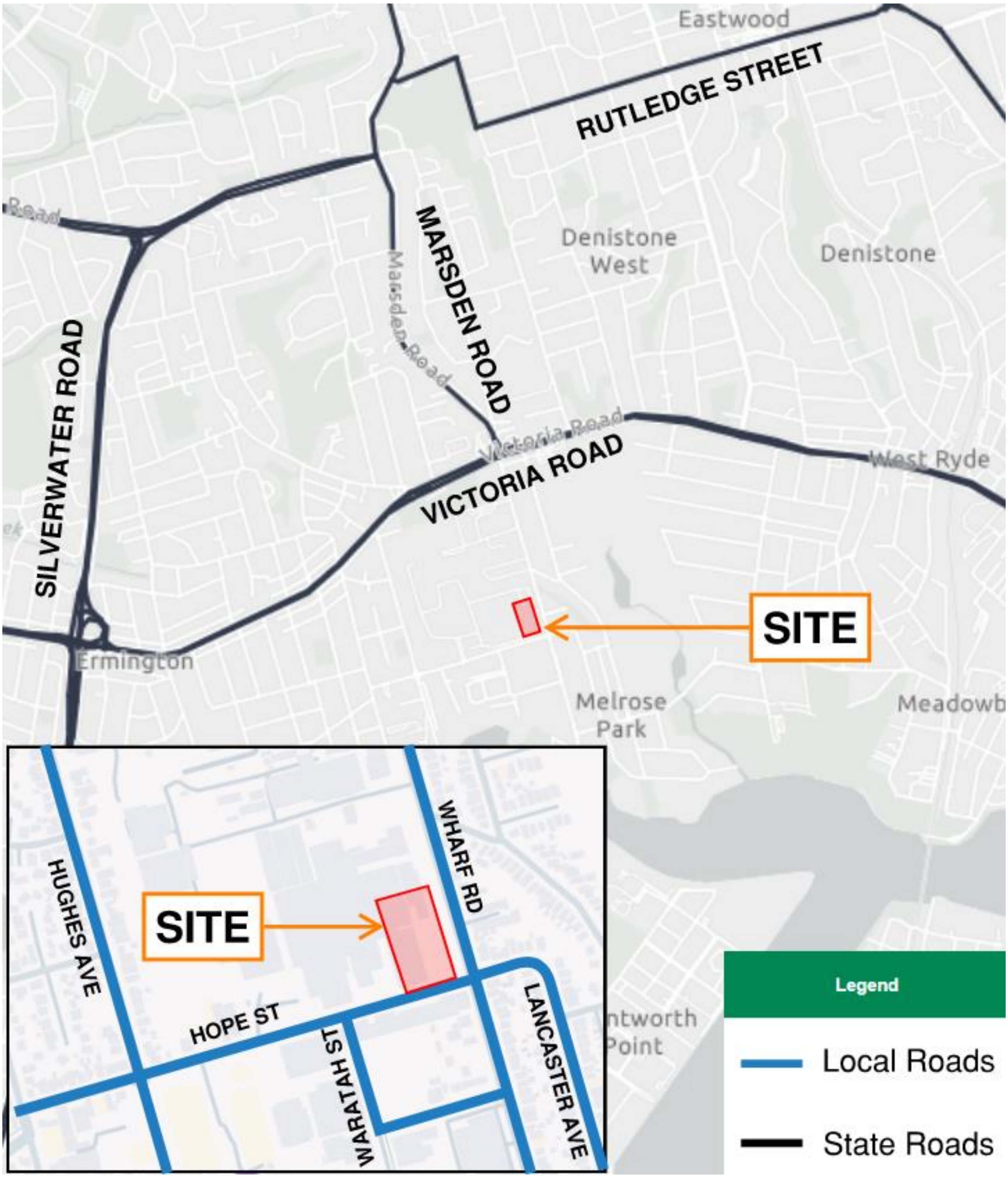


Figure 11: Existing Road Classification

Source: Modified from NSW Road Network Classification

2.2.2 Future Road Network

As previously mentioned, the road network for Melrose Park North is currently under construction (at the time of writing). These roads will be completed as part of the Voluntary Planning Agreement (VPA) once the subdivisions have been created. This includes NSR-4 to the west of the site, which is scheduled for construction in early 2025 and will be completed prior to the opening of MPHS, as agreed between SINSW and the developer. The details of the future road network in Melrose Park North has been extracted from the Melrose Park North Internal Street Network, Traffic Report (DA 1100/2021) and Melrose Park Street Type Cross Sections from Parramatta DCP Part 8. Details are summarised in Table 8 and Figure 12.

Table 8: Future Road Network

Road Name	Classification	Road Geometry
NSR-1	Local Street	▪ One travel lane in each direction ▪ Indented on-street parking bays on both sides ▪ 11.6m undivided carriageway ▪ 2.0m footpath on both sides
NSR-2	Major Road	▪ Two travel lanes in each direction ▪ Indented on-street parking bays both sides ▪ 3.5m wide footpaths on both sides ▪ 12.8m undivided carriageway
NSR-3	Main Road	▪ One travel lane in each direction ▪ Indented on-street parking bays on both sides ▪ 11.0m undivided carriageway ▪ One separated cycle lane in each direction ▪ 1.8m-2m footpath on both sides
NSR-4 (adjacent to MPHS)	Local Street	▪ One travel lane in each direction ▪ Indented on-street parking bays on both sides ▪ 11.6m undivided carriageway ▪ 2.0m footpaths on both sides
EWR-3	Local Street	▪ One travel lane in each direction ▪ Indented on-street parking bays on both sides ▪ 11.6m undivided carriageway ▪ 2.0m footpath on both sides
EWR-4	Connector Road	▪ One travel lane in each direction ▪ Indented on-street parking bays on both sides ▪ 11 m undivided carriageway ▪ 3.0m footpath on the north side, 2m footpath on the south
EWR-5	Local Street	▪ One travel lane in each direction ▪ Indented on-street parking bays on both sides ▪ 11.6m undivided carriageway ▪ 2.0m footpath on both sides
EWR-6	Local Street	▪ One travel lane in each direction ▪ Indented on-street parking bays on both sides ▪ 11.6m undivided carriageway ▪ 2.0m footpath on both sides

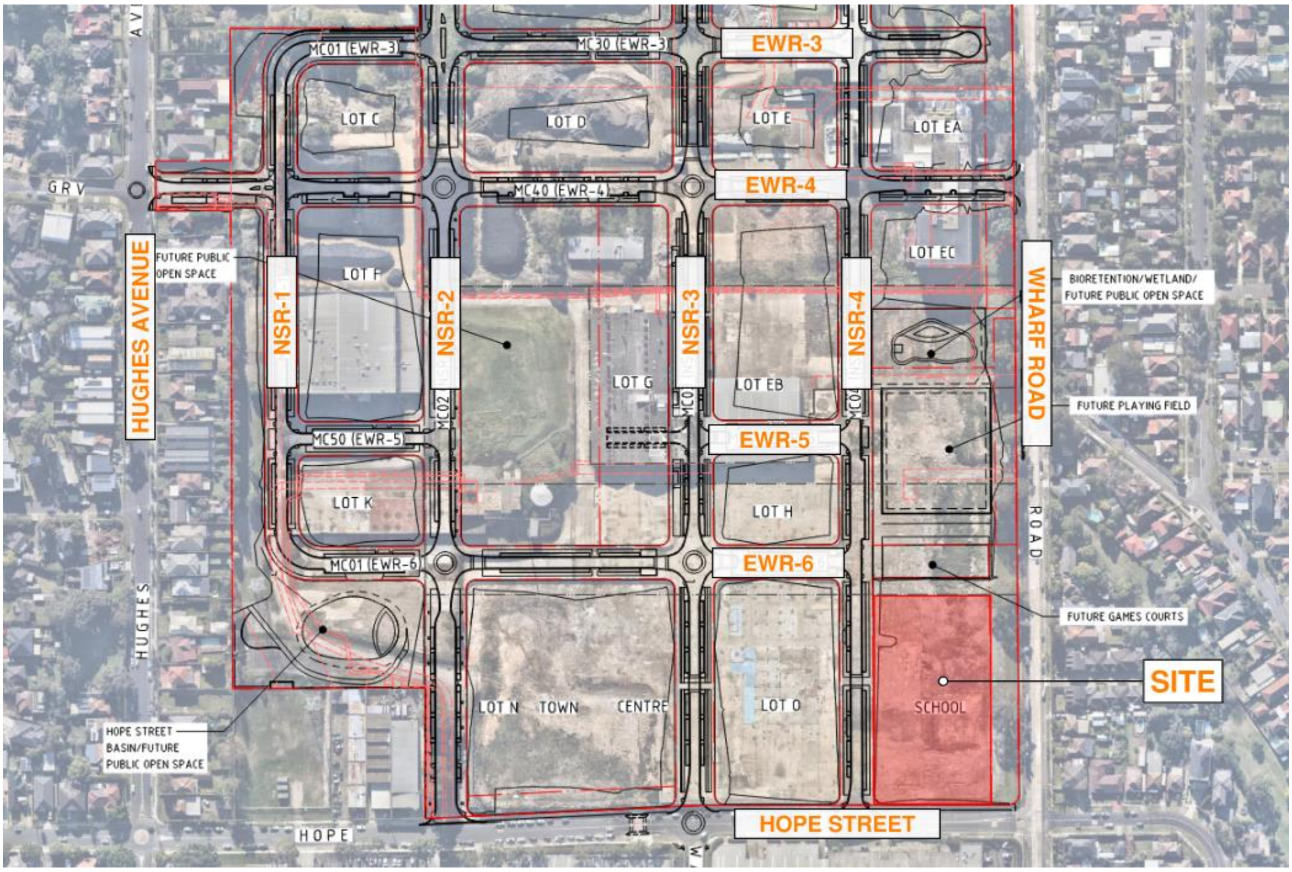


Figure 12: Melrose Park North Road Network

Source: Modified from DA Civil Engineering Package (Northrop, 2023)

2.3 Active Transport

2.3.1 Existing Active Transport Infrastructure

As shown in Figure 13 the existing pedestrian infrastructure within a 400-metre radius of the site (approximately a 5-minute walk) is generally well-developed along the existing road network. Footpaths are provided along all roads, with widths varying between 1.5 and 2 metres, offering ample space for pedestrian movement. There are also existing zebra crossings and refuge islands in the vicinity of the proposed site.

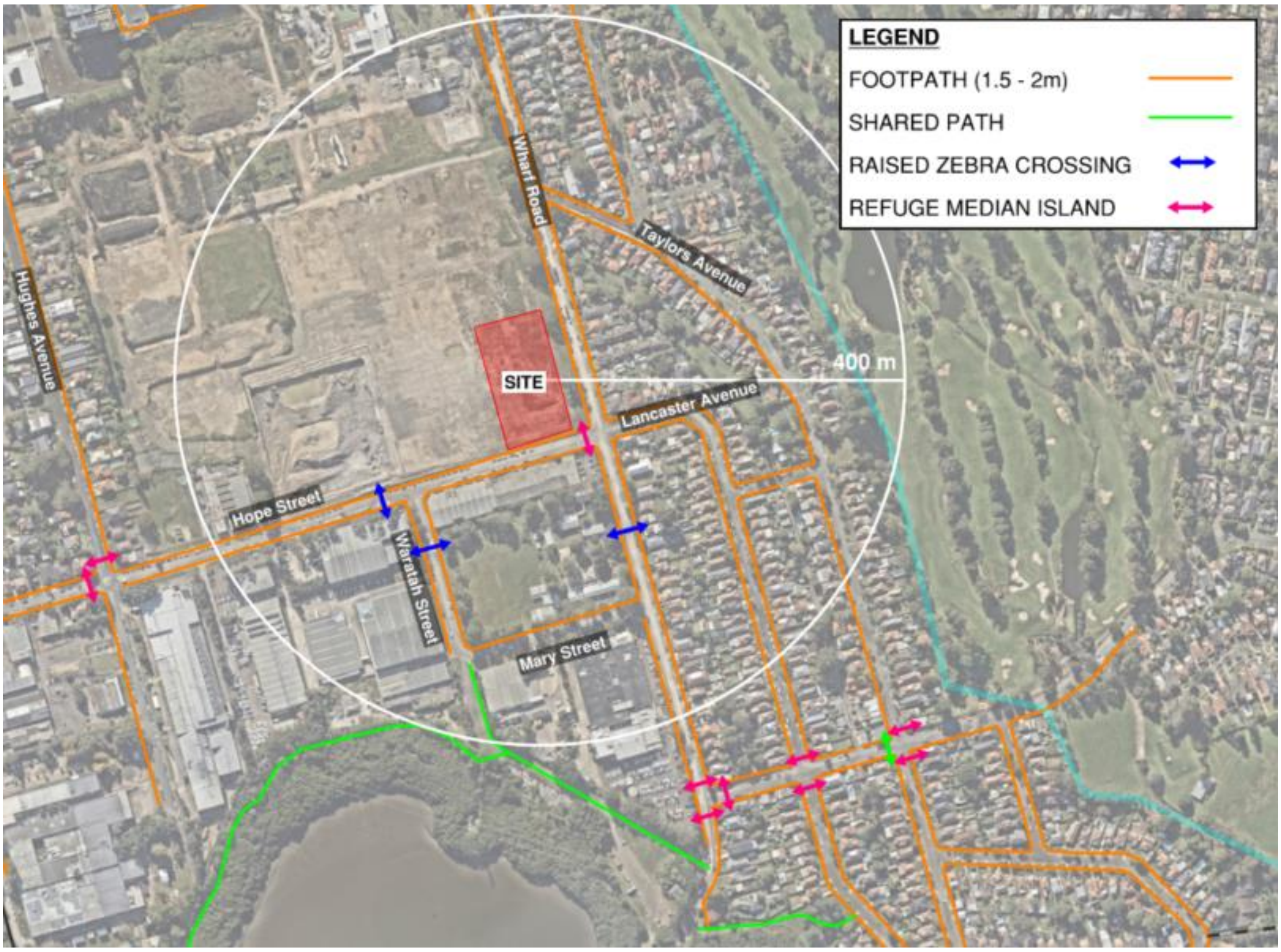


Figure 13: Existing Active Transport Infrastructure
Source: Modified from Nearmap

2.3.2 Future Active Transport Infrastructure

Melrose Park North

As previously mentioned, the Melrose Park Precinct is currently undergoing development. As a result, the new roads will further expand the pedestrian network and improve connectivity within the area. Figure 14 illustrates the future pedestrian infrastructure in the local area, as a result of the Melrose Park North development.

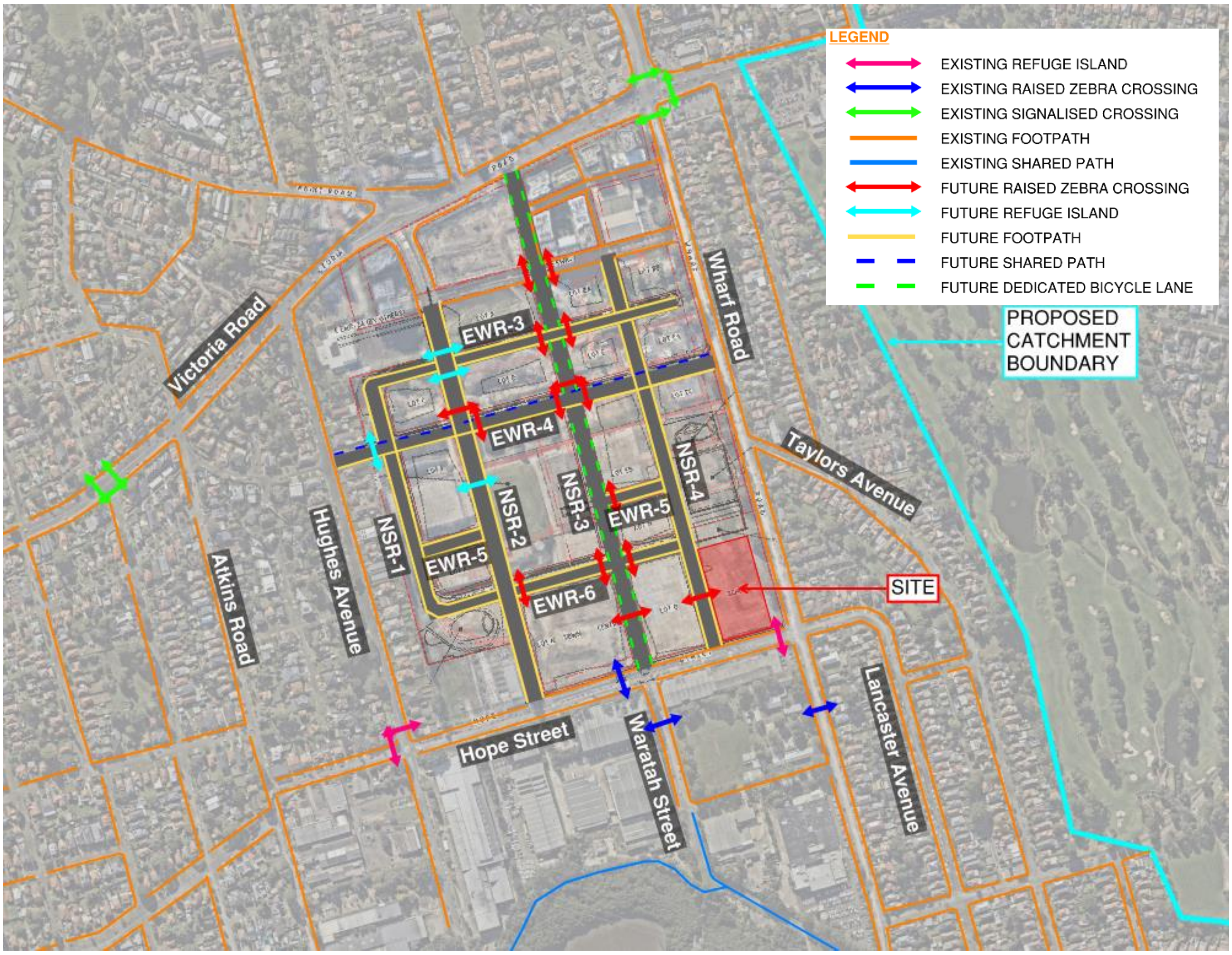


Figure 14: Confirmed Active Transport Infrastructure

Source: Modified from Nearmap

As shown in Figure 14, within the vicinity of the site the future network includes:

- Footpaths on both sides of NSR-4 to the west of the site
- Raised pedestrian crossing on NSR-4 to the west of the site
- Separated cycle lanes on NSR-3
- Shared paths on EWR-4

Other future active transport works in the area include part of the Melrose Park South, road and footpath network, however these are yet to be approved and are currently under assessment by CoP (at the time of writing). Refer to Section 1.8.3 for further detail.

Parramatta Bike Plan

The Parramatta Bike Plan detailed below in Figure 15 outlines proposed cycling infrastructure near the site, linking it to the primary cycle networks within the precinct.

Figure 15: Proposed Parramatta Cycling Network
Source: Draft Parramatta Bike Plan 2023

As shown in Figure 15, there are a number of proposed cycle paths within the vicinity of the site. This includes a planned Shared Path known as Wharf Road Linear Park, along Wharf Road to the east of the site. The detailed DA has been approved by CoP (DA/459/2024) and it is anticipated Wharf Road Linear Park will be completed prior to opening year of MPHS. The location of Wharf Road Linear Park is shown in Figure 16.

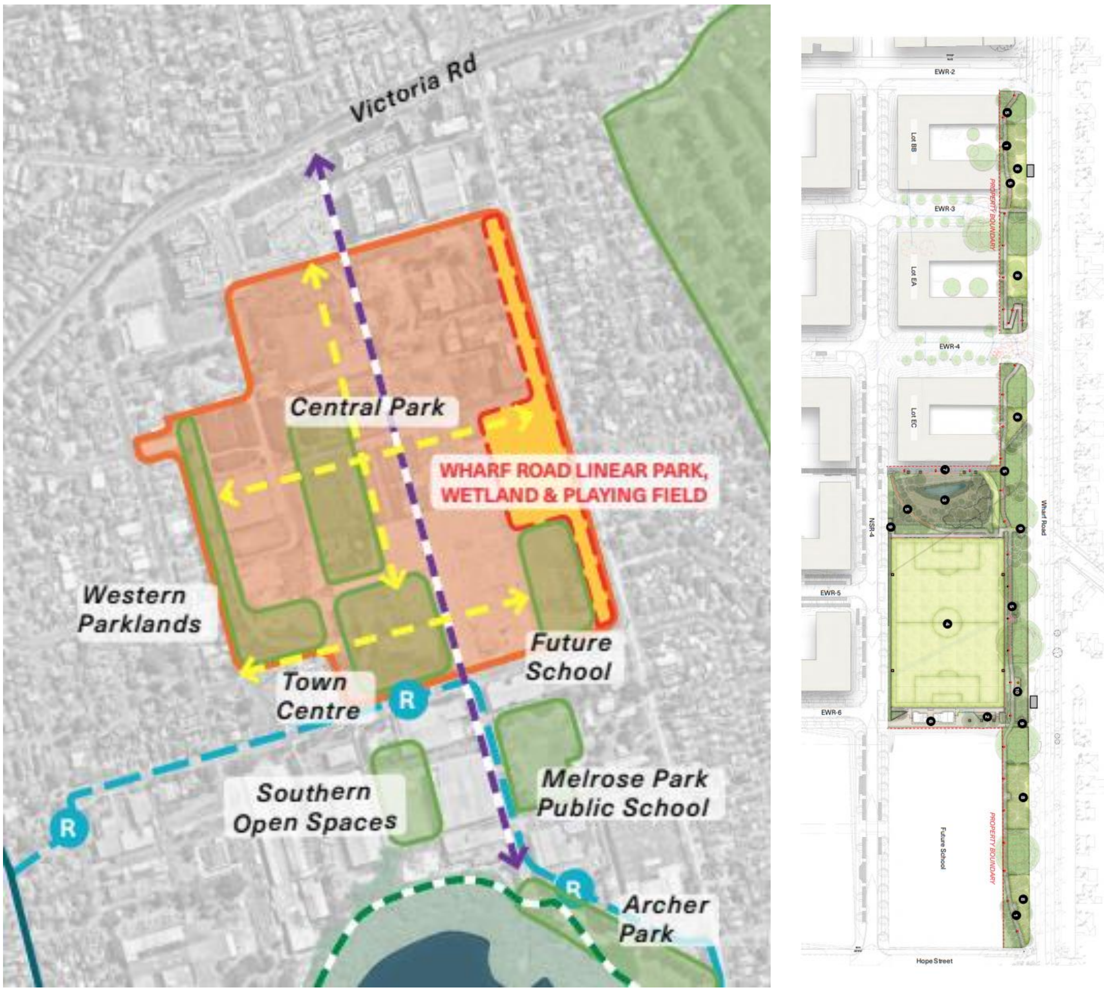


Figure 16: Wharf Road Linear Park, Wetlands, & Playing Field

Source: Landscape DA Package (Aspects Studios, 2024)

The Wharf Linear Park provides an entry point to MPHS in the northern corner of the site adjacent to the playing fields. It is assumed students cycling to the site via Wharf Road will utilise this access. At the time of the writing, the Wharf Linear Park DA application has been approved, and the construction is expected to begin early 2025.

Parramatta Light Rail

As identified in the Parramatta Bike Plan, a separated cycleway along Boronia Street, Hope Street and Waratah Street is proposed. This route is the proposed corridor for the PLR Stage 2, and it is understood the implementation of this separated cycleway will be part of the PLR Stage 2 project. Figure 17, details the proposed light rail corridor which includes active transport links along these roads in close proximity to the proposed MPHS site. Further details in relation to the proposed PLR Stage 2 are provided in Section 2.4.5.

Figure 17: PLR Stage 2 Indicative Active Transport Links
Source: Parramatta Light Rail Stage 2 EIS (TfNSW)

2.4 Public Transport

2.4.1 Existing Bus Services

The nearest bus stops are currently located directly south of the site on Hope Street and on the eastern side of Wharf Road. There are also a number of bus stops to the north of the site along Victoria Road approximately 750 metres from the MPHS site. Table 9 provides a summary of the existing bus routes and their frequencies from these stops, while Figure 18 shows the locations of the nearest bus stops and corresponding bus routes around the site.

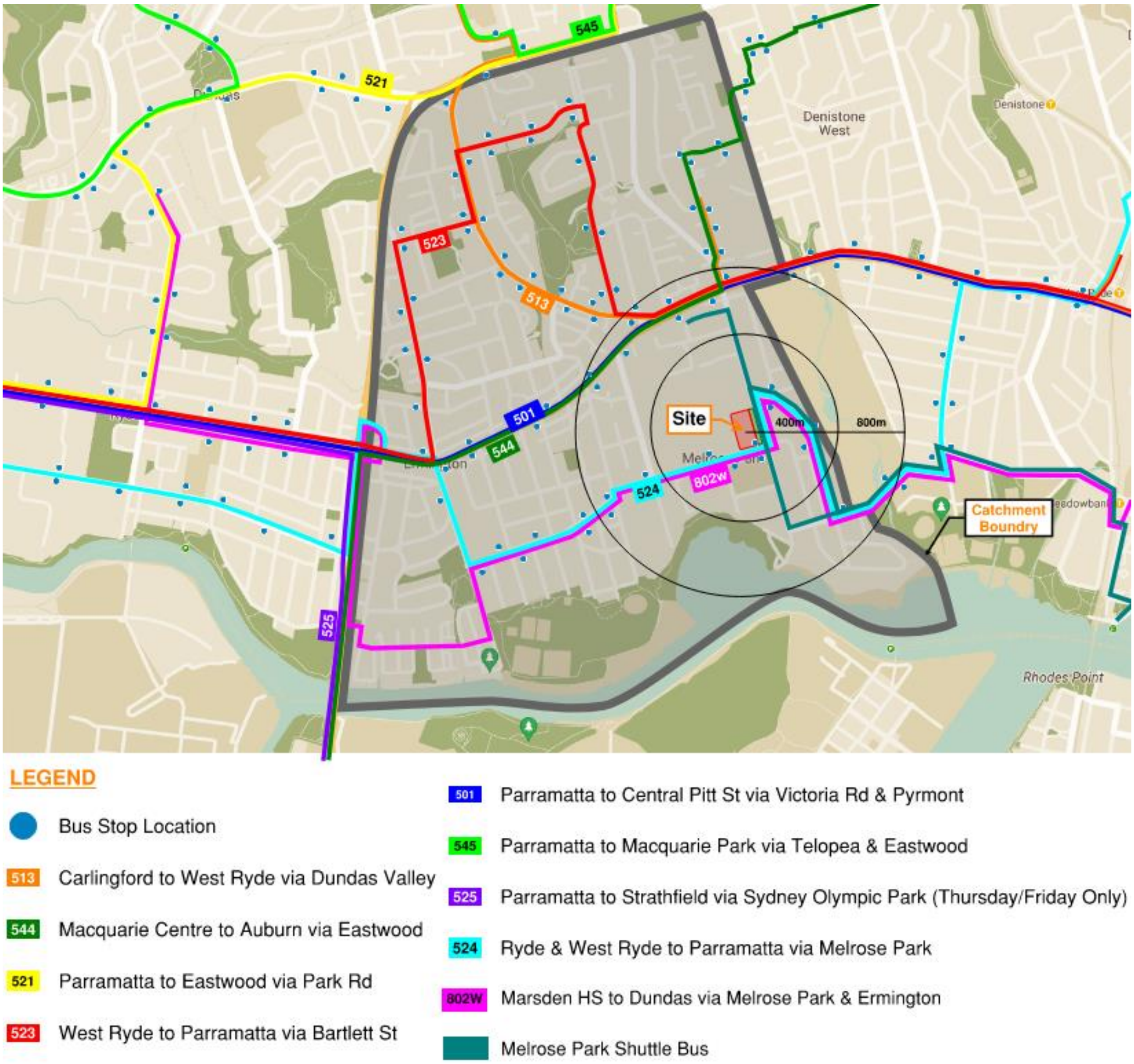


Figure 18: Existing Bus Service Network

Source: Modified from Google Maps

Table 9: Existing Public Bus Services

Bus Number	Bus Service	Frequency
501	Parramatta to Central Pitt St via Victoria Rd & Pyrmont	**Peak**: Every 15 mins **Off pea**k: Every 15 mins
513	Carlingford to West Ryde via Dundas Valley	**Peak**: Every 60 mins **Off pea**k: Every 60 mins
521	Parramatta to Eastwood via Park Rd	**Peak**: Every 60 mins **Off peak**: Every 60 mins
523	West Ryde to Parramatta via Bartlett St	**Peak**: Every 60 mins **Off peak**: Every 60 mins
524	Ryde & West Ryde to Parramatta via Melrose Park	**Peak**: Every 30 mins **Off peak**: Every 60 mins
525	Parramatta to Strathfield via Sydney Olympic Park (Thursday/Friday Only)	**Peak**: Every 30 mins **Off peak**: Every 30 mins
544	Macquarie Centre to Auburn via Eastwood	**Peak**: Every 30 mins **Off peak**: Every 60 mins
545	Parramatta to Macquarie Park via Telopea & Eastwood	**Peak**: Every 15 mins **Off peak**: Every 15 mins
802W (School Service)	Dundas to Marsden HS via Ermington and Melrose Park	1 morning service & 1 afternoon service

In addition to the above public bus services, a private shuttle bus service provided by Sekisui is currently in operation between the Melrose Park North site connecting to Meadowbank Railway Station and Meadowbank Ferry Wharf between 6:00am to 10:00am and 3:00pm to 7:00pm (weekdays only). This free bus shuttle stops at nine convenient points along the above route and is currently patronised by Melrose Park North employees and residents wishing to connect with either train or ferry services.

Initiating in 2019 it is noted the service has gathered considerable patronage over its past 5 years, averaging 300 passengers per week. Table 10 details the bus stop locations along the route.

Table 10: Existing Shuttle Bus Services

Bus Service	Bus Service	Frequency
Melrose Park – Meadowbank Wharf via Meadowbank Station	Wykoff Lane, Taylor Avenue, Meadowbank Station, Meadowbank Wharf	**Peak**: Every 30 mins **Off pea**k: No Services

As shown above in Table 10, the private shuttle bus service currently operates every 30 minutes during peak periods. As detailed in the TMAP as the Melrose Park Precinct expands this shuttle service will run more frequently providing a total of 12 shuttle services during the morning and evening peak periods.

2.4.2 Future Bus Services

As outlined in the TMAP, there will be significant demand for higher frequency 'local' services further to the broader redevelopment of Melrose Park, and particularly for services linking to local rail stations and sub-regional centres. No detail public bus service updates have been provided at this stage, however TfNSW bus service team have noted planning is underway for higher frequency local services as the population of Melrose Park increases.

As part of the activity to improve the public transport mode to MPHS, one of the bus services (513 service) is also proposed to be rerouted to provide additional reach for students living in the western portion of the catchment. TfNSW are in support of this amendment, however note no changes will be made to the existing service until MPHS has been approved. Further details are provided in Section 7 and Appendix A.

2.4.3 Future Parramatta River Active Transport Bridge – PLR Stage 2 Enabling Works

Further to sections above, the most significant piece of major infrastructure identified in the TMAP as being essential to the transport network to accommodate the development of Melrose Park is an active and public transport bridge over the Parramatta River to Wentworth Point. The TMAP determined that the Melrose Bridge will be required by 2028, by which time some 6,700 dwellings would be occupied within Melrose Park based on projections available at the time of the TMAP modelling.

Construction for the Melrose Bridge is anticipated to begin in 2025 and will provide the essential active and public transport connection to the broader Sydney Metropolitan transport network, including:

- A direct link to the Sydney Metro West station at Sydney Olympic Park;
- New bus services between Top Ryde and Concord Hospital via Melrose Park;
- New public and active transport connections to the future Rhodes East Ferry Wharf (see Section 4.5);
- Direct access to the emerging Sydney Olympic Park and Rhodes regional centres; and
- Provisions for the introduction of PLR Stage 2 in the future.

Perhaps the most significant finding of the TMAP is that the Melrose Bridge and moreover the active and public transport opportunities it creates will reduce the private vehicle trip generation of Melrose Park to such a level that it can (further of course to other road network upgrades and transport strategies) appropriately accommodate the future trip demands of Melrose Park; critically, this is the case regardless of whether PLR Stage 2 is constructed.

It is anticipated these services will provide frequent and reliable levels of public transport particularly for staff travelling to the MPHS site and will therefore be relied upon.

2.4.4 Existing Railway Services

As illustrated in Figure 19, the closest railway station to the proposed MPHS site is, Meadowbank Train Station, which is 1.75 kilometres to the east, West Ryde Train Station is also 1.8 kilometres to the northeast. Given this distance and the catchment boundary does not extend to this area it is anticipated that students will have limited reliance on train services. However, with the implementation of the Melrose Park Shuttle bus, travelling between Meadowbank train station these services can be utilised by staff as part of a multi-modal journey to the site. Meadowbank and West Ryde stations are serviced by a single train line, the T9 Northern Line. Table 11 shows the frequency of services along the T9 line during the peak and off-peak periods.

Table 11: Train Services

Train line	Train line service	Frequency
T9	Northern Line	**Peak**: 7 mins **Off peak**: 15 mins

Figure 20 illustrates Sydney Trains and Metro network map with the nearest stations highlighted.

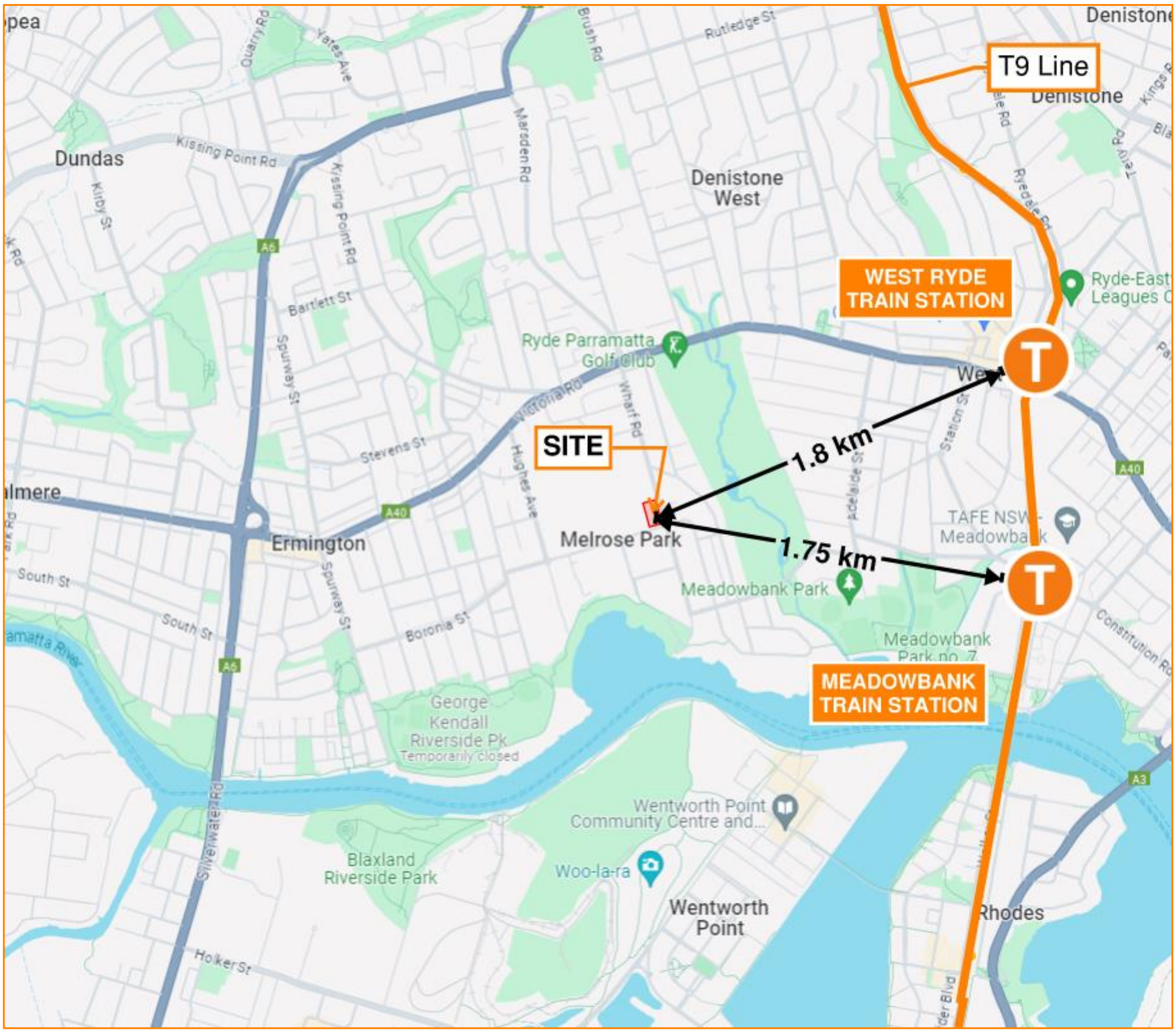


Figure 19: Local Train Stations
Source: Modified from Google Maps

Figure 20: Sydney Trains Network Map

Source: Modified from Sydney Trains Map

2.4.5 Future Parramatta Light Rail – Stage 2 PLR

There is currently no light rail servicing Melrose Park, however the proposed PLR Stage 2 main works is anticipated to begin construction in 2028-2029, (at the time of writing) the project is still not funded.

PLR Stage 2 will extend the light rail from Parramatta CBD to Ermington, Melrose Park, Wentworth Point, and Sydney Olympic Park as shown in Figure 21. It also includes a light rail stop along Hope Street located approximately 300 metres to the west of the site, as well as a stop on Waratah Street located approximately 550 metres south of the site. With this in mind, it is anticipated these services will be heavily utilised by staff.

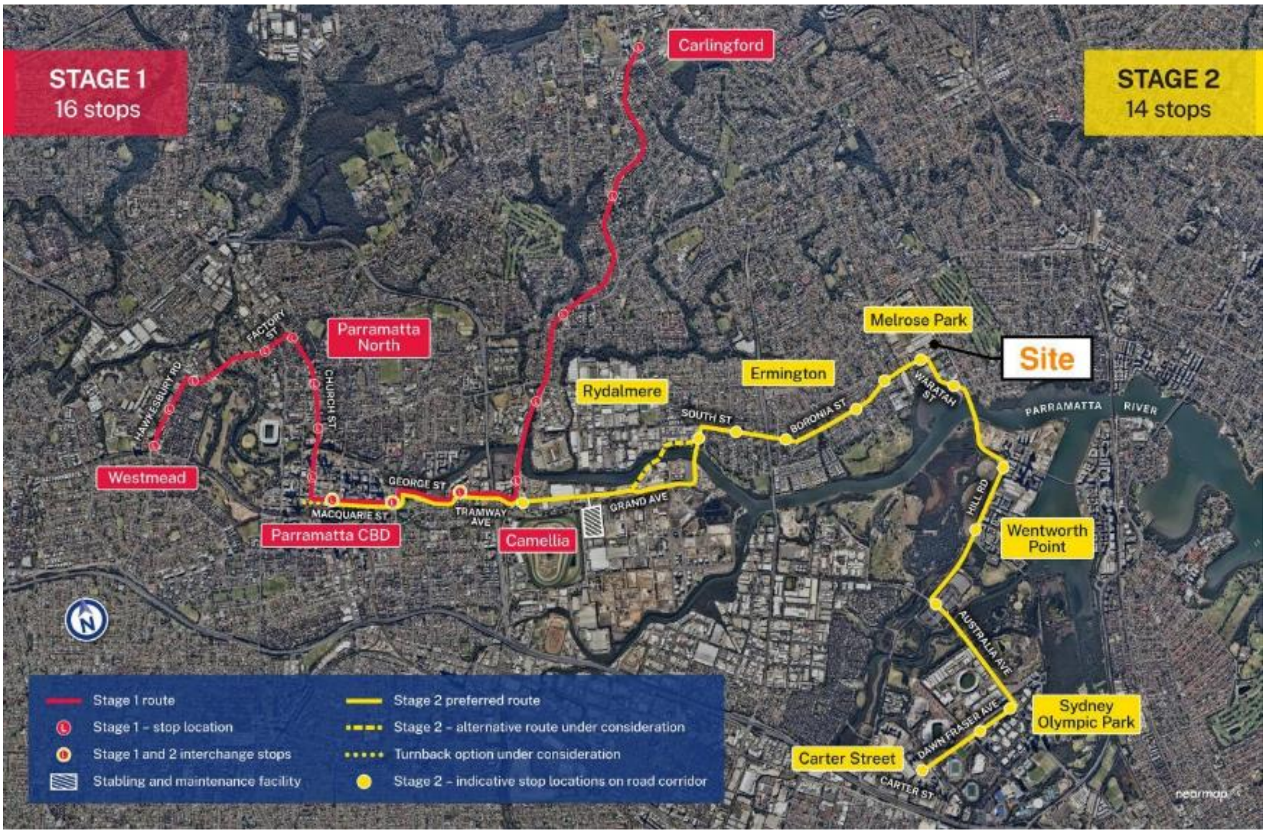


Figure 21: Proposed Parramatta Light Rail Stage 2 Route

Source: Modified from TfNSW – Parramatta Light Rail Stage 2 – Chapter 2 Location and Setting

The PLR Stage 2 project offers an excellent public transport opportunity for Melrose Park by:

- Better integrating Parramatta CBD with Rydalmere, Melrose Park, Wentworth Point and Sydney Olympic Park
- Providing an attractive and accessible service and the potential to reduce the need for car trips and car-parking use at Melrose Park
- Facilitating the development of higher density housing through better urban design and urban form at future light rail stops on Hope Street and Wharf Road

Road Network Changes

As part of the PLR Stage 2 main works there are a range of localised network connectivity impacts that may result due to the light rail corridor crossing existing traffic routes. These include intersection upgrade works, permanent road closures, restriction of right turns across the light rail corridor, and left-in/left-out only on minor roads. As shown in Figure 22, the relevant changes proposed near to the MPHS site include:

- Signalised intersection at Hope Street / Waratah Street (including no right turn restrictions)
- Signalised intersection at Waratah Street / Mary Street (including no right turn restrictions)

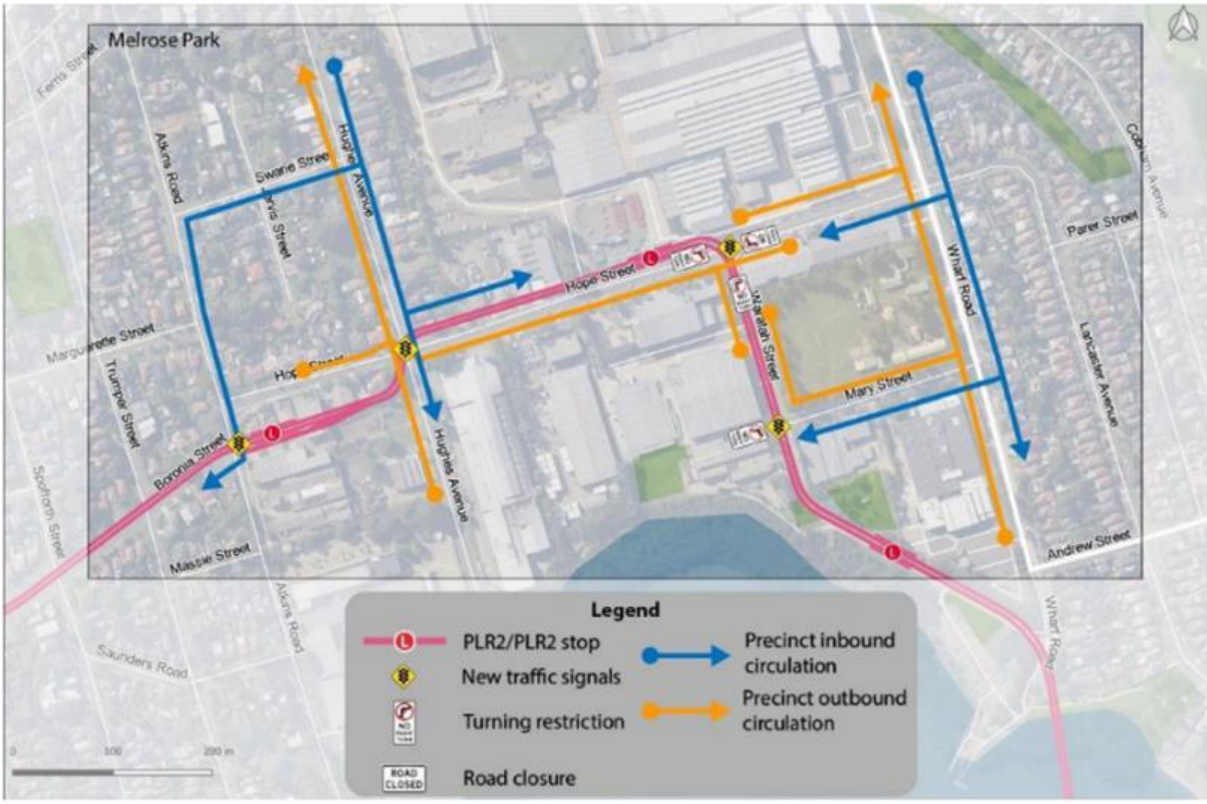


Figure 6.8 Changes to traffic circulation – Melrose Park

Figure 22: PLR Stage 2 Local Road Network Changes

Source: PLR2 EIS, Transport and Traffic

2.4.6 Existing Ferry Services

As shown in Figure 23, the closest ferry wharf to the proposed MPHS site is, Meadowbank Ferry Wharf, which is 1.85 kilometres to the southeast. Given this distance and the catchment boundary does not extend to this area it is anticipated that students will have limited reliance on ferry services. However, with the implementation of the Melrose Park Shuttle bus, travelling between Meadowbank Ferry Wharf and Melrose Park Precinct this ferry service can be utilised by staff as part of a multi-modal journey to the site. Meadowbank ferry wharf is serviced by a single ferry service, being the F3 Parramatta River service. Table 12 shows the frequency of this service during the peak and off-peak periods.

Table 12: Ferry Services

Ferry Service	Ferry Service	Frequency
F3	Parramatta River	**Peak**: 30-60 mins **Off peak**: 60 mins

Figure 23: Local Ferry Wharfs

Source: Modified from Google Maps

At present, ferry services operating along the Parramatta River between Parramatta and to/from Sydney Olympic Park Wharf (on the other side of the Parramatta River from Melrose Park) and Meadowbank Wharf offer travel times to the Sydney CBD and emerging centres such as Darling Harbour and Barangaroo similar to those provided by bus/rail connections.

Figure 24 illustrates Sydney Ferry Services network map with the nearest wharfs highlighted.

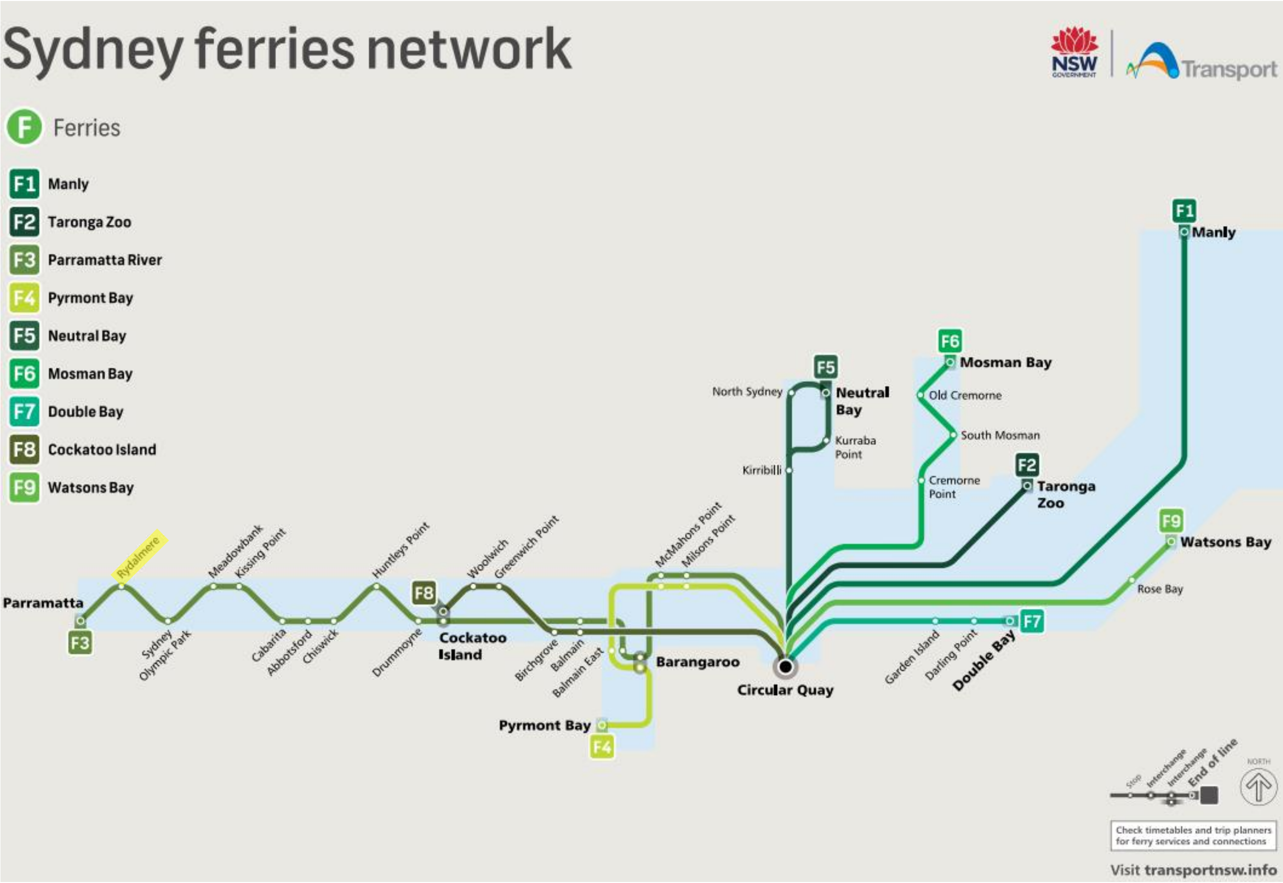


Figure 24: Sydney Ferrys Network Map

Source: Modified from Sydney Ferry Map

2.4.7 Future Ferry Services

Sydney's Ferry Future reports increase in ferry patronage over the past 10 years, with key demand for trips to/from the Sydney CBD, as well as forecast population growth in areas services by the Parramatta River wharves, and particularly those at Sydney Olympic Park, Meadowbank and Cabarita. Notwithstanding, there remains spare capacity over most of the ferry network to accommodate additional growth.

In addition, it is understood TfNSW is investigating the provision of a new wharf at Rhodes East, likely between the John Whitton Rail Bridge and Ryde Bridge, with a decision on the final location to be based on operational and navigational parameters. It is acknowledged that no decision has been made (at the time of writing) on the location or delivery timeframe of the new wharf.

While a future ferry wharf at Melrose Park has previously been examined, the TMAP determined that a new wharf was not an essential component of the Melrose Park transport network, but that the broader suite of proposed public and active transport services and infrastructure can accommodate the future trip demands without ferry services.

2.5 Car Parking

2.5.1 On-Street Parking

Figure 25 shows the existing on-street parking restrictions in the surrounding streets within a 500 metre radius of the proposed site. Generally, within the vicinity of the site

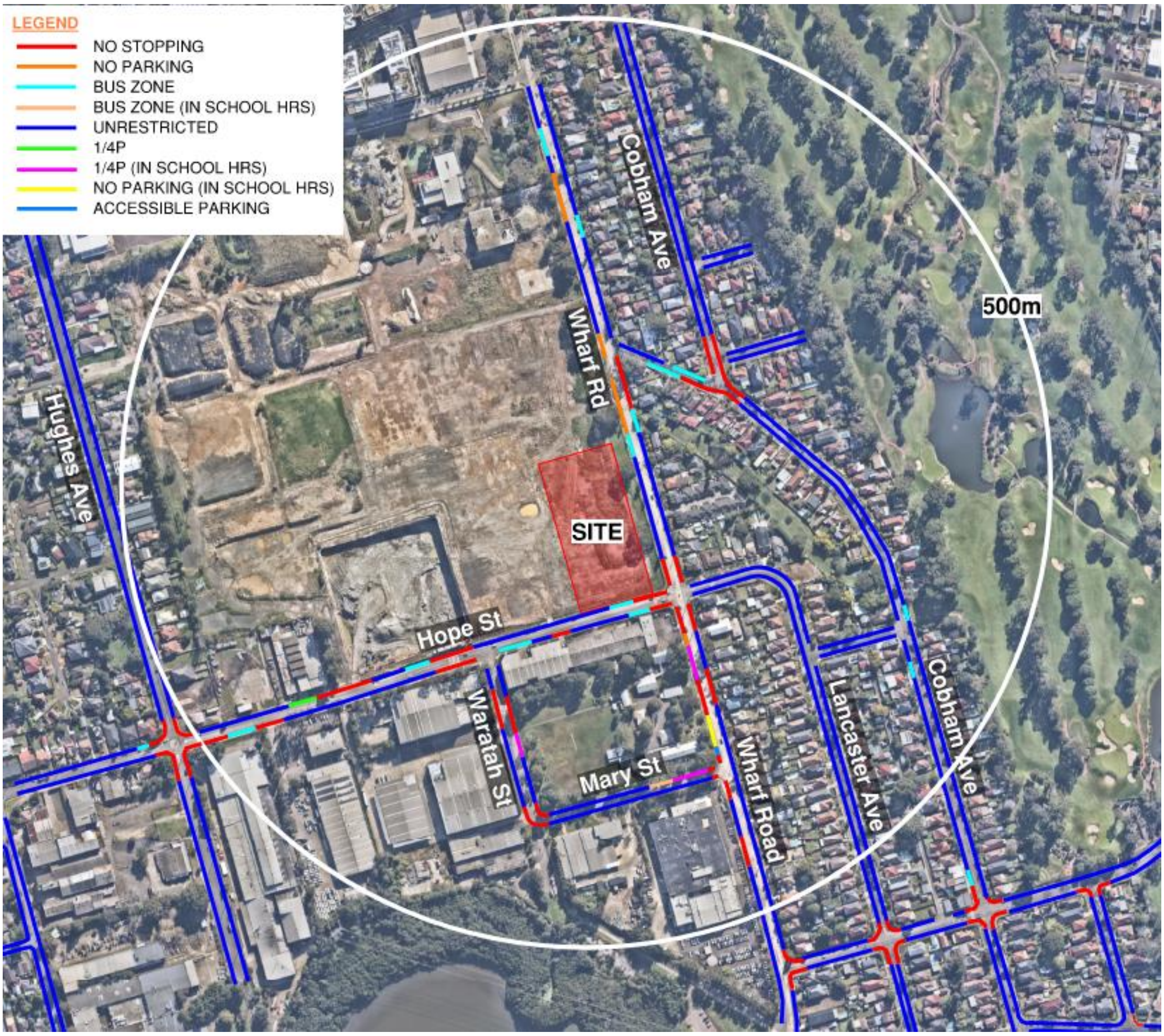


Figure 25: On-Street Parking Restrictions

Source: Modified from Nearmap

As shown in Figure 25, parking within the vicinity of the site is typically unrestricted, with a number of time restricted parking areas and bus zones close to the existing MPHS.

TTW completed two site inspections on a typical weekday in 2024, during these inspections it was observed there is generally an abundance of on-street parking capacity within a 500 metre radius of the site. Specifically, Wharf Road and Waratah Street had approximately 50% spare capacity. It was observed parking demand on Hope Street was higher, with approximately 30% spare capacity. It was assumed parking on Hope Street was mainly occupied by construction workers on Melrose Park North. In addition, Nearmap aerial footage was reviewed to gain an understanding of on-street parking demands. Similarly to our on-site observations it appeared Wharf Road and Waratah Street had an abundance of spare capacity, while Hope Street appeared to have between 20-30% spare capacity. In summery, it is considered reasonable to assume the surrounding streets have spare on-street parking capacity.

2.6 Travel Mode

2.6.1 School Travel Surveys

In order to establish an expected baseline for travel behaviour at the proposed MPHS site, travel mode data from other comparable schools has been analysed.

The mode splits for **students** shown in Table 13 and **staff** shown in Table 14 have been developed through an assessment of existing travel data collected at other comparable high school sites, including:

- Northmead Creative and Performing Arts High School (NCAPA)[1]
- Pendle Hill High School (PHHS)[2]
- Cumberland High School (CHS)[3]
- Marsden High School (MHS)[4]
- Melrose Park Primary School (MPPS) – Staff only[5]

Table 13: Existing School Mode Share Data - Students

Travel Mode	NCAPA		PHHS		CHS		MHS		Average	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Walk	16%	18%	26%	26%	13%	18%	21%	21%	**19%**	**20%**
Bicycle	1%	1%	0%	0%	1%	1%	1%	1%	**1%**	**1%**
Bus	42%	52%	20%	20%	52%	63%	37%	37%	**38%**	**43%**
Train	5%	7%	5%	5%	5%	4%	19%	19%	**9%**	**9%**
Car, driver	1%	0%	7%	7%	3%	1%	0%	0%	**3%**	**2%**
Car, passenger	35%	22%	42%	42%	26%	13%	22%	22%	**31%**	**25%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

As shown in Table 13, the highest mode of travel observed for students is bus travel with 38% and 43% usage in AM and PM, respectively. This is followed by students being picked up and dropped off by private vehicle with 31% and 25% in AM and PM, respectively. The remaining students are shown to travel by active transport, and some low usage of train travel.

[1] As per surveys undertaken by TTW in April 2022
[2] As per surveys undertaken by TTW December 2020
[3] As per surveys undertaken by TTW in May 2022
[4] As per surveys undertaken by Ason Group in Term 3, 2023
[5] As per surveys undertaken by TTW in Term 4, 2024

It is noteworthy to mention these travel mode splits are considered for comparison reasons only. It is anticipated given the proposed MPHS is a new school this is an opportunity to reduce private vehicle dependency and promote active and public transport modes for both students and staff.

Table 14: Existing School Mode Share Data - Staff

Travel Mode	NCAPA		PHHS		CHS		MHS		MPPS		Average	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Walk	4%	2%	4%	2%	4%	4%	3%	3%	11%	16%	**5%**	**6%**
Bicycle	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	**0%**	**0%**
Bus	6%	8%	0%	0%	0%	2%	5%	5%	0%	0%	**2%**	**3%**
Train	4%	6%	0%	0%	0%	0%	16%	16%	0%	0%	**4%**	**4%**
Car, driver	82%	82%	93%	93%	96%	94%	76%	76%	84%	84%	**85%**	**85%**
Car, passenger	4%	2%	2%	3%	0%	0%	0%	0%	5%	0%	**2%**	**1%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	100%	100%	**100%**	**100%**

As shown in Table 14, typical with most school sites, staff travel mode habits are very car-dependent, with an average of 85% of staff travelling by private vehicle in the AM and PM peak. Following private vehicles, the results show an average of 5%-6% of staff walk to / from school. In addition, some staff also travel via public transport such as buses and trains with 6% (2%+4%) in the AM and 7% (3%+4%) in the PM peak period. The survey results show that the remaining staff will either get picked up and dropped off 4 to/from the school. Based on the travel mode surveys from comparable schools, the results reflect that whilst some staff use public and active transport modes to travel to / from school the majority of staff travel via private vehicle.

2.6.2 Census Travel Data

For comparison, the 2021 Journey to Work (JTW) data was also reviewed. The data provides an estimate of employee travel modes into and out of the local area for the purposes of travel to or from a place of employment. JTW data is defined by Travel Zones and can be assessed as a destination (employees in the zone, who may be from the local area or elsewhere). The site is located within the Statistical Area Level 2 (SA2) 'Ermington – Rydalmere' as illustrated in Figure 26.

Within this area, a few industrial areas and construction sites are the only major employment centre. While the wider SA2 zone is mostly residential areas. It should be noted that the development of Melrose Park will increase employment numbers in retail and commercials due to the opening of Melrose Park Town Centre.

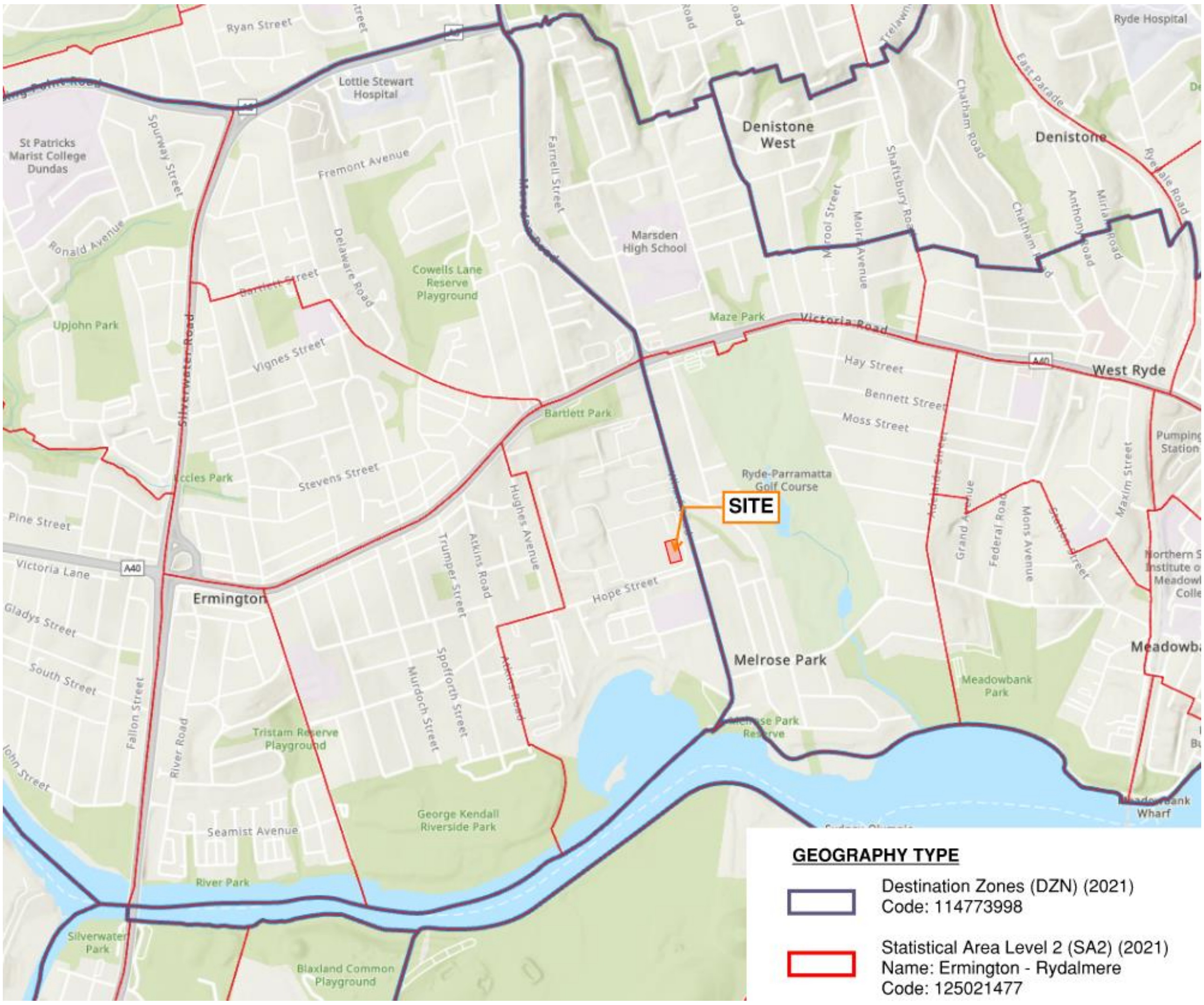


Figure 26 Statistical Area of Site

Source: Modified from ABS Maps

To provide a comparison between the school travel survey results and the JTW census data, Table 15 provides an analysis and summary of the Census JTW travel mode splits for the Ermington – Rydalmere SA2. It is noted, responses for "worked at home", "did not go to work", and "mode not stated" have been excluded from this analysis.

Table 15: Census Travel Data

Source: ABS

Travel mode	Place of work	Place of residence
Train	5%	5%
Bus	4%	3%
Ferry	0%	0%
Tram/Light rail	0%	0%
Taxi	0%	1%
Car, as driver	80%	82%

Travel mode	Place of work	Place of residence
Car, as passenger	6%	7%
Truck	1%	1%
Motorbike/scooter	1%	1%
Bicycle	1%	1%
Other Mode	1%	1%
Walked only	2%	1%
Total	**100%**	**100%**

The census 2021 travel data detailed in Table 15 identified that 3% of employees typically travel to/from work via active transport (walk or cycle), while 9% of employees typically travel to/from work via public transport (train or bus). Car travel is relatively high with 86% of employees travelling to/from work via private vehicle (car driver or car passenger). The result shows a relatively high car usage for staff which is similar to the average school travel mode surveys.

2.7 Other Site Conditions and Observations

Observations of the existing site and nearby MPPS were undertaken during multiple morning and afternoon peak periods across September 2023 and November 2024, with key findings noted as follows:

Morning Peak Period

- Kiss & ride activity at the primary school started occurring approximately 5 – 10 minutes before the bell, from approximately 8:50am. Activity was split between Mary Street and Wharf Road, with parents parking and walking students into the school from Mary Street (refer to Figure 27), and Wharf Road used as a typical kiss & ride zone i.e. parents remain in their car (refer to Figure 28).
- Vehicle volumes around the school were observed to be comfortably accommodated within the road network, with minimal queueing at intersections, with queues of approximately 3 – 4 vehicles forming at the west leg of the Mary Street / Wharf Road intersection.
- Staff car park was observed to be full prior to 8:45am, estimated to accommodate majority of staff.
- On-street parking within the local roads had spare capacity, particularly along Mary Street and Wharf Road. On-street parking at Waratah Street was highly used, assumed to be mainly construction workers from the nearby development.

Afternoon Peak Period

- Afternoon kiss & ride activity is self-managed, with no supervision from staff. Vehicles started parking on Mary Street as early as 15 minutes before the bell, with most parents meeting their child at the school gate. Wharf Road was observed to be less busy than Mary Street, with parents stopping for a shorter time and staying in their car.
- Similar to the morning, the vehicle volumes were accommodated within the network, with queues of approximately 6 – 7 vehicles forming at the west leg of the Mary Street / Wharf Road intersection. This queue length was observed once following the school bell and cleared within about one minute. Similarly, a queue of approximately 8 vehicles formed at the west leg of the Wharf Road / Hope Street intersection. This queue was observed once after the bell and cleared within about two minutes.

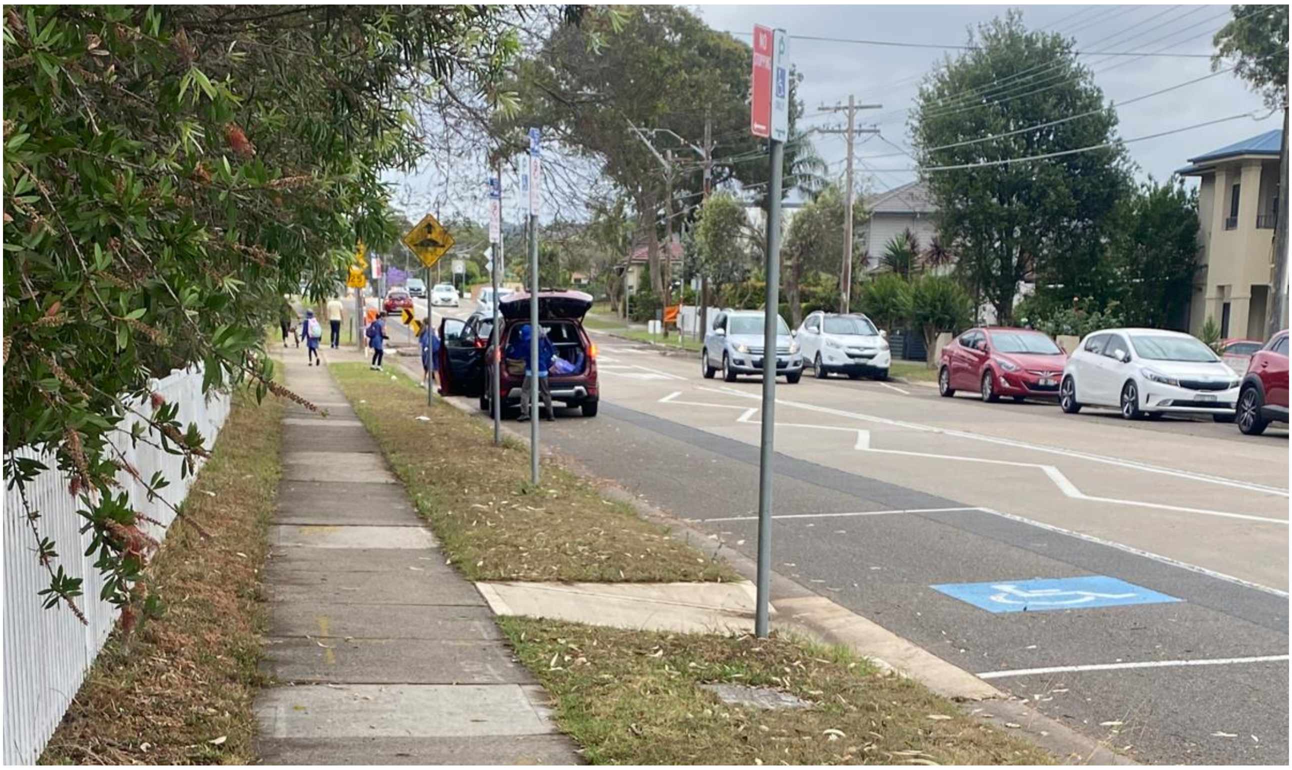


Figure 27: Morning Kiss & Ride Activity on Wharf Road
Source: TTW

Figure 28: Morning Vehicle Parking along Mary Street (Typical Park & Walk Activity)
Source: TTW

Section 3 Proposed Works

3.1 Description of Works

The proposed activity involves the construction and use of a new high school in two stages for a maximum capacity of 1,000 students.

Stage 1 of the proposed activity includes the following:

- Site preparation works.
- Construction of Block A – a six-storey (with additional roof/plant level) school building in the south-western portion of the site containing staff rooms and General Learning Spaces (GLS).
- Construction of Block B – a one storey (double height) hall, gymnasium, canteen and covered outdoor learning area (COLA) building in the south-eastern portion of the site.
- Construction of Block C – a single storey plant and storage building at the north-eastern portion of the site.
- Associated landscaping.
- Construction of on-site car parking.
- Provision and augmentation of services infrastructure.
- Associated public domain infrastructure works to support the school, including (but not limited to):
    - Provision of kiss and drop facilities along Wharf Road, and widening of the Wharf Road footpath.
    - Raised pedestrian crossings on Wharf Road and Hope Street.
    - Consolidation of 2 bus zones on the southern side of Hope Street

Stage 2 of the proposed activity includes the following:

- Construction of Block D – a five-storey (with additional roof/plant level) school building in the north-western portion of the site containing staff rooms and GLS:
- Additional open play spaces within the terrace areas of Building D.
- Minor layout amendments to Block A.

The Review of Environmental Factors prepared by Ethos Urban provides a full description of the proposed works. The overall proposed site plan is illustrated in Figure 29.

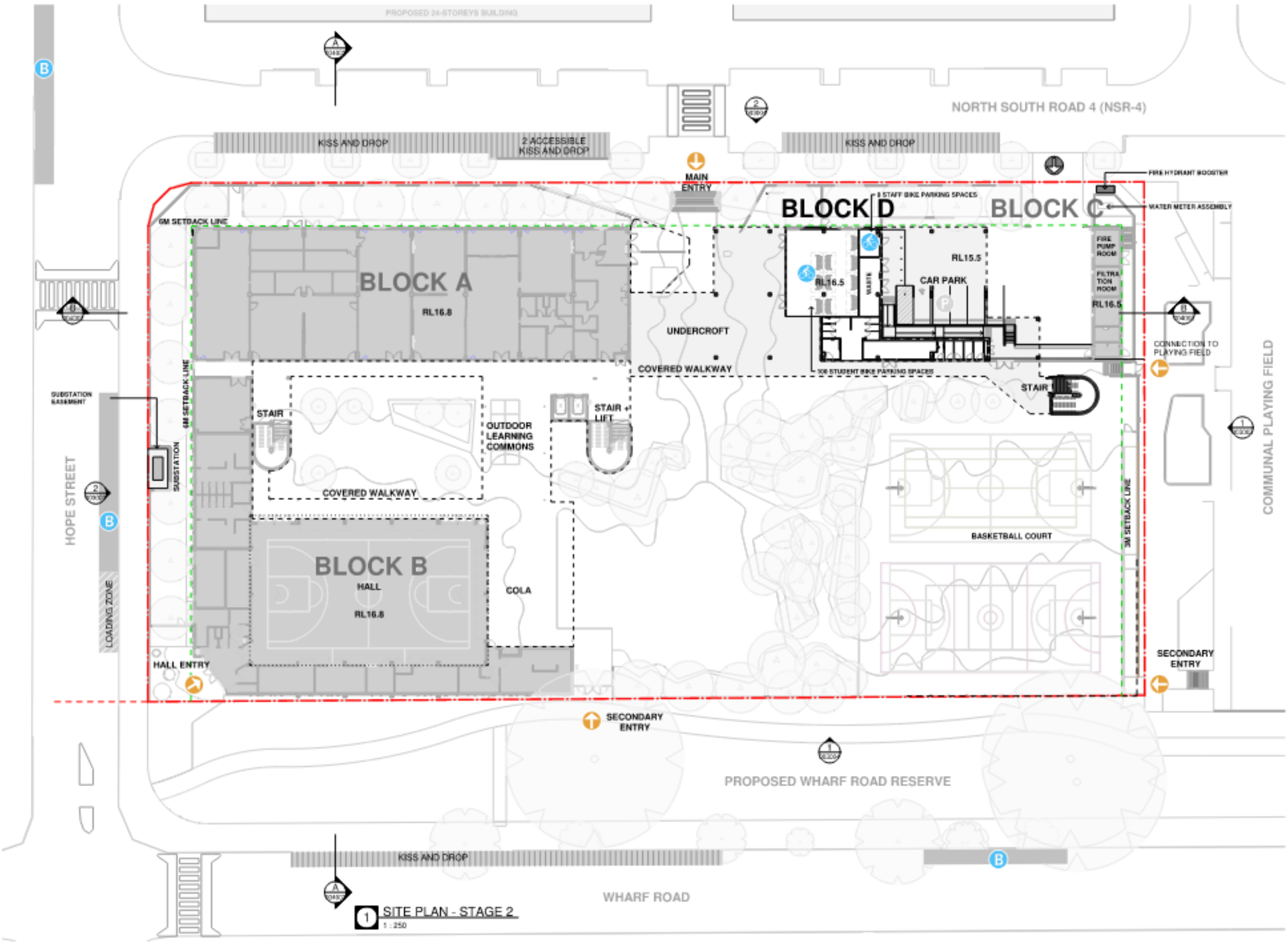


Figure 29: Proposed Site Plan

Source: NBRS (MPHS-NBRS-ZZ-ZZ-DR-A-000201[4])

3.2 Public Domain Works

An overall plan showing the proposed off-site works is illustrated in Figure 29 and includes the following:

- 2 new raised pedestrian zebra crossings on Wharf Road and Hope Street
- Footpath widening along the western footpath on Wharf Road adjacent to the proposed kiss & ride zone
- Signage changes to accommodate kiss & ride zones on Wharf Road
- Signage changes and minor public domain works to consolidate 2 bus zones on the south side of Hope Street to provide one 63 metre bus zone
- Signage changes to provide a 12-metre loading zone on the northern side of Hope Street
- Arrangements made between SINSW and Sekisui include the following additional works to be undertaken by the developer:
  - A new raised pedestrian crossing on NSR-4
  - Footpath widening on NSR-4 for the length of the site boundary
  - Kerb widening at accessible kiss & ride zone to accommodate wider 3.2m parking spaces
  - Signage changes to accommodate accessible kiss & ride zone on NSR-4

3.3 Melrose Park Primary School Proposal

As previously mentioned, the existing MPPS is located 200 metres to the south of the proposed MPHS site. MPPS is an existing primary school with a 2024 enrolment of 185 students and 22 staff.

There is a proposal to upgrade the existing MPPS to meet the demand arising from redevelopment of the Melrose Park Precinct. SINSW are currently in the early planning stages of the redevelopment, however the following details are considered noteworthy:

- The proposed redevelopment of MPPS will be completed in 2 stages, with a maximum capacity of ~1,000 students and 68 staff
- The MPPS development will construct a staff car park on the MPPS site which will be shared between both MPPS and MPHS, whilst the parking provision for MPPS staff is yet to be confirmed the following provision will be provided for MPHS staff:
    - 24 staff parking spaces for MPHS will be provided in Stage 1
    - 39 staff parking spaces (an additional 15 spaces) for MPHS will be provided in Stage 2
- A separate planning application for MPPS will be submitted
- Construction is scheduled for mid 2025 with a proposed Day 1 Term 1 2027

Coordination between both schools is currently ongoing with SINSW and the project teams to ensure both proposals take into consideration traffic and parking provisions.

Section 4 Travel Demands

4.1 Transport Hierarchy

The transport strategy for the activity is designed as a sustainable transport strategy, prioritising non-vehicle modes such as active transport (i.e. walking, cycling) and public transport, while discouraging private vehicle travel (including kiss & ride and car parking). This hierarchy is indicatively illustrated in Figure 30.

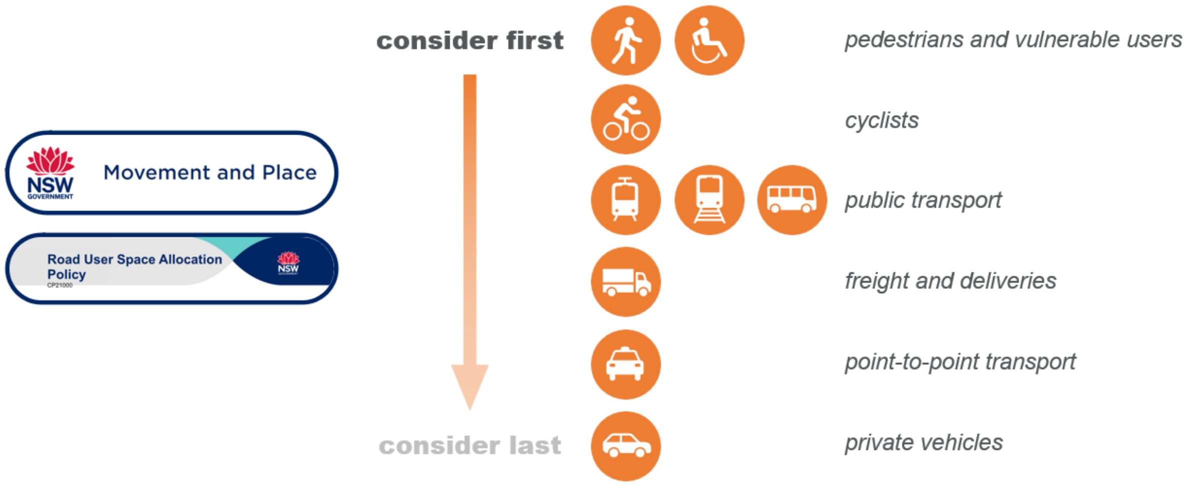


Figure 30: Sustainable Transport Hierarchy

Source: TfNSW

This strategy is consistent with NSW Government policy, specifically the Road User Space Allocation Policy, and is applied across all current SINSW projects.

4.2 Student Location Analysis

Typically to confirm where students currently live within the catchment SINSW will provide student location data within 5km radius of the site. This allows an assessment to be completed and determine where students live within the catchment, and therefore determine suitable travel modes to / from school.

However, as Melrose Park is currently a developing precinct with many undeveloped areas within the school catchment and within close proximity to the school, existing student location data is not an accurate representation of future conditions. To complete a more accurate assessment of student locations, TfNSW Travel Zone Projection Data (TZPD) was utilised to estimate residential density within the school catchment. The data is provided for 2026 and 5 yearly. MPHS is anticipated to open in 2027 and reach full capacity by 2036, therefore the TZPD for 2026 and 2036 was deemed most appropriate. The methodology is detailed below:

- TfNSW TZPD was utilised to confirm the location codes and the residential population density for 2026 and 2036 within the school catchment area.
- To estimate student numbers within the catchment we distribute the school enrolment capacities (560 for Stage 1 in 2026 and 1,000 for Stage 2 in 2036) into each of these zones by applying a ratio based on the population distribution, as shown in Figure 31.
- Students were evenly distributed within each of the below zones to provide an understanding of where students would live and ultimately determine how they would travel to / from school.

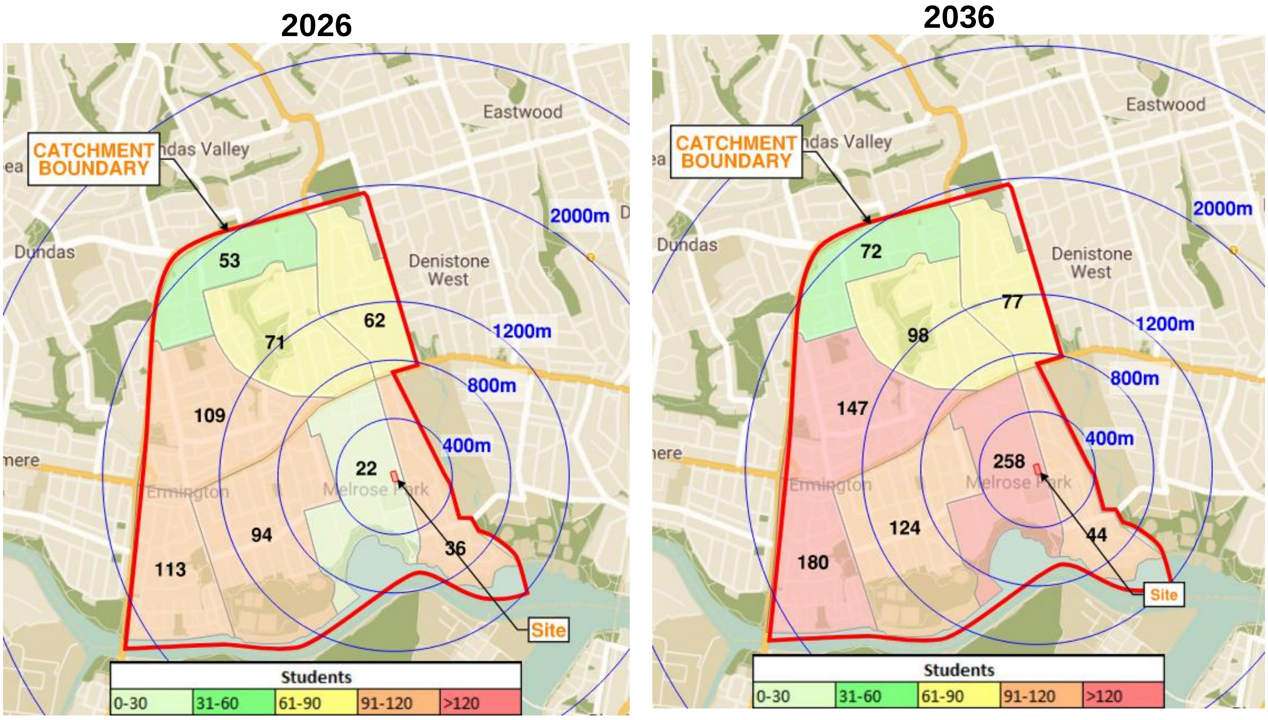


Figure 31: Forecast Catchment Analysis

As shown in Figure 31, in 2026 it is evident a large portion of students will live outside 400-800 metres of MPHS, this is as a result of the Melrose Park Precinct which will still be under construction until an anticipated completion date of 2036. This is evident in Figure 31 by 2036 a large portion of students will live within 400-800 metres of the site as the Melrose Park Precinct becomes occupied.

The analysis goes into further detail by incorporating the approved Melrose Park North Internal Street Network (DA 1100/2021). Therefore, the analysis is able to estimate student's distance to / from the school, which can determine the relevant travel modes to / from the school. The distribution of estimated student's location is detailed in Table 16 and shown in Figure 32.

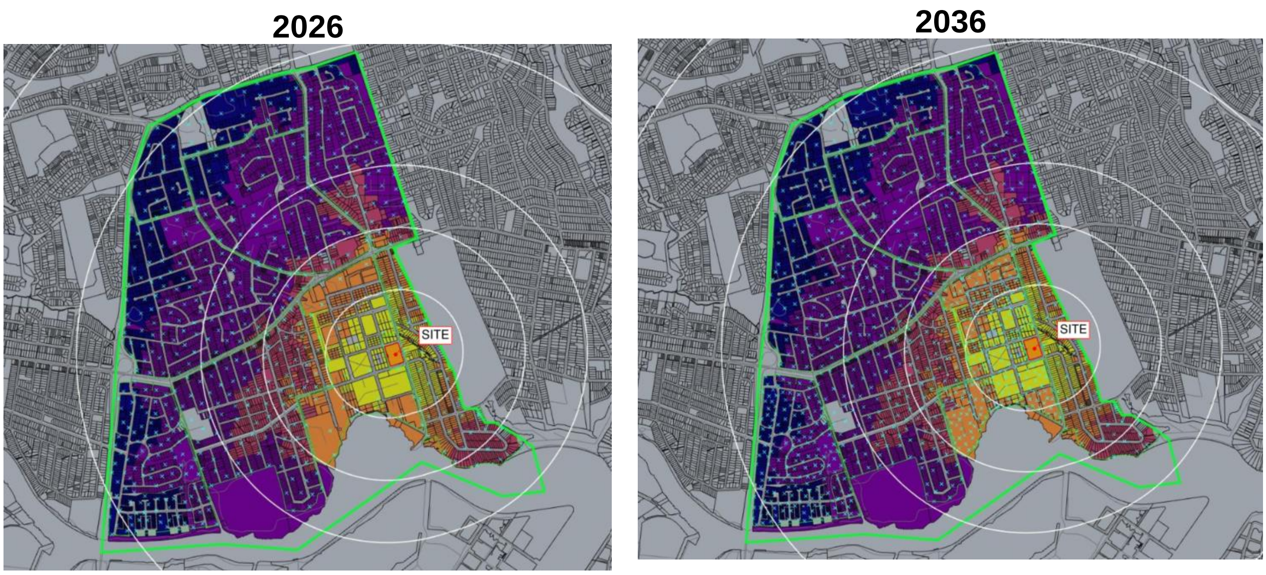


Figure 32: Walking and Radial Distances
Source: TTW

Table 16: Student Location Distribution within the School Catchment

Distance	Actual Walking Distance (2026)		Actual Walking Distance (2036)	
	%	Students	%	Students
0 – 400m (5min walk)	3%	15	10%	100
400 – 800m (10min walk)	8%	43	17%	170
800 – 1,200m (15min walk)	13%	72	13%	130
1,200 – 2,000m	48%	268	37%	370
2,000 – 2,900m	28%	162	23%	230
Total	**100%**	**560**	**100%**	**1,000**

As shown in Table 16, the key findings derived from this walking distance analysis include the following:

- Approximately 24% of students live within a 15-minute walk of the site in 2026. However, as Melrose Park develops, 40% of students will live within a 15-minute walk of the site in 2036.
- Approximately 76% of students are located outside a 15-minute walk of the site, showing a large portion of students live outside typical walking distance from the school in 2026. However, this decrease to 60% in 2036 once Melrose Park Precinct becomes fully developed.
- No students live more than 2.9km actual walking distance from the site and are not eligible for free public transport in accordance with the School Student Transport Scheme (SSTS)

4.3 Travel Scenarios

As detailed in Section 3, the proposal is for a high school with a full capacity of 1,000 students and 79 staff. The projected travel mode splits for full capacity have been presented for 3 different scenarios including **baseline, moderate** and **reach** mode splits, described in the following paragraphs.

The basis for the transport assessment presented in the remainder of this document will adopt a conservative approach that assesses the school at full capacity and considers either the baseline or target mode share splits, whichever results in the largest travel demand (unless otherwise indicated).

4.3.1 Baseline Scenario

The baseline scenario has been calculated through an assessment of existing travel data collected at other comparable high school sites (see Section 2.6.1). This scenario does not consider any site-specific factors but is calculated entirely as the average of existing travel mode data from schools located in similar areas with similar school catchment sizes.

This scenario provides a reference point for developing the forecast travel mode splits for the new MPHS. However, it is expected that this project will be able to achieve more ambitious travel mode splits as described in the following section, with less focus on car travel and a greater uptake in active and public transport.

4.3.2 Moderate Scenario

The moderate target scenario represents the expected travel demands developed based on a combination of existing travel habits at comparable sites, plus anticipated travel habits based on the proposed school catchment area, proposed student locations based on the student location analysis and the school's transport provision.

Refer to Section 2.6.1 which discusses existing travel habits at a benchmark school. A sample of existing travel habits include:

- 19% and 20% average walking mode split for students in the morning and afternoon
- 1% average bicycle usage for students in the morning and afternoon
- 38% and 43% average bus usage for students in the morning and afternoon
- 34% and 27% average private vehicle usage for students in the morning and afternoon

Site-specific considerations based on the student location analysis are detailed in Section 4.2 for the transport provisions at the school and catchment area include:

- Based on our analysis it is anticipated approximately 24% of students will live within 0-1.2km of the school (15-minutes walk) in 2026 and this will increase to 40% of students in 2036.
- Based on our analysis it is anticipated approximately 48% of students will live within 1.2km-2km of the school (10-minute cycle) in 2026. By 2036 this will reduce to 37% of students as more students will live closer to MPHS within the Melrose Park North precinct.
- The proposed Melrose Park North precinct will provide good pedestrian and cyclist infrastructure within the vicinity of the site which provides good connections within the local road network and to nearby residential areas. This includes shared paths and footpaths along a vast majority of roads.

The proposed on-site and off-site transport facility based on Section 3 include:

- There will be 3 wombat crossings within the vicinity of the site. This will encourage and promote safe active transport travel for both students and staff to the school.
- Proposed on-site bike parking for students and staff as well as end-of-trip provisions for staff.
- Retaining existing bus infrastructure plus consolidating 2 bus stops to provide additional space for bus queuing to service future bus routes to the school frontage.

Other relevant policies and considerations include:

- The school is a new campus, allowing students and staff to form new travel habits.
- Local staff recruitment considerations are currently under review by DoE.

4.3.3 Reach Target Scenario

Importantly, the activity is seeking to use the opportunities presented by a new site to establish new targets for travel behaviour which differs from other existing schools. In transport planning terminology, this is the change from a ‘predict and provide’ methodology based on existing behaviours to a ‘decide and provide’ methodology to achieve a preferred future and vision. In order to avoid generating high levels of additional vehicular traffic through induced demand, transport provisions and capacity are specifically targeted and are supported with infrastructure and services across the full spectrum of transport options.

This strategic vision is also consistent with the recently released Future Transport Strategy, which in relation to schools, states that a specific priority action is to be implemented (which are “actions to be implemented as a priority, with the view to delivery outcomes in 1-5 years”):

> *“Partner with the Department of Education and key stakeholders to improve safe walking, cycling and public transport access to schools.”*[i]

This priority action indicates that higher levels of walking, cycling, and public transport, and conversely lower levels of private vehicle travel, are of high importance to the success of local neighbourhoods, and that existing travel behaviours are expected to change as new facilities or services are implemented.

In addition, the TMAP transport planning objectives note that the Melrose Park Precinct has been planned with the goal of delivering balanced, integrated and sustainable outcomes to achieve the proposed transport targets of 5% walking and cycling mode share, 45% public transport mode share and 50% car mode share. It is also noted that these mode shares are for peak hour trips external to the development. It is anticipated that trips within the development will be primarily undertaken by active transport.

On these grounds, the target travel mode splits presented in the following tables are considered realistic and feasible. The target travel demands outlined Table 17 have been developed in light of this, with a greater emphasis on active and public transport, and seeking to minimise private vehicle usage for both students and staff as much as possible.

Table 17: MPHS Students & Staff Mode Share Scenarios

Travel mode	Students			Staff		
	Baseline	Moderate	Reach	Baseline	Moderate	Reach
Walk	20%	20%	35%	3%	5%	5%
Bicycle	1%	5%	8%	0%	3%	5%
Bus	41%	48%	30%	3%	17%	5%
Train	9%	0%	0%	5%	5%	5%
Light rail	0%	0%	12%	0%	0%	20%
Car, passenger	27%	25%	15%	2%	15%	10%
Car, driver	2%	2%	0%	87%	55%	50%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

As shown in Table 17, the project aims to provide moderate travel mode targets for students and staff in **opening year**. These targets focus on promoting active and public transport where possible with a walking target of 20% for students and 5% for staff, as well as a bus travel mode target of 48% for students and 17% for staff.

It is noteworthy to mention, whilst no students are eligible for free public transport under the SSTS, it is expected bus services will still be heavily utilised by students. This pattern has been observed at several other SINSW schools such as Liverpool Girls and Boys High School which has a 35% bus travel mode uptake, with only 4% of students eligible for SSTS.

The moderate targets also aim to be realistic, noting that travel mode trends may still rely on private vehicle as Melrose Park Precinct is still in development, with 27% of students and 70% of staff anticipated to travel by private vehicle (as passenger and driver) in opening year.

The reach travel mode targets aim to align with the objectives in the TMAP and Part 8 of Parramatta DCP which discuss the goal of delivering sustainable outcomes to achieve higher active and public transport mode shares and a reduction of car mode share to 50%. The proposed reach targets aim for 15% of students and 50% of staff to travel to / from MPHS by private vehicle. The reach targets also acknowledge the implementation of PLR Stage 2 and reduce some bus travel modes to light rail, noting that the PLR Stage 2 will replace some existing bus services. A reach travel mode provision of 12% for students has been assumed, based on the number of students located within a 400-800 metre radius of a proposed light stop that are outside typical walking distance from MPHS. A reach travel mode provision of 20% for staff has been assumed, based on targets set out in the TMAP and the proposed frequency of services, also providing connections to the wider Sydney rail network.

The proposed travel mode targets are therefore considered acceptable and align with the objectives and goals set out for the wider Melrose Park Precinct. Table 18 and Table 19 provide a summary of the travel demand projections for Stage 1 & Stage 2 student and staff numbers.

Table 18: Students Travel Demand Projection

Students	Stage 1			Stage 2		
Travel mode	**Baseline**	**Moderate**	**Reach**	**Baseline**	**Moderate**	**Reach**
Walk	112	112	196	200	200	350
Bicycle	6	28	45	10	50	80
Bus	230	269	168	410	480	300
Train	50	0	0	90	0	0
Light rail	0	0	67	0	0	120
Car, passenger	151	140	84	270	250	150
Car, driver	11	11	0	20	20	0
Total	**560**	**560**	**560**	**1,000**	**1,000**	**1,000**

Note: Totals may slightly differ due to rounding

Table 19: Staff Travel Demand Projection

Staff	Stage 1			Stage 2		
Travel Mode	**Baseline**	**Moderate**	**Reach**	**Baseline**	**Moderate**	**Reach**
Walk	2	3	3	2	4	4
Bicycle	0	2	3	0	2	4
Bus	2	9	3	2	13	4
Train	3	3	3	4	4	4
Light rail	0	0	10	0	0	16
Car, passenger	1	8	5	2	12	8
Car, driver	45	29	26	69	44	40
Total	**52**	**52**	**52**	**79**	**79**	**79**

Note: Totals may slightly differ due to rounding

Section 5 Pedestrians

5.1 Demands

Future pedestrian volumes have been calculated in the proposed travel mode splits above in Section 4.3.3, and are summarised in Table 20 for reference.

Table 20: Summary of Pedestrian Travel Demands

Pedestrians	Baseline			Moderate			Reach		
	Mode Split	Volume		Mode Split	Volume		Mode Split	Volume	
		Stage 1	Stage 2		Stage 1	Stage 2		Stage 1	Stage 2
Students	20%	112	200	20%	112	200	35%	196	**350**
Staff	3%	2	2	5%	3	4	5%	3	**4**

This traffic assessment considers the scenario which results in the largest travel demand as the most conservative approach. As **underlined** in, this scenario would be the Stage 2 student and staff numbers with the reach mode splits applied. The analysis of the projected demand is detailed in Section 5.2 and supported with the proposed facilities shown in Section 5.3.

5.2 Analysis

5.2.1 Estimate Student Pedestrian Volume

To understand the most utilised paths of travel to MPHS, the shortest trip assessment was completed based on the student location analysis data. The student location analysis data has adopted Stage 2 student capacity that live within a 15-minute walk of the site (400 students) as it provides a more conservative assessment to the analysis. The shortest walking path and the walking distribution are shown in Figure 33.

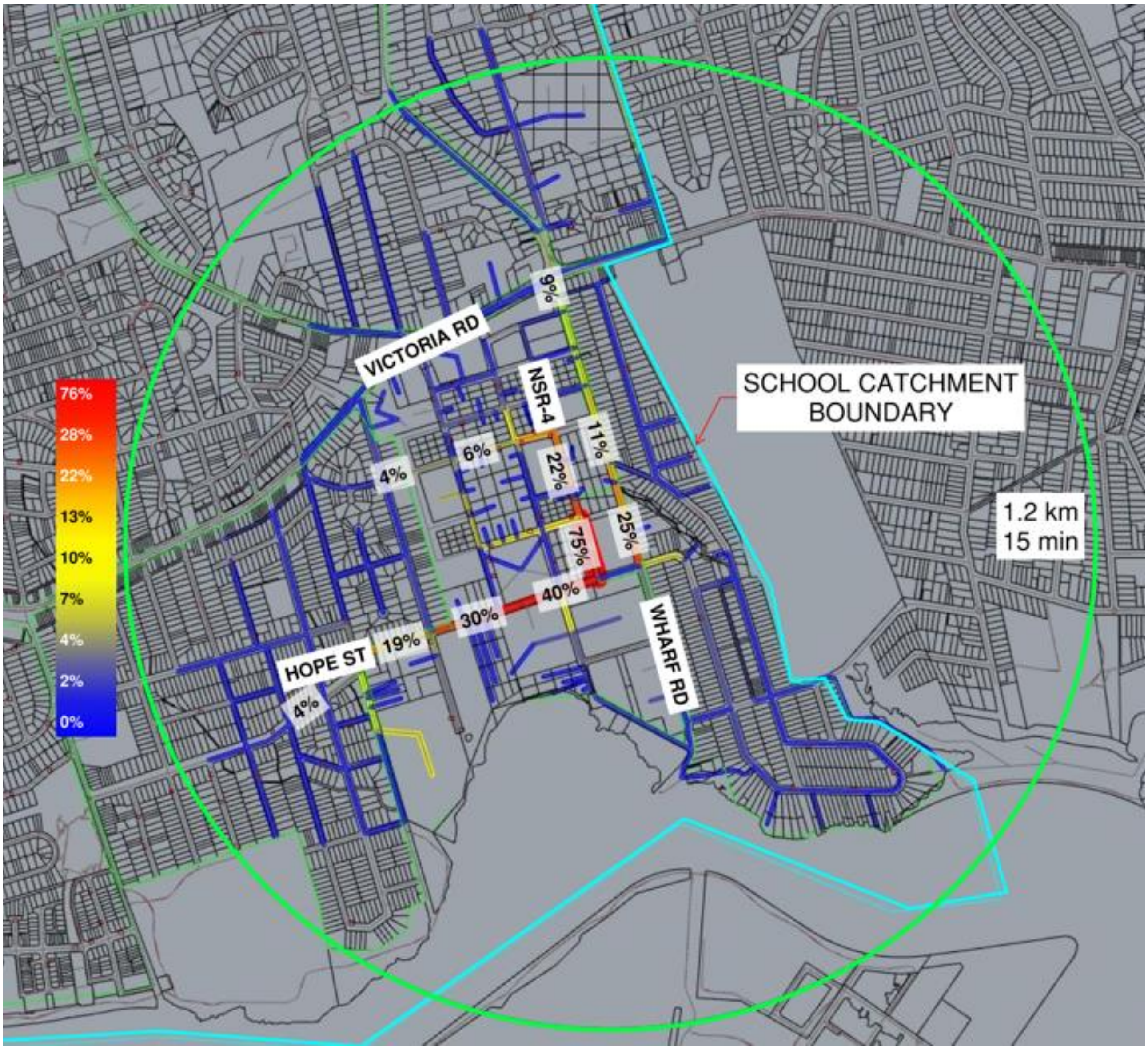


Figure 33: Pedestrian Inbound Trip Distribution

As shown below in Figure 33, a total of 75% of students will utilise the new road NSR-4 as the main pathway to MPHS. These pedestrians are mainly travelling from the north and west of the precinct, with 40% of students utilising Hope Street and turning onto NSR-4 to access MPHS. It is also shown that 11% of students will utilise Wharf Road as the shortest path of travel to the school.

The above percentage splits have been applied to the number of students that live within a 15-minute walk of the site. As per the student location data, it was estimated that 400 students of the maximum 1,000 students will live within a 15-minute walk of the school.

Figure 34 below applied the above percentages to the actual number of students who have the potential to walk to school.

Figure 34: Footpath Utilisation Near the Vicinity of The Proposed School

Based on the student walking analysis above, the maximum student reach trip generation is summarised below:

- Approximately 196 students will utilise the proposed raised crossing at the site access along NSR-4 to walk to / from MPHS
- It is estimated that a maximum of 144 students will utilise the northern side of Hope Street before turning left onto NSR-4
- It is estimated that 84 students will walk along the eastern side of NSR-4 to walk to / from MPHS
- Approximately 72 students will utilise the proposed raised crossing along the Wharf Road to walk to / from MPHS
- It is estimated that there are 40 to 60 students that will walk via Wharf Road to walk to / from MPHS
- Approximately 24 students will utilise the proposed raised crossing along Hope Street to walk to / from MPHS

Note, the above is a conservative assessment and has only considered walking travel mode habits with students located 15 minutes (~1.2 km) from the proposed school, it does not account for students that travel to/from school by other travel modes, i.e. public bus, private vehicle and utilise a crossing to access the site.

5.3 Proposal

The scope of proposed pedestrian provisions including site access points, footpath works and crossing facilities are illustrated in Figure 35.

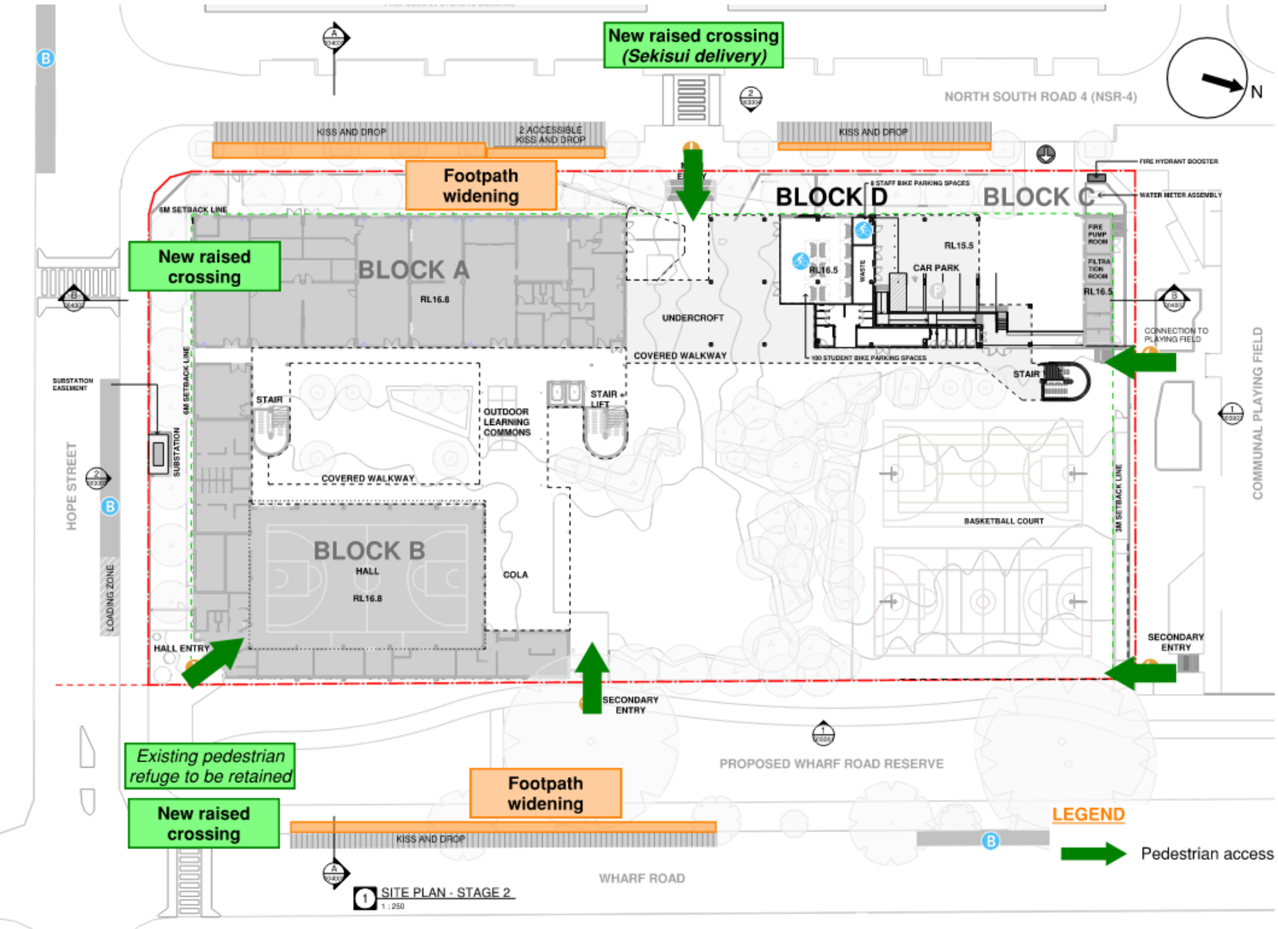


Figure 35: Summary of Pedestrian Facilities

Source: Modified from NBRS (MPHS-NBRS-ZZ-ZZ-DR-A-000201[4])

5.3.1 Site Access

MPHS will have its main pedestrian access points on the eastern side of NSR-4. The proposal also includes 4 secondary access points located around the site. 2 of the accesses are located to the north adjacent to the proposed Melrose Park playing fields. 1 access will be provided along Wharf Road at the western side of the Wharf Road linear path and 1 access will be provided on the northern side of Hope Street, through the main school hall.

5.3.2 Footpaths

Wharf Road

As shown in Figure 35, the footpath along the western side of Wharf Road is proposed to be widened to the kerb along the K&R zone. This will accommodate safe access for student K&R activity within the dedicated K&R area along Wharf Road. Students who utilise Wharf Road K&R can use a pedestrian path along the Wharf Road Linear Park to access the school.

NSR-4

As shown in Figure 35, the footpath will be widened to the kerb by removing the grass verge to accommodate the general K&R zone and the accessible K&R spaces. These works are currently being completed by the developer with consultation between SINSW and CoP. These works will be completed prior to MPHS opening year.

5.3.3 Crossings

As shown in Figure 35, there will be three (3) new raised pedestrian crossings within the vicinity of the site. 2 2 are proposed by SINSW as part of this project while the crossing on NSR-4 is provided by Sekisui as part of the Melrose Park Precinct. These include one along NSR-4, one along Hope Street and one at the northern leg of Wharf Road / Hope Street intersection. The proposed pedestrian access along NSR-4 will provide safe pedestrian access for students who are walking to/from the north and western part of the Melrose Park North precinct. The new raised crossing along Hope Street will cater for students who are walking from the western and southern parts of the catchment. Whereas the pedestrian at the northern leg of Wharf Road / Hope Street intersection will provide safe access to the east of the school. All crossings will be designed in accordance with AS 1742.10.

Section 6 Cyclists

6.1 Demands

Future cyclist volumes have been calculated in the proposed travel mode splits within Section 4.3, and are summarised in Table 21 for reference.

Table 21: Summary of Cyclist Travel Demands

Cycling	Baseline			Moderate			Reach		
	Mode Split	Volume		Mode Split	Volume		Mode Split	Volume	
		Stage 1	Stage 2		Stage 1	Stage 2		Stage 1	Stage 2
Students	1%	6	10	5%	28	50	8%	45	**80**
Staff	0%	0	0	3%	2	2	5%	3	**4**

This traffic assessment considers the scenario which results in the largest travel demand as the most conservative approach. As **underlined** in Table 21 this scenario would be the Stage 2 student and staff numbers with the reach mode splits applied. The analysis of the projected demand is detailed in Section 6.2and supported with the proposed facilities shown in Section 6.2.

6.2 Proposal

6.2.1 Student Cyclist Facilities

The proposal includes bicycle storage with a capacity for 100 student bicycle parking spaces. The bicycle parking will be provided in two stages as follows:

- Stage 1 will provide 56 bicycle spaces
- Stage 2 will provide 100 bicycle spaces.

Student bicycle spaces will be secured and undercover, they are located close to the main school entry via NSR-4 road. The bicycle storage area has been located in this area to ensure there is sufficient space to provide an undercover, lockable enclosed storage area which is separated from the main play space and easy for staff to supervise.

It is understood some students will utilise the Wharf Road Linear shared cycle path and access the school via the secondary access located along the eastern boundary. Due to on-site constraints additional secure bicycle spaces are unable to be provided in this location, it is therefore considered acceptable students entering from the eastern site access alight from their bicycle and walk it through the school to the secured storage area which is less than 100 metres away. The location of the bicycle parking is shown in Figure 37 and Figure 37.

6.2.2 Staff Cyclist and End of Trip Facilities

The proposal provides a total of 8 bicycle parking spaces for staff. In addition, end of trip facilities (EOTF) for staff will be provided to comply with Greenstar requirements. A breakdown of the proposed staff facilities are detailed below:

- Stage 1 will provide 6 bicycle spaces, 2 unisex shower / change facilities and 10 lockers
- Stage 2 will provide an additional 2 bicycle spaces

The location of staff facilities are detailed below in Figure 37 and Figure 37.

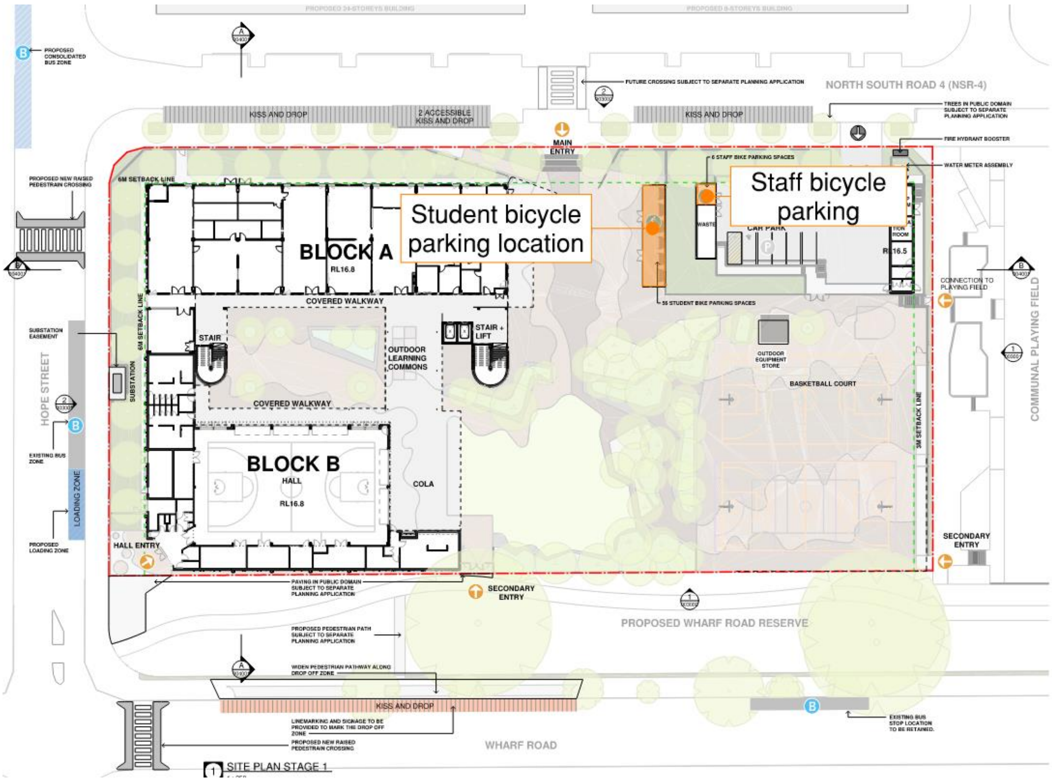


Figure 36: Proposed Bicycle Parking Location - Stage 1

Source: Modified from NBRS (MPHS-NBRS-ZZ-ZZ-DR-A-000200[5])

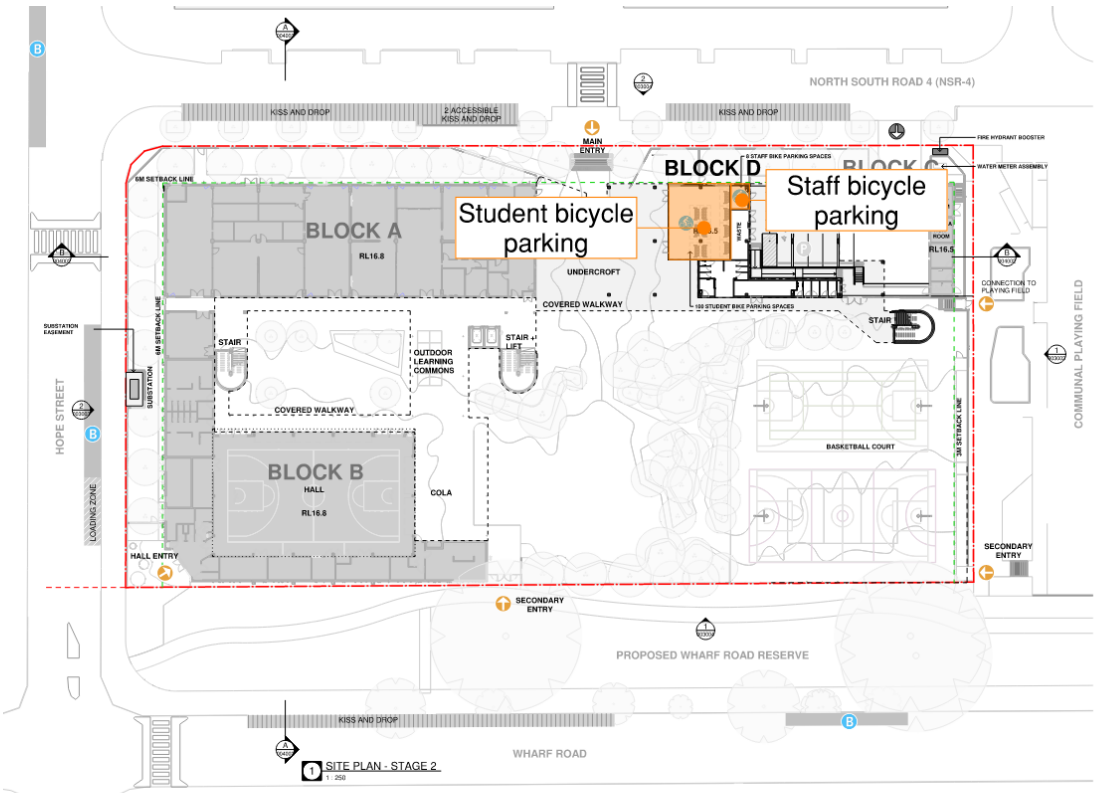


Figure 37: Proposed Bicycle Parking Location - Stage 2

Source: Modified from NBRS (MPHS-NBRS-ZZ-ZZ-DR-A-000201[4])

Figure 38: End-of-trip facilities for Staff at Level 3 & 4

Source: Modified from NBRS
(MPHS-NBRS-L3-ZZ-DR-A-000205[3] & MPHS-NBRS-L4-ZZ-DR-A-000206[3])

6.2.3 Design

Student and staff bicycle parking has been designed for convenience to be near the main site access points. Bicycle storage shall be designed in accordance with AS2890.3.

6.3 Analysis

6.3.1 Bicycle Facilities

As outlined above, the proposed bicycle parking for students and staff includes a total of 100 bicycle spaces. The bicycle parking provision will be constructed in 2 stages, Stage 1 will provide 56 student and 6 staff bicycle spaces. Stage 2 will provide the remaining spaces, including an additional 44 students and 2 staff bicycle spaces.

The above provision meets the forecasted travel mode reach targets of 8% bicycle travel mode for students and 5% bicycle travel mode for staff. Reference was also made to the Parramatta DCP 2023, Part 8.2.6.4.3 – Melrose Park Urban Precinct which does not stipulate any bicycle parking rates for students and staff for educational establishments but mentions that "*Secure bicycle parking facilities are to be provided in accordance with Council's Bike Plan".*

CoP Draft Bike Plan 2023 does not stipulate any specific bicycle parking provision and therefore reference was made to the Parramatta DCP– Part 6.3 for bicycle parking rates. The bicycle parking rates are shown below in Table 22.

Table 22: Bicycle Parking Rates & Provision as per Parramatta DCP Part 6.3

Cyclist	Volume	DCP Bicycle Rates	DCP Requirements	Parking Provision	
				Stage 1	Stage 2
Staff	79	1 space per 10 staff, plus	8	**6**	**8** (+2)
Students	1,000	1 space per 10 students	100	**56**	**100** (+44)
Total			**108**	**62**	**108** (+46)

As shown in Table 22, the Parramatta DCP– Part 6.3 requires a total of 108 bicycle parking, which include 100 bicycle parking spaces for students and 8 bicycle parking for staff. The proposed site will provide a total of 108 bicycle parking spaces, comprising of 100 students and 8 staff bicycle spaces and therefore is considered acceptable.

6.3.2 Staff EOTF Facilities

As detailed above, the proposal includes provision for 8 staff bicycle parking spaces as well as 2 unisex shower / change areas and 10 lockers.

Reference has also been made to The *Green Star Building Guidelines* to ensure the proposed EOTF facilities meet the requirements. For a maximum staffing body of 79 staff the Green Star requirements are detailed below:

- 2 showers (unisex) - showers must be 900mm x 900mm to enhance usability
- No specific rate for change rooms, assumed change area can be combined with shower
- 1 locker must be provided every eight building occupants or staff

The proposed provision meets the demands of the Green Star Building Guidelines and is therefore considered acceptable.

Reference was also made to the Parramatta DCP Part 8.2.6.4.3 which stipulates EOTF for non-residential development (excluding the town centre). The rates are shown in Table 23 below.

Table 23: End of Trip Facilities & Provision as per Parramatta DCP Part 8.2.6

<table>
<tr><th></th><th>Bicycle Parking Provision</th><th>Parramatta DCP – Part 8.2.6 EOTF Rates</th><th>DCP Requirements</th><th>EOTF Provision</th></tr>
<tr><td>Students</td><td>100 students</td><td rowspan="2">1 personal locker per bicycle parking space
1 shower and change cubicle for up to 10 bicycle parking spaces
Shower and change cubicle for 11 to 20 more bicycle parking spaces are provided
Additional shower and cubicles for each additional 20 bicycle parking or part thereof</td><td>6 unisex showers & change cubicles
100 lockers</td><td>No EOTF for students</td></tr>
<tr><td>Staff</td><td>8 staff</td><td>1 shower change cubicle
8 lockers</td><td>2 unisex shower & change cubicles
10 lockers</td></tr>
</table>

As shown in Table 23, the proposal is required to provide a minimum of 7 unisex showers / change cubicles and 108 lockers in accordance with Parramatta DCP. Given the proposal is for a high school, it is considered that these EOTF rates are excessive, particularly noting that students do not have the ability to shower in school after arriving to the school.

The proposed staff EOTF provisions meet the requirements of the Green Star requirements and will be dedicated to staff only. These are considered acceptable and are aligned with the requirements stipulated Green Star Building Guidelines.

Section 7 Public Transport

7.1 Demands

Future bus and train volumes have been calculated in Section 4.3, and are summarised in Table 24 to Table 26 for reference.

Table 24: Summary of Train Travel Demands

Train users	Baseline			Moderate			Reach		
	Mode Split	Volume		Mode Split	Volume		Mode Split	Volume	
		Stage 1	Stage 2		Stage 1	Stage 2		Stage 1	Stage 2
Students	9%	50	**90**	0%	0	0	0%	0	0
Staff	5%	3	**4**	5%	3	4	5%	3	4

Table 25: Summary of Bus Travel Demands

Bus users	Baseline			Moderate			Reach		
	Mode Split	Volume		Mode Split	Volume		Mode Split	Volume	
		Stage 1	Stage 2		Stage 1	Stage 2		Stage 1	Stage 2
Students	41%	230	410	48%	269	**480**	30%	168	300
Staff	3%	2	2	17%	9	**13**	5%	3	4

Table 26: Summary of Proposed Light Rail Travel Demands

Light rail users	Baseline			Moderate			Reach		
	Mode Split	Volume		Mode Split	Volume		Mode Split	Volume	
		Stage 1	Stage 2		Stage 1	Stage 2		Stage 1	Stage 2
Students	0%	0	0	0%	0	0	12%	67	**120**
Staff	0%	0	0	0%	0	0	20%	10	**16**

This traffic assessment considers the scenario which results in the largest travel demand as the most conservative approach, as underlined in Table 24 to Table 26.

For train travel, Table 24 outlines the highest travel demands would be the Stage 2 student and staff numbers with the baseline mode splits. Whilst it is anticipated some staff may utilise trains to travel to / from MPHS, it is highly unlikely students will utilise trains given the Meadowbank train station and any other train stations are located outside the school catchment. Therefore, the MPHS proposes no changes to existing train services.

For bus travel, Table 25 outlines the highest travel demands would be the Stage 2 student and staff numbers with the moderate mode splits, while for light rail travel, Table 26 shows the highest travel demands would be the Stage 2 student and staff numbers with the reach mode splits. It is understood the Melrose Park Precinct will utilise bus services until the PLR Stage 2 is operational in 2036, whereby light rail services will replace many bus services. The proposed MPHS travel mode targets reflect this transition with fewer students and staff utilising bus services in Stage 2.

7.2 Analysis

7.2.1 Bus

Based on Section 4.2, no students are eligible for free travel as part of the SSTS. However, as previously mentioned it is expected a large portion of students will utilise bus services to travel to / from MPHS. Based on the student location analysis it is anticipated approximately 76% of students that will live within 1.2 to 2.9km of the school in opening year and 60% by 2036.

As shown in Section 2.4.1, 524 and 802W bus routes are currently servicing the bus stops within close proximity to the proposed MPHS. As part of the activity to improve the public transport mode to the school and to accommodate the forecasted demand, one of the bus services (523 service) is also proposed to be altered to provide bus services from the northern part of the school catchment to MPHS. SINSW is currently consulting with TfNSW to alter the existing bus service. These discussions are currently still ongoing. Correspondence between SINSW and TfNSW is detailed in Appendix A.

It is also understood, as part of the TMAP trigger points it is intended more frequent bus services provided by TfNSW will be implemented to facilitate service needs of the growing Melrose Park population. Particularly as the town centre is anticipated to be completed by opening year of MPHS it is understood more frequent bus services to facilitate both students and staff will be implemented within the vicinity of the site.

To accommodate public and school bus services, the existing 2 bus stops at the southern side of Hope Street, are proposed to be consolidated into 1 bus zone, of approximately 60-metres. The existing bus stop along the western side of Wharf Road and at the northern side of Hope Street will be retained and operational for MPHS. The location of the proposed bus stop is shown in Figure 39.

The existing bus zones on Wharf Road and at the northern side of Hope Street have a kerbside length of approximately 20 metres and 25 metres, respectively, having a capacity for 1 bus in each zone. The proposed consolidated bus zone on Hope Street will have a kerbside length of approximately 60 metres, which typically accommodates 3 buses on each side at a fully independent spacing of six metres between buses, or 4 buses at a reduced spacing of 3 metres between each bus.

As detailed above, the target demand for bus services is approximately 480 students once the school opens. At 50 students per full bus, this would be equivalent to filling 10 buses in each of the morning and afternoon travel periods.

It is anticipated that students travelling to the site by bus would do so on a mixture of general public route services and dedicated school services, subject to future operations to be determined by TfNSW. Buses may be shared by members of the public and/or other schools. Therefore, the demand for 10 full buses would likely be spread across more buses, say 15.

The bus zone capacity of a total of 5 to 6 buses could accommodate the forecast demands in approximately 3 cycles of each bus zones. Assuming a timetabled separation of services by 5 – 10 minutes, this could be cleared within approximately 15 to 20 minutes in the afternoon (when bus service demand is often highest) and would likely be more spread during the morning. It should be noted that once the proposed light rail is operational, it is expected that the bus usage will decrease as students would utilise light rail to travel to/from the school.

7.2.2 Train

It is unlikely that many students will utilise travel by train due to the size of the school catchment area which does not span across any train stations.

As shown in Section 2.4, the closest train station is Meadowbank train station, located approximately 1.8km from MPHS. It is expected that travel by train may be used by some out of area students, as well as a portion of staff who typically travel further distances than students.

7.2.3 Proposed Light Rail

As detailed in Section 2.4.5, the proposed light rail station on Hope Street will be located 300m from the site. The proximity of the light rail means that travel by light rail is an accessible option for both students and staff. By reviewing the light rail route, the light rail is able to accommodate students that are located at the western side of the catchment. In addition, it is able to accommodate out of area students and staff who typically travel further distances than students.

Currently, no specific information is presented on when the light rail will be in operation. However, the design and early works have already begun, and the bridge construction will start in 2025. Therefore, it can be expected that the light rail will be in operation after the opening of the school.

7.3 Proposal

The proposed works include the provision of a consolidated bus zone on the southern side of Hope Street as shown in Figure 39. The proposed bus zone is 60 metres in length and 3 metres in width, as per *Bus Infrastructure Guidelines*. The bus zones will typically accommodate 3 to 4 buses at one time. The proposed school will include the 2 existing bus stops along Hope Street and Wharf Road.

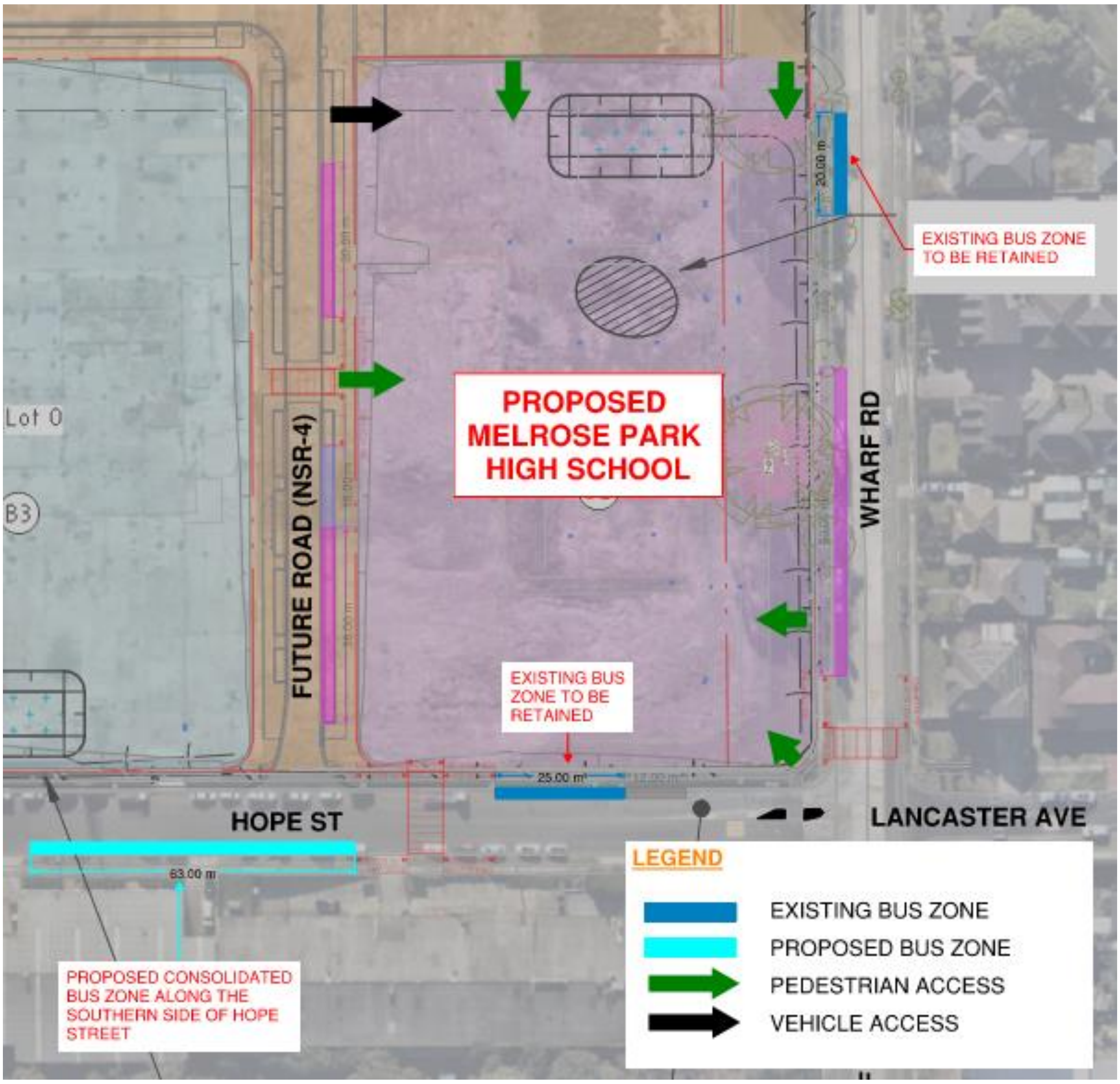


Figure 39: Proposed Bus Zones
Source: Modified from Nearmap

Section 8 Loading and Servicing

8.1 Analysis

Part 8 of the Parramatta DCP 2023 nor the general requirements of the Parramatta DCP stipulate a service vehicle parking rate for education establishments.

Nevertheless, the proposed development provides an on-site loading area and an on-street loading bay for MPHS. The on-site loading area will accommodate a total of 1 service vehicle up to and including a 10.8 metre waste truck, including provisions for the swept paths of these vehicles. The on-street proposed loading zone is intended to be utilised by couriers or smaller services vehicles and can accommodate 1 service vehicle up to 8.8m MRV.

This level of provision is considered acceptable noting that the development would generate a minimal demand for service vehicles, with a low number of deliveries expected per day. The proposed service vehicle and waste collection arrangements are therefore considered acceptable and ensure all vehicles will enter and exit the site in a forward direction. Swept path analysis for the loading dock and service vehicle area is provided in Appendix B, with an extract shown in Figure 40.

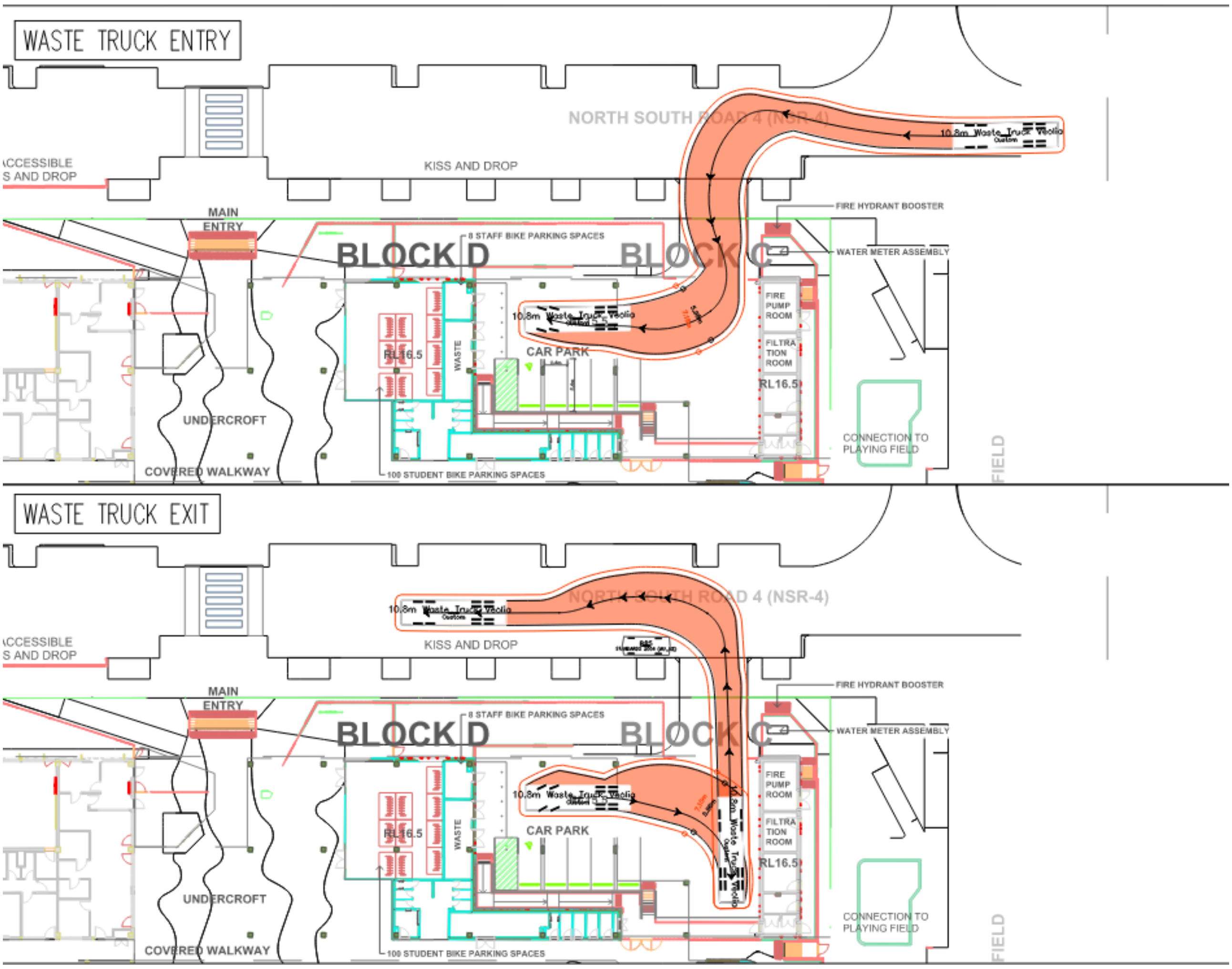


Figure 40: Swept Path of Proposed On-site Loading Area

Source: TTW

Service vehicle facilities shall be designed in accordance with AS2890.2.

8.2 Proposal

The on-site loading dock for service vehicles and waste collection is located west of the site within the on-site the car park. As mentioned before, the on-site loading zone can accommodate a vehicle up to 10.8m waste truck and the loading zone can be accessed via NSR-4. The loading dock will have a minimum head height of 4.5 metres. This head height is compliant with AS 2890.2 and ensures the waste truck can operate without any overhead obstructions.

The on-street loading bay will be located along the northern side of Hope Street adjacent to the existing bus zone. The loading zone has a proposed length of 12 metres and is therefore able to accommodate a vehicle up to 8.8m MRV. Figure 41 shows the proposed design for the on-site and on-street loading dock.

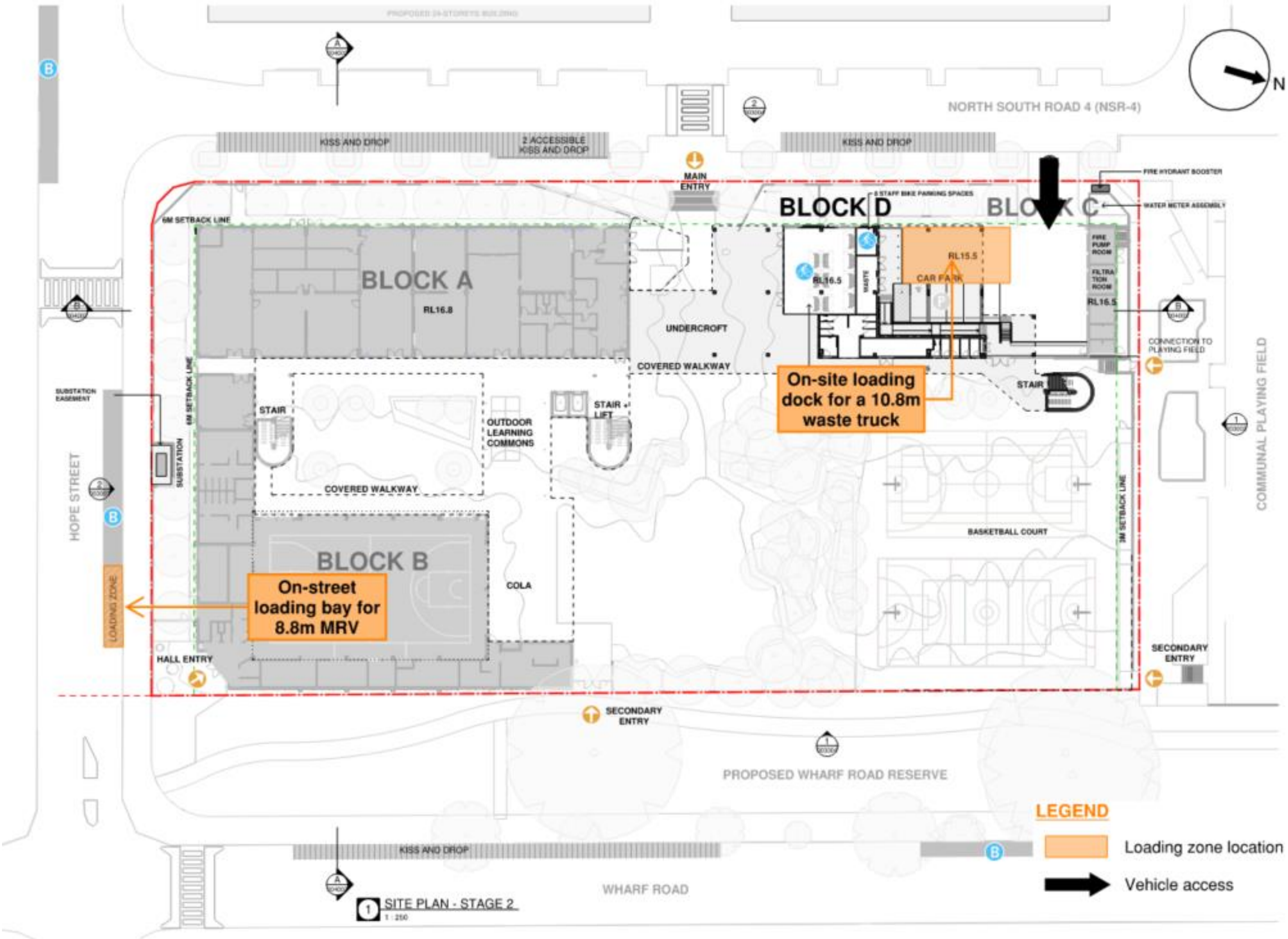


Figure 41: On-site & On-street Loading Areas

Source: Modified from NBRS (MPHS-NBRS-ZZ-ZZ-DR-A-000201[4])

8.2.1 Emergency Vehicles

There is no dedicated parking areas provided for emergency vehicles, however depending on the nature of the emergency there would be options along any at either of the K&R zones, the existing bus bay, the staff car park, the on-street loading dock, and the on-site loading dock for an emergency vehicle to park.

Section 9 Kiss & Ride

9.1 Demands

Future student K&R volumes have been calculated in Section 4.3 and are summarised in Table 27 for reference.

Table 27: Summary of Kiss & Ride Travel Demands

Kiss and Ride users	Baseline			Moderate			Reach		
	Mode Split	Volume		Mode Split	Volume		Mode Split	Volume	
		Stage 1	Stage 2		Stage 1	Stage 2		Stage 1	Stage 2
AM	31%	174	**310**	25%	140	250	15%	84	150
PM	25%	140	**250**	25%	140	250	15%	84	150

This traffic assessment considers the scenario which results in the largest travel demand as the most conservative approach. As **underlined** in Table 27, this scenario would be the Stage 2 student and staff numbers with the baseline mode splits applied.

9.2 Queueing Analysis

Table 28 outlines the forecast vehicle demands at each of the K&R zones, and the anticipated arrival rate during the peak period. The values listed may vary in operation, based on the actual turnover time of individual vehicles, and the initiatives in the operational STP that will be implemented to ensure reasonable operation of the K&R facilities.

The following key assumptions have been adopted in a base analysis:

- Each K&R bay has a turnover rate of 60 seconds per vehicle
- Each K&R bay would be 6 metres in length
- The K&R zone on NSR-4 has the capacity to accommodate 11 vehicles at any one time.
- The K&R zone on Wharf Road has the capacity to accommodate 10 vehicles at any one time.
- 100% of the K&R activity would occur during the peak period

Table 28 overleaf provides a breakdown of the forecast vehicle demands associated with the proposed K&R zones for the worst-case scenario.

Table 28: Kiss & Ride Queueing Analysis

Parameter	AM	PM
Forecast student demand	1,000 students	1,000 students
Portion travelling by car	31%	25%
Students travelling to school via private vehicles	310 students	250 students
Assumed occupancy	1.6 students per vehicle	1.6 students per vehicle
Vehicles using dedicated K&R	100%	100%
Forecast vehicles using K&R	194 vehicles	156 vehicles
Number of kiss & ride zones	2	2
Kerbside available	21 K&R bays	21 K&R bays
Turnover required	9 cycles per bay	7 cycles per bay
Assumed turnover rate	1 minute per cycle	1 minute per cycle
Peak duration	9 minutes	7 minutes

As shown in Table 28, this analysis demonstrates that the forecast demands for MPHS can be accommodated or processed in approximately 9 minutes within the dedicated on-street K&R areas. This is considered acceptable and a typical amount of time for K&R activity. Importantly, this also assumes that 100% of K&R activity would occur through the signposted bays at the school frontages.

It is noteworthy to mention, the proposed operational targets on day 1 term 1 are anticipated to be moderate targets (25% car passenger travel) and therefore the above assessment is considered to be the worst-case scenario.

9.3 Proposal

The proposed K&R zones are shown in Figure 42, including one zone on NSR-4 and one zone on Wharf Road. The zones are approximately 68 metres and 60 metres in length. In addition, an accessible kiss & ride area is located on new road adjacent to the proposed raised crossing, with an approximate length of 16 metres (or capacity for 2 accessible on-street bays).

It is noted that MPHS is located with large areas of catchment to both the north and west, therefore, the K&R provision has considered to the proposed student locations, when determining the most appropriate location to provide designated K&R areas. The K&R zones have been split so that NSR-4 can accommodate traffic arriving from the north and the Wharf Road K&R zone can accommodate traffic arriving from the west generally, noting that individual drivers may choose to drop off in locations that suit them (including outside these formalised zones).

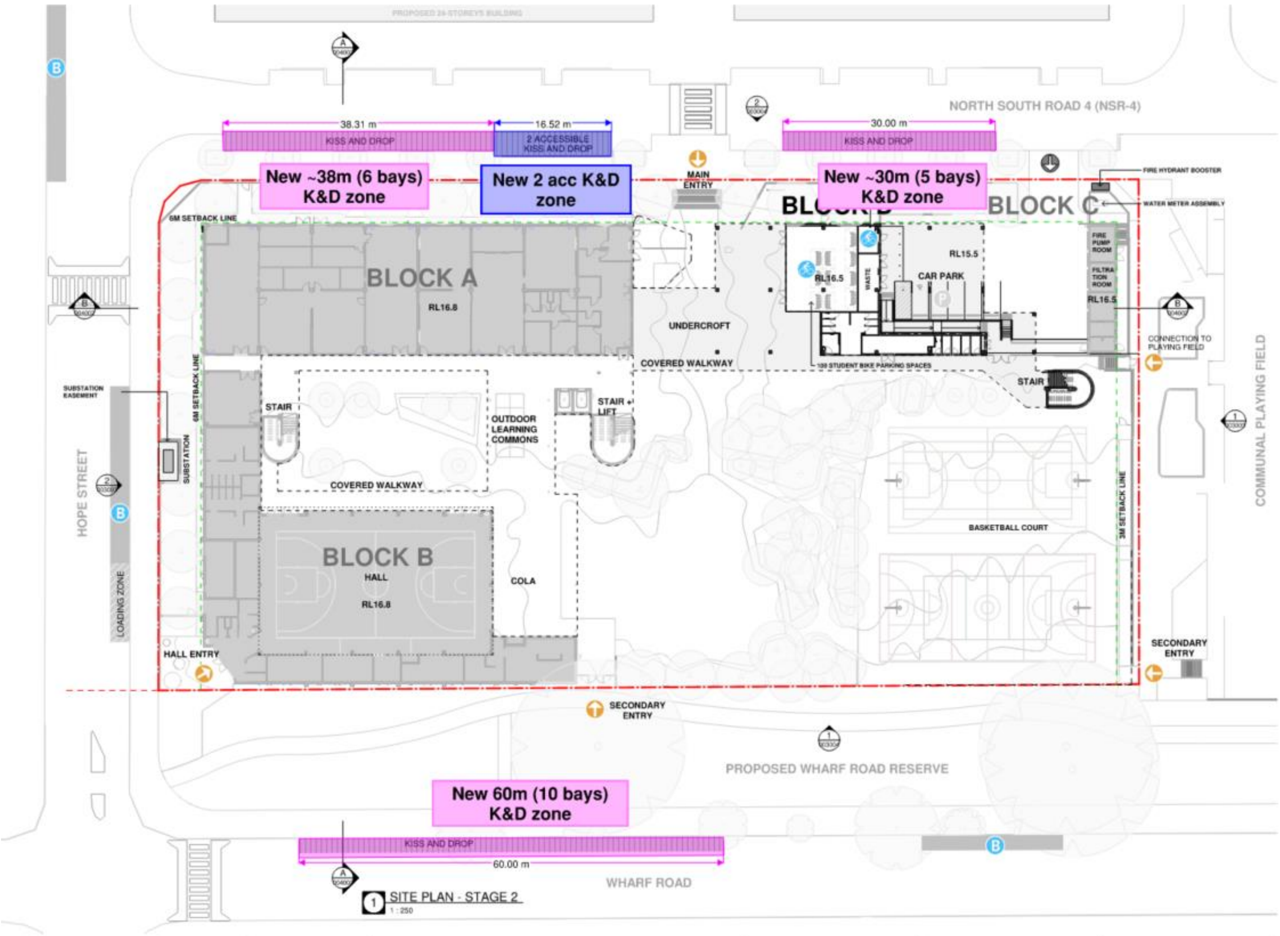


Figure 42: Proposed Kiss & Ride Zones

Source: Modified from NBRS (MPHS-NBRS-ZZ-ZZ-DR-A-000201[4])

9.4 Design

9.4.1 General Usage Kiss & Ride Zone

The K&R zone is proposed to be 2.3 metres wide. The K&R zone on NSR-4 will be an indented K&R zone whereas the K&R zone at Wharf Road will be kerbside parking. As a point of reference, Australian Standards AS2890.5 for on-street parking facilities requires a parking space width of 2.0 to 2.3 metre for a road with a 50km/h speed limit. It is acknowledged that a K&R zone operates differently to an on-street parking lane with more movements to and from the kerbside lane and high volumes of activity occurring in a short period of time. The proposed 2.3 metre width caters for this type of operation by providing a greater buffer to the adjacent lanes, and ensuring vehicles have adequate space to manoeuvre in and out of the kerbside lane and between other vehicles stopped in the K&R lane.

9.4.2 Accessible Kiss & Ride Bays

The NSR-4 K&R zone has been designed to accommodate two accessible K&R parking bays to provide transport functionality for the SELU rooms. These bays have been designed in accordance with AS2890.5 and AS2890.6 at a width of 3.2 metres, higher than the standard minimum width of 2.0 metre for kerbside parking. AS2890.5 is a specific design document for on-street parking facilities and includes this guidance for accessible parking design, which is a typical type of on-street parking configuration.

Figure 43 is an extract from AS 2890.5 which provides the design guidance for these facilities. Final arrangements for signage and line marking of these bays will be subject to future coordination with, and approval by, Council's Local Traffic Committee.

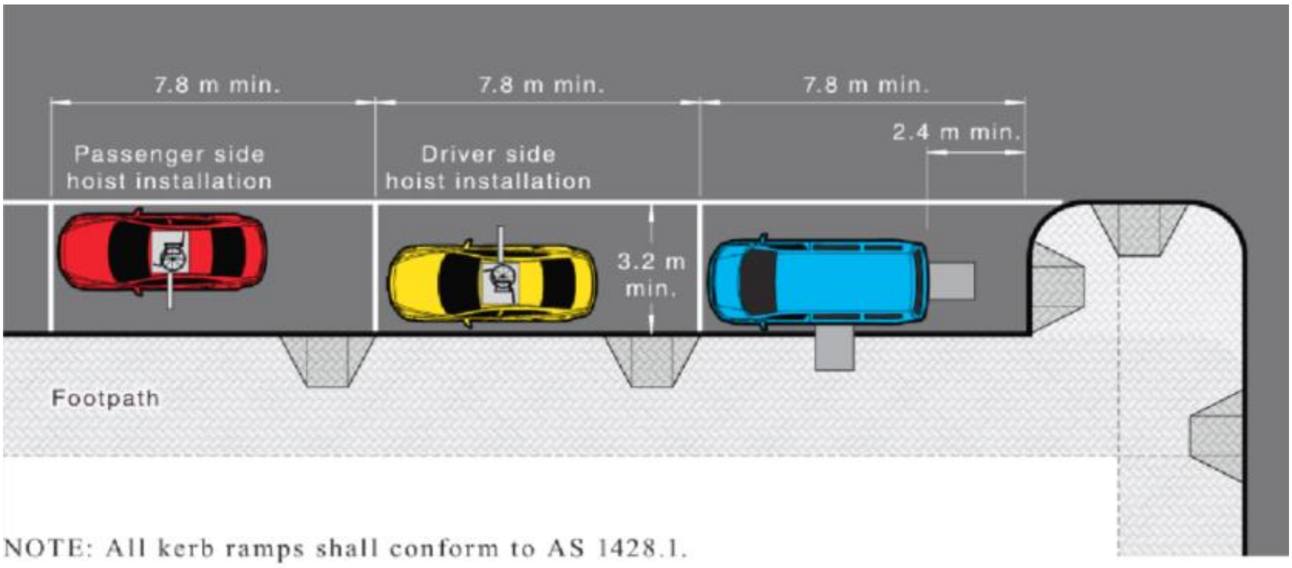


Figure 43: Compliant Design Options for Accessible Parallel Parking Bays (On-street)
Source: Australian Standard AS2890.5 (Figure 4.3)

Section 10 Car Parking

10.1 Demands

Future car parking demands have been calculated in Section 4.3, and are summarised in Table 29 for reference.

Table 29: Summary of Car Parking Demands

Car users	Baseline			Moderate			Reach		
	Mode Split	Volume		Mode Split	Volume		Mode Split	Volume	
		Stage 1	Stage 2		Stage 1	Stage 2		Stage 1	Stage 2
Student	2%	11	**20**	2%	11	20	0%	0	0
Staff	87%	45	**69**	55%	29	43	50%	26	40

As shown in Table 27, the scenario resulting in the largest travel demand would be Stage 2 with the baseline car mode splits applied, resulting in a requirement for 20 student car spaces and 69 staff car spaces. However, due to a combination of site constraints, the location of the site and provision of alternative travel measures, it is reasonable to adopt and provide a car parking provision for the forecasted reach target car travel mode of 50% for staff and 0% for students. The project will not provide any parking provisions for students, and this is inline with SINSW policies. Section 10.3 provides a detailed assessment of the parking provision and its adequacy.

10.2 Proposal

The proposed activity will provide a **total of 5 staff car parking** spaces, including 1 accessible parking space on-site. Due to site constraints, the remaining 39 car spaces will be provided as part of the MPPS project and will be located within the MPPS proposed staff car park. 39 car spaces within the MPPS car park will be allocated to MPHS staff.

The car parking provision will also be provided in two stages, below Table 30 provides a summary of the proposed staff parking provision and location for Stage 1 and Stage 2.

Table 30: Proposed Staff Parking Provision & Location

	Staff No.	Melrose Park High School	Melrose Park Public School	Total
Stage 1	52	5 car spaces	24 car spaces	**29 car spaces**
Stage 2	79	5 car spaces	39 car spaces	**44 car spaces**

As shown above in Table 30, a total of 29 car spaces will be provided for staff in Stage 1, comprising of 5 car spaces on MPHS site and 24 car spaces on MPPS site. Stage 2 will provide a total of 44 car spaces, comprising 5 car spaces on MPHS site and 39 car spaces (15 additional spaces) on MPPS site.

10.2.1 Melrose Park High School Staff Car Park

The MPHS site will provide 5 staff car spaces on-site, these are detailed below in Figure 44.

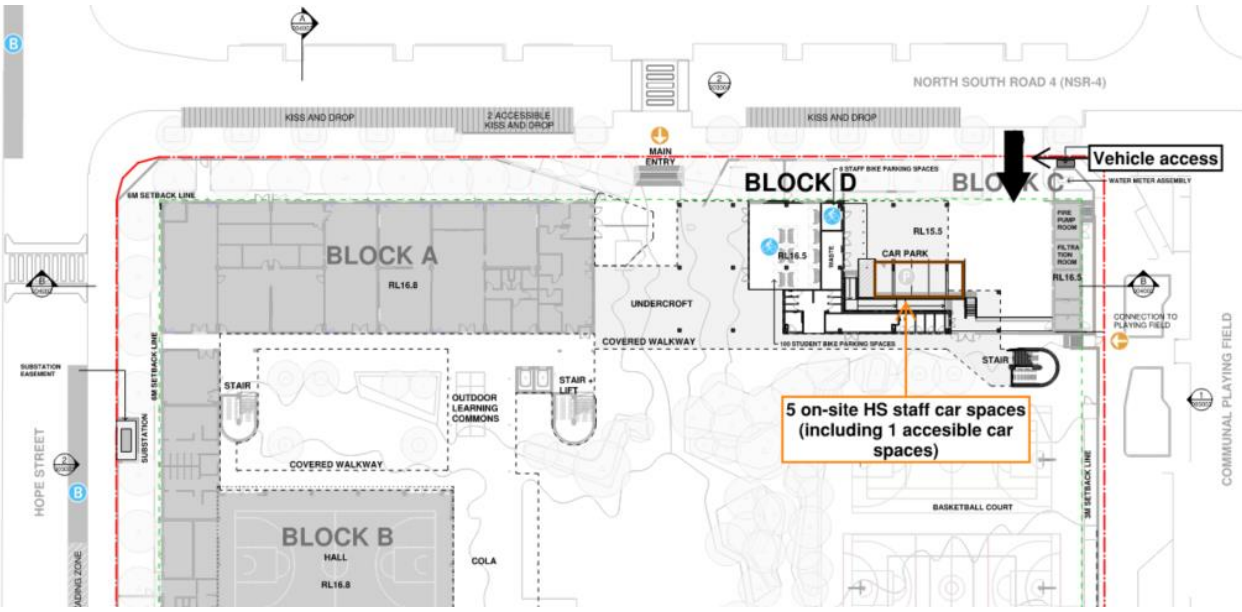


Figure 44: Proposed MPHS Car Park

Source: Modified from NBRS (MPHS-NBRS-ZZ-ZZ-DR-A-000201[4])

10.2.2 Melrose Park Public School Staff Car Park

As detailed in Section 3.3 the MPPS project will deliver staff car parking, some of which will be allocated to MPHS staff. Stage 1 will provide 24 MPHS staff car spaces, while Stage 2 will provide an additional 15 staff car spaces. A total of 39 staff car spaces dedicated to MPHS will be located on the MPPS site. The proposed parking arrangement is detailed below in Figure 45.

Figure 45: Proposed MPHS Car Park within MPPS Site
Source: Modified from PTW Architects (Drawing is working in progress)

The path of travel for staff to / from the MPPS car park is approximately 200 metres to the MPHS access. Details are provided in Figure 46.

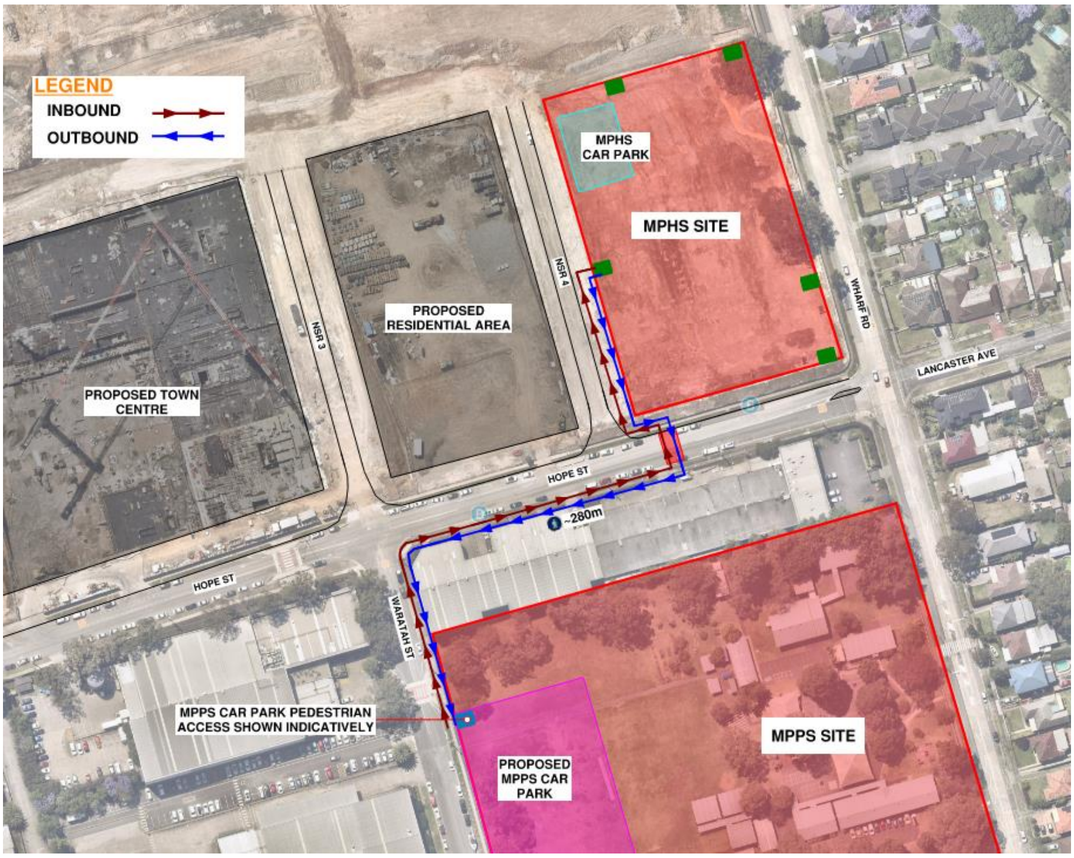


Figure 46: Proposed Travel Path Between MPHS & MPPS Staff Car Parks
Source: Modified Nearmap

10.3 Analysis

10.3.1 Parramatta DCP Parking Requirements

Reference was made to Parramatta DCP, Part 8 which stipulates car parking requirements for centres, precincts and specific sites. In particular, Section 8.2.6.4.2 details the following in relation to parking within the Melrose Park Precinct:

> ***8.2.6 Melrose Park Urban Renewal Precinct***
>
> *8.2.6.4.2 On-Site Parking*
>
> *Controls*
>
> ***C.01*** *Car parking rates for Melrose Park are as per the rates identified in Table 6.2.1 of the Parramatta DCP 2023. While these rates in the table refer to minimums, these rates are to be applied as maximum rates in Melrose Park and should not be exceeded.*

Table 6.2.1 of the Parramatta DCP does not provide specific parking rates for schools, but does outline the following requirement in relation to educational establishments:

> *"Required parking to be confirmed through a traffic and transport impact assessment. The assessment must demonstrate the development will not result in any adverse impacts on on-street parking in surrounding residential areas."*

In summary, the Parramatta DCP does not provide specific parking rates for schools, however controls within Melrose Park Precinct section aim to reduce the provision of parking requirements and work to maximum parking rates rather than minimum rates. The proposed MPHS project aims to align with the controls set out in Section 8.2.6.4.2 of the Parramatta DCP and provide a restrained level of car parking to work towards reducing existing car travel mode trends and promoting active and public transport.

10.3.2 Other Development Control Plan School Parking Rates

To provide a comparison of educational establishment parking rates in other DCPs throughout metropolitan Sydney Table 31 provides a summary of parking rate requirements and has applied these to the maximum capacity of the proposed MPHS.

Table 31: Other DCPs Parking Requirement

DCP Reference	DCP requirements	MPHS Max Capacity	Parking Space Requirements
Ryde DCP 2014	1 space per 2 staff members	79 Staff & 1,000 Students[1]	40 parking spaces
Marrickville DCP 2011	Between 1 space per 2 staff members and 1 space per 5 staff members (depending on locations)		16-40 parking spaces
Willoughby DCP 2016	1 space per 2 staff members		40 parking spaces
Campsie & Bankstown Centre Draft DCP 2023 (draft)	1 car space per employee (maximum rates)		Maximum of 79 parking spaces
Cumberland DCP 2021	1 space per 20 year 12 students + 1 space per 1 staff plus 1 visitor parking space per 100 students		97 parking spaces (79 staff + 8 students + 10 visitors)

DCP Reference	DCP requirements	MPHS Max Capacity	Parking Space Requirements
Fairfield CityWide DCP 2024	1 space per employee plus 1 space per 10 students in Year 12 (where applicable)[1]	79 Staff & 1,000 Students[1]	95 parking spaces (79 staff + 16 students)
Canada Bay	No specific parking rate		-

[1] Assume total students are distributed evenly between Year 7 to Year 12.

Table 31 indicates that there are a number of LGAs within relatively close proximity to the site which provide a parking rate of 1 space per 2 staff for schools. These LGAs are similar in nature to the proposed Melrose Park Precinct, located in built up areas typically located in proximity to frequent public transport services. Table 31 also notes there are a few surrounding LGAs that require a car parking rate of 1 space per 1 staff, it is understood these LGAs are more car dependant and are not relevant to adopt in relation to the proposed Melrose Park Precinct and specifically the MPHS site.

In reference to the proposed MPHS which proposes a maximum capacity of 79 staff, adopting the 1 space per 2 staff parking rate, would equate to a requirement of 40 parking spaces. A total provision of 44 staff car parking spaces will be provided for MPHS. This consists of 5 staff parking spaces as part of the MPHS project and 39 staff parking spaces as part of the MPPS project.

A proposed parking provision of 44 staff car parking spaces is therefore typically aligned with other LGAs with similar characteristics to the proposed Melrose Park Precinct and is considered supportable.

10.3.3 Site Specific Parking Assessment

In order to determine an appropriate level of parking provision for MPHS a number of assessments were completed, including a site specific analysis which developed baseline, moderate and reach travel mode targets, a review of other LGA DCP parking rates, a review of the Parramatta DCP objectives for the Melrose Park Precinct and consultation with SINSW, TfNSW and Council were completed during the two TWG meeting.

Following these assessments and consultations, a parking provision of 0.55 car spaces per staff (55%) was considered appropriate. Table 32 provides details of the proposed parking rate and provision in response.

Table 32: Proposed Staff Parking Provision & Location

	Staff No.	Parking Rate	Parking Requirement	Proposed Parking Provision		
				MPHS	MPPS	Total
Stage 1	52	0.55 car spaces per staff	29	5	24	**29 car spaces**
Stage 2	79		43	5	39	**44 car spaces**

As shown in Table 32 applying a 55% parking rate to staff numbers in Stage 1 and Stage 2 results in the requirement of 29 car spaces in Stage 1 and 43 car spaces in Stage 2. A total provision of 44 staff car parking spaces will be provided for MPHS. This consists of 5 staff parking spaces as part of the MPHS project and 39 staff parking spaces as part of the MPPS project. Further details in relation to the adequacy of the proposal are set out in the following section.

10.3.4 Adequacy of Proposal

As discussed at length in Section 4.3 and throughout this document, the project is seeking to use the opportunities presented by a new site to establish new targets for travel behaviour which differs from other existing schools. In order to avoid generating high levels of additional vehicular traffic through induced demand, transport provisions and capacity (including car parking provision) are specifically targeted to achieve a mode shift away from private vehicle usage.

To support the sustainable transport strategy for the project and work towards this target car parking demand, the following is provided:

- The TMAP transport planning objectives note that the Melrose Park Precinct has been planned with the goal of delivering balanced, integrated and sustainable outcomes to achieve the proposed transport targets of 5% walking and cycling mode share, 45% public transport mode share and 50% car mode share. It is also noted that these mode shares are for peak hour trips external to the development. It is anticipated that trips within the development will be primarily undertaken by active transport. The MPHS project provides a car parking provision of 55% and a reach target mode share split of 50% of staff travelling by car. The MPHS therefore aligns with the overall objectives of the TMAP and is therefore considered acceptable.
- The Melrose Park TMAP leverages off and facilitates existing, planned and potential future transport options and accommodates the staged implementation of these proposals. Figure 47 below has been extracted from the TMAP and shows the overall, integrated transport strategy.

Table 4.3 : Melrose Park integrated transport objectives and indicators

Objective	Melrose Park indicators
1. Contribute to a general mode shift to public and active transport and reduce non-car mode share for peak trips to / from Melrose Park	Reducing the reliance on private car travel will provide significant benefits for future residents of Melrose Park whilst also minimising the impacts of the proposed developments on existing users of the road network. A non-car mode share of 50% represents a sizeable shift from the existing travel characteristics of the area. The delivery of significant new infrastructure – PLR Stage 2 and Sydney Metro West – will enable this step change in travel behaviour. These new public transport options will directly connect Melrose Park to the cores of the Eastern and Central CBD's, enhancing accessibility and reducing travel times to jobs and services.
2. Ensure that the transport network and services reflects the future growth and importance of key activity centres to / from Melrose Park	Melrose Park is perfectly located to provide 30-minute access to both the Eastern and Central CBD by public transport. Other nearby strategic centres include Sydney Olympic Park, Rhodes Business Park. This goal of 30-minute access to centres has been a key driver throughout the TMAP process and will be a key indicator for the overall success of the precinct.
3. Ensure all new residents in Melrose Park are within a safe walking distance of open space, social infrastructure and retail facilities.	The proposed development will deliver important non-residential facilities with retail, commercial and community uses as well as public open space. In order to maximise the benefits from these uses it will be imperative that a convenient, comfortable and safe walking environment is provided.
4. Minimise travel times along key public transport and movement corridors	Victoria Road is a regionally significant movement corridor. The efficiency and productivity of the corridor will need to be protected and the Melrose Park development will need to be implemented in a way that does not lead to travel time increases of more than 5% through the study area. This TMAP shall seek to meet this performance indicator through the provision of appropriate infrastructure upgrades and the minimisation of car use for trips to and from Melrose Park.

5. Ensure that the future transport network and services are attractive to the trip patterns of future residents	Melrose Park will be well served by existing and planned public transport services but there is a need to ensure patronage from the development does not exceed the planned future capacity of the network. The TMAP process will ensure that the staged development of the precinct occurs in lock-step with the provision of public transport infrastructure and services. The development will seek to focus highest intensity land uses around the primary public transport network such that 90% of the potential passenger catchment is within a 800 metre radius of a stop on the intermediate public transport system and/or within 400 metres of a local and suburban public transport route.
6. Ensure the key road network performs at acceptable levels of service during the highest impact peak hour.	The two key access points for the precinct will be on Victoria Road at Kissing Point Road and Wharf Road. Maintaining intersection level of service at LOS E or better will ensure that Victoria Road through traffic is not adversely impacted by the development whilst also allowing efficient access into and out of the precinct. It is noted that Victoria Road/Wharf Road currently performs at LOS F.
7. Prioritise active and public transport, and demand management measures to support sustainable travel behaviour and encourage reduced car use	Maximising the use of active and public transport will have significant benefits for the future residents and visitors of Melrose Park and will reduce the impacts of the development on the wider transport network. A key driver of active and public transport use will be the prioritisation of these modes throughout the precinct. This can primarily be done through best-practice urban and public realm design and by designing the precinct with pedestrians and cyclists as a primary consideration.

Figure 47: Melrose Park Integrated Transport Objectives

Source: TMAP 2019

- In opening year of MPHS it is understood a maximum of 6,700 dwellings and the Melrose Town Centre will be completed. As part of the TMAP trigger points it is intended at this stage more frequent bus services provided by TfNSW will be implemented to facilitate service needs of the growing Melrose Park population. This includes additional frequency of M52 bus services on Victoria Road as to provide ultimate frequency of 18 per hour in peak direction. This will provide additional public transport options for staff travelling to / from the site.
- In the interim until PLR Stage 2 is completed, the Melrose Park Precinct is currently chartering a private shuttle bus during morning and afternoon peak periods to transport residents and employees of the Melrose Park Precinct to Meadowbank wharf and train station, the frequency of this service is intended to increase to 12 services during peak hours by 2027. The nearest shuttle service bus stop to MPHS is located at Taylors Avenue / Cobham Avenue, this is approximately 200 metres walking distance from MPHS and provides a convenient option for staff to travel to / from school via public transport. Further details are provided in Section 2.4.1.
- MPHS is anticipated to reach maximum capacity by 2036. It is anticipated by 2036 the delivery of significant new infrastructure including the PLR Stage 2 and Sydney Metro West will enable this step change in travel behaviour. These new public transport options will directly connect staff travelling to MPHS to the cores of the Eastern and Central CBD’s, enhancing accessibility and reducing travel times.
- Melrose Park structure plan recognises that there is a very strong link between parking provision and travel behaviour, and that it is a critical element of the integrated transport strategy. The need to constrain parking supply as a means of reducing travel by private car is a crucial element to work towards a shift in travel mode behaviours towards active and public transport. By providing a constrained parking provision of 55% car parking for staff at MPHS works towards these objectives of changing travel mode behaviours.
- The proposed end-of-trip facilities will be provided as part of the Stage 1 development and provide storage for approximately 8 staff bicycles, as well as showers and change facilities for staff. This ensures that active transport is a good and accessible option for staff and assists in reducing travel by car. The bicycle storage area is fully enclosed and is adjacent to staff shower and change facilities, providing an excellent level of amenity.

- The Department of Education is currently reviewing and considering options for local staff recruitment, i.e. encouraging employment of staff who live in close proximity to the site. All recruitment will continue to be decided on a merit basis, with proximity to site being just one element in the recruitment process. Higher numbers of staff living close to the site, compared to other typical schools, will allow the walking and cyclist mode shares to be increased.
- It is also noteworthy to mention, if the baseline car mode splits were applied, resulting in a requirement for 20 student car spaces and 69 staff car spaces. The proposal, combined with MPPS, project provides a total of 44 on-site car parking spaces resulting the potential of 25 staff car spaces and 20 student car spaces to park on-street. Students and staff travelling to the site by car will be highly discouraged, management to discourage private vehicle travel will be detailed in STP. In the event additional vehicles exceed the demand of the on-site car park, as detailed in Section 2.5 there is an abundance of unrestricted spare capacity within the surrounding streets, this may be utilised in the interim until Melrose Park Precinct is fully developed, following which there will be sufficient levels of public transport to accommodate staff travelling to site via other travel modes.

It is acknowledged that the target mode splits are ambitious and depart reasonably significantly from the baseline scenario. However, as mentioned, the mode splits are considered achievable due to the considerations listed above, and the opportunity for the new school to establish new travel habits. Further to this, it is important to note that the targets are not expected to be achieved in the opening year of the school, but rather reached over time as the school grows.

10.3.5 Car Parking Mitigation Measures

In order to achieve a 55% car mode split the following mitigation measures will be considered:

- SINSW to appoint a travel coordinator. This role's responsibility will be to implement specific strategies to encourage higher active and public transport uptake. Responsibilities also include enforcement of the STP and undertaking annual student and staff travel mode surveys to monitor travel to / from school.
- Implementation of a site specific STP which details transport encouragement programs and activities to reduce car travel and encourage active and public transport, measures include but are not limited to:
  - New starter kits, to make students and staff aware of available travel options
  - Implementation of a Travel Access Guide (TAG) providing information on available transport options
  - School initiatives i.e. school walking bus and ride to school week

  Further details are also outlined in the preliminary STP and will be updated once the school is operational.
- In order to provide adequate car parking provision for staff the MPPS Stage 1 car park will be completed prior to Day 1 Term 1 of MPHS. Construction of the MPPS Stage 2 car park is also required prior to Stage 2 of MPHS.

10.4 Design

10.4.1 Staff Parking Spaces

Car parking is to be provided in accordance with AS2890.1:2004. Key design parameters for 90-degree angled parking include:

- Classification: Class 1 (all-day employee parking) or higher
- *Note: Higher classes are typically only required for higher turnover usage and would not be required for this use class, however does have a narrower aisle width (with wider space) which can be a useful design option to consider.*
- Parking space width: 2.4 metres or higher
- Aisle width: 6.2 metres (or as required by class)
- Parking space length: 5.4 metres

- Gradient: 1:20 (5%) maximum

Swept path analysis for the car park and vehicle access point is provided in Appendix B.

10.4.2 Accessible Parking Spaces

Accessible parking is to be provided in accordance with AS2890.5: 2020. Key design parameters for accessible parking include:

- Classification: Class 1 (all-day employee parking) or higher
- Parking space width: 2.4 metres or higher
- Aisle width: 6.2 metres (or as required by class)
- Parking space length: 5.4 metres
- Gradient: 1:20 (5%) maximum
- A shared area on one side of the accessible space of 2.4 metres wide x 5.4 metres long

Swept path analysis for the car park and vehicle access point is provided in Appendix B.

10.5 Operation

The proposed car park would be controlled by a sliding gate at the entry point to act as the out-of-hours secure perimeter.

10.6 Accessible Parking

The Building Code of Australia (BCA) defines accessible parking requirements as a portion of total capacity depending on the land use. To cater for the school development, accessible parking is to be provided at a rate of 1 space for every 100 car parking spaces or part thereof (1%). The development is required to provide a minimum of 1 accessible parking spaces within the MPHS site and 1 accessible parking spaces within the MPPS site.

The proposed design provides 1 accessible space, complying with the BCA.

There is also proposed provision of accessible K&R bays, as detailed in Section 9, which will be designed in accordance with AS2890.5 and AS2890.6.

Section 11 Traffic Impacts

11.1 Traffic Generation (Proposed MPHS)

As discussed in Section 3, the MPHS is anticipated to accommodate 560 students and 52 staff in Stage 1 and 1,000 students and 79 staff in Stage 2. SINSW enrolment forecasts estimate in opening year, 2027 MPHS enrolments will be close to 560 students and 52 staff. The school capacity will be reached gradually with an anticipated maximum capacity year of 2036, however to provide a conservative assessment the traffic analysis has considered the maximum student and staff demand. Forecasted vehicle volumes are detailed below.

11.1.1 Vehicle Volumes

Future travel demands for car usage for students and staff have been calculated in 4.3 and are summarised in Table 33 and Table 34 respectively.

Table 33: Summary of Student Vehicle Volumes

	Baseline		Moderate Target		Reach Target	
	Stage 1	**Stage 2**	**Stage 1**	**Stage 2**	**Stage 1**	**Stage 2**
Student number	560	1,000	560	1,000	560	1,000
Mode split (K&R)	27%	27%	25%	25%	15%	15%
Mode split (driver)	2%	2%	2%	2%	0%	0%
Demand (K&R)	151	270	140	250	84	150
Demand (driver)	11	20	11	20	0	0
Occupancy (K&R) [6]	1.6 students / car	1.6 students / car	1.6 students / car	1.6 students / car	1.6 students / car	1.6 students / car
Occupancy (driver)	1 student / car	1 student / car	1 student / car	1 student / car	1 student / car	1 student / car
Car number (K&R)	94	**169**	88	156	53	94
Car number (driver)	11	**20**	11	20	0	0
Vehicle volume	105	**189**	99	176	53	94

As shown in Table 33 the scenario that would generate the highest volume of student traffic would be Stage 2, applying to the baseline car travel mode splits. Whilst it is unlikely MPHS will operate with baseline car travel mode splits, to provide a robust assessment the worst-case scenario has been adopted, this would result in **378 student vehicle trips** (189 inbound, 189 outbound) during the morning and school afternoon peak periods.

[6] Trip Generation Surveys, Schools Analysis Report 2014 detailed average car occupancy for high schools to be 1.65 and 1.77 in the AM and PM peak hours respectively. A trip rate of 1.6 students was therefore adopted for our assessment.

A summary of the proposed MPHS staff travel demands are provided below in Table 34.

Table 34: Summary of Staff Vehicle Volumes

	Baseline		Moderate Target		Reach Target	
	Stage 1	**Stage 2**	**Stage 1**	**Stage 2**	**Stage 1**	**Stage 2**
Staff number	52	79	52	79	52	79
Mode split (Passenger)	2%	2%	15%	15%	10%	10%
Mode split (driver)	87%	87%	55%	55%	50%	50%
Demand (Passenger)	1	2	8	12	5	8
Demand (driver)	45	69	29	43	26	40
Occupancy (Passenger)[7]	1.6 staff / car	1.6 staff / car	1.6 staff / car	1.6 staff / car	1.6 staff / car	1.6 staff / car
Occupancy (driver)	1 staff / car	1 staff / car	1 staff / car	1 staff / car	1 staff / car	1 staff / car
Car number (Passenger)	1	**1**	5	8	3	5
Car number (driver)	45	**69**	29	43	26	40
Vehicle volume	46	**70**	34	51	29	44

As shown in Table 34 the scenario that would generate the highest volume of staff traffic would be Stage 2, applying the baseline car travel mode splits. Whilst it is unlikely MPHS will operate with baseline car travel mode splits, to provide a robust assessment the worst-case scenario has been adopted, this would result in **70 staff vehicle trips** (70 inbound, 0 outbound) during the morning and school afternoon peak periods as a worst-case scenario. In summary the total traffic volumes associated with MPHS are detailed below:

- AM peak period – 448 vehicle trips (259 inbound, 189 outbound)
- PM peak period – 448 vehicle trips (189 inbound, 259 outbound)

[7] Staff occupancy rates are not included in the Schools Analysis Report 2014, however the student trip rate was adopted for staff travelling to the site by car passenger to be consistent.

11.2 Proposed MPHS Traffic Distribution

To provide an understanding of the proposed MPHS traffic on the external road network, a traffic distribution analysis was completed and has been calculated using proposed student location data for students and assumed existing traffic distributions for staff.

Detailed traffic distribution diagrams are provided in Appendix C and the following section provides details of the worst case scenario, applying baseline travel modes to the Stage 2 (2036) student and staff numbers. The analysis shows the expected distribution of development traffic for students and staff and on the external road network.

11.2.1 Student Vehicle Trip Distribution

The student vehicle distribution splits during the AM peak period across the network have been determined based on the student location analysis in Section 4.2. Student vehicle trips will be distributed across the two K&R zones, located at NSR-4 and Wharf Road. The detailed distributions are outlined in Figure 48 and summarised below:

- 55% of students are picked up and dropped off at the Wharf Road K&R zone.
- 45% of students are picked up and dropped off at the NSR-4 K&R zone.

The above distribution is conservative as it assumes 100% of K&R activity would occur through the signposted bays at the school frontages. In practice, it is anticipated that some K&R activity would occur informally at other locations, reducing the demands on the main frontage K&R zones. Figure 48 illustrates the proposed student traffic distribution in the morning peak period.

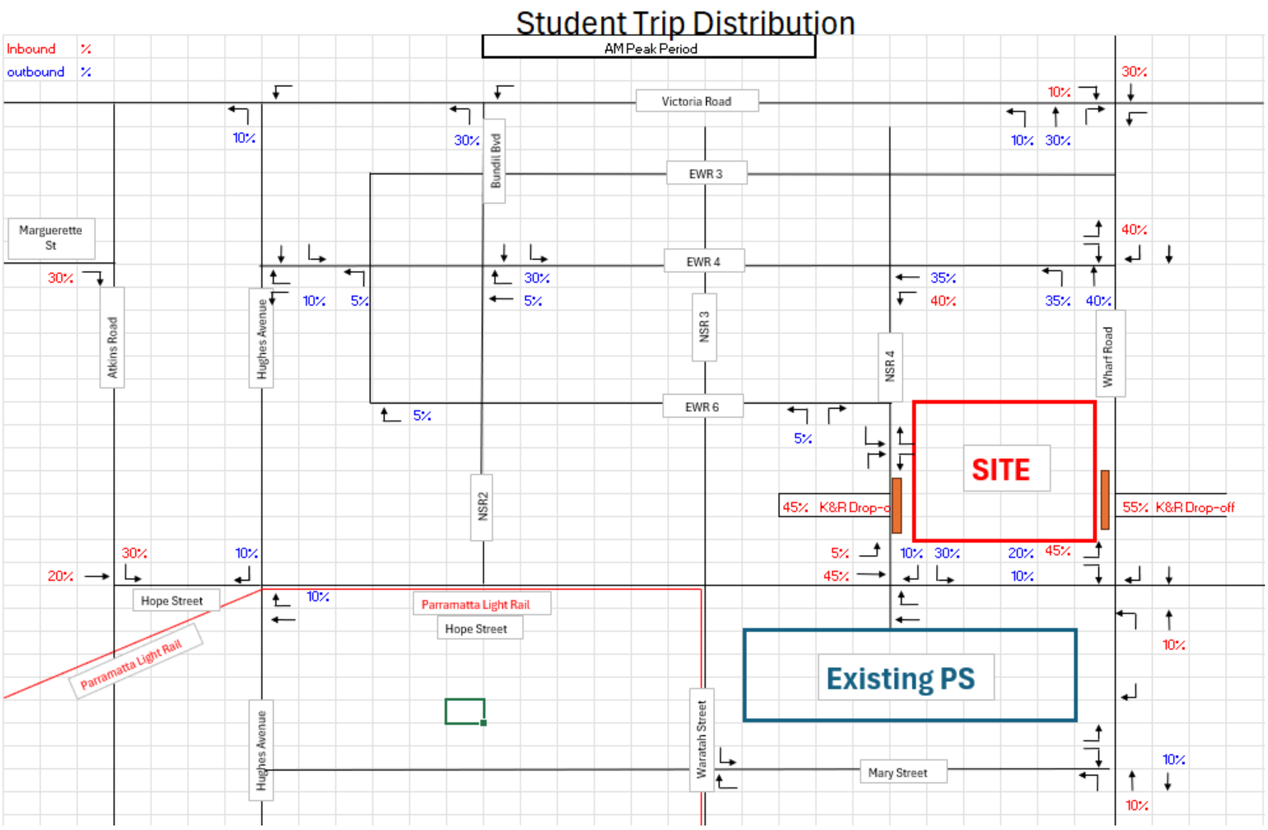


Figure 48: Student Inbound and Outbound Vehicle Trip Distributions – 2036 AM

The proposed student traffic distribution based on the student location analysis is shown above in Figure 48. It is noteworthy to mention the PM traffic distribution has also adopted the above distribution splits.

11.2.2 Student Vehicle Trip Volumes 2036

As previously mentioned, as a worst-case scenario, applying the base case travel mode results in Table 33, a vehicle demand of **189 vehicle movements inbound and outbound** during the AM peak period. The proposed vehicle movements have been applied to the distribution percentages on the external road network and are detailed below in Figure 49.

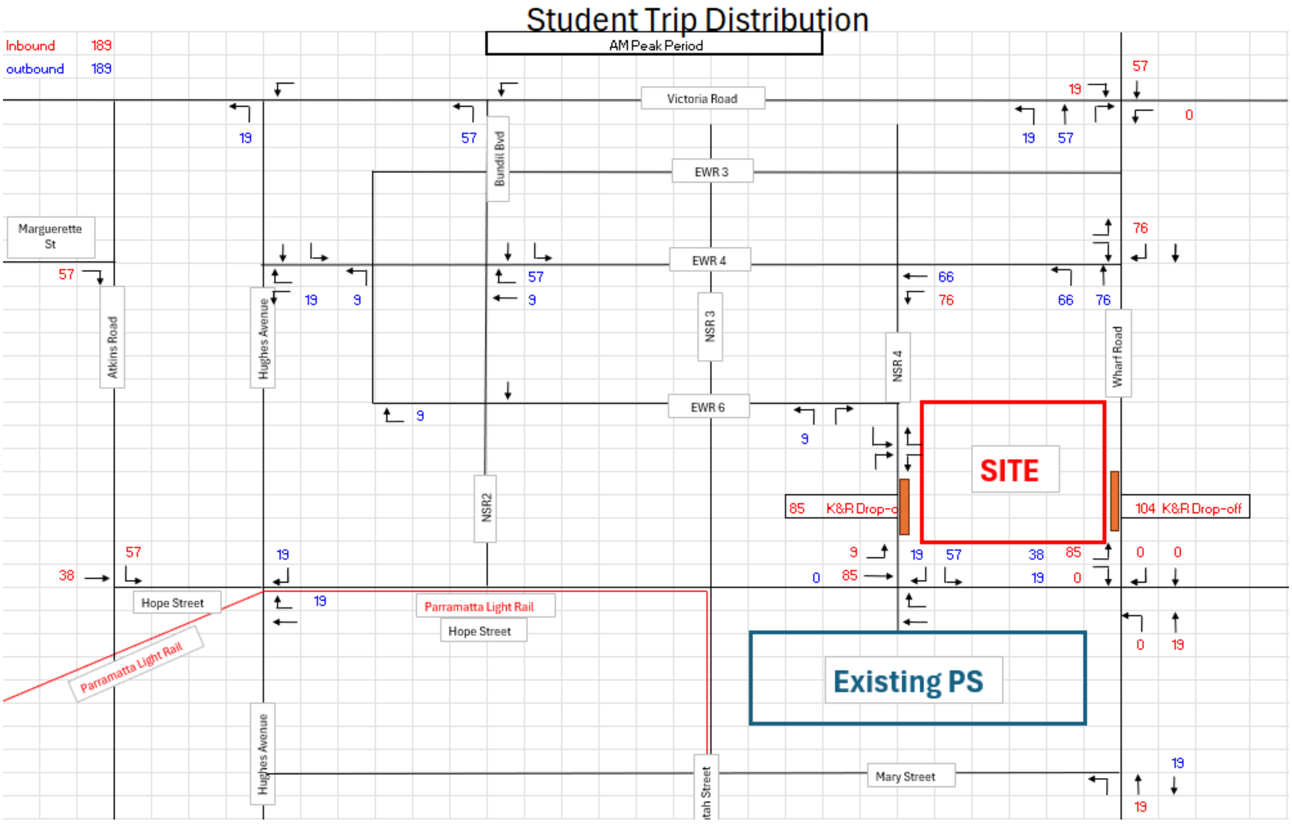


Figure 49: Student Inbound and Outbound Vehicle Trips- 2036 AM

As shown above in Figure 49, the proposed 189 inbound and 189 outbound vehicle movements have been applied to proposed traffic distributions. Specifically reviewing the existing Wharf Road / Hope Street / Lancaster Avenue intersection 19 vehicles will travel north via Wharf Road, 19 vehicles will turn right from Hope Street and 123 vehicles will turn left from Hope Street onto Wharf Road.

11.2.3 Staff Trip Distribution

The staff vehicle distribution splits during the AM peak period across the network have been determined based on estimations (based on the site's general location relative to surrounding residential areas and Victoria Road being the main arterial road. It is also noteworthy to mention, as a number of staff will park within the MPPS car park, there is likely a change in staff traffic distribution between 2027 opening year and 2036 Stage 2 given the PLR2 project is anticipated to be operational by 2036. It is likely the PLR2 will restrict right turn movements in / out of the site via Waratha Street, therefore a 2027 and 2036 staff distribution analysis has been completed. Detailed traffic distribution splits for 2027 and 2036 are provided in Appendix C.

As opposed to students, staff are not bounded by the proposed catchment area, and there is currently no accurate way of forecasting staff trip distribution given that there are no existing staff to analyse. Therefore, it is important to note that these are broad estimates that may vary significantly during the operation of the school and based on the location of staff during any given year. However, given the scale of staff trip generation in comparison to the student trip generation (and the overall levels of background traffic), these uncertainties relating to staff trip distribution are not considered to have any impact on overall results and assessment.

Figure 50 illustrates the proposed staff traffic distribution in the morning peak period in 2036.

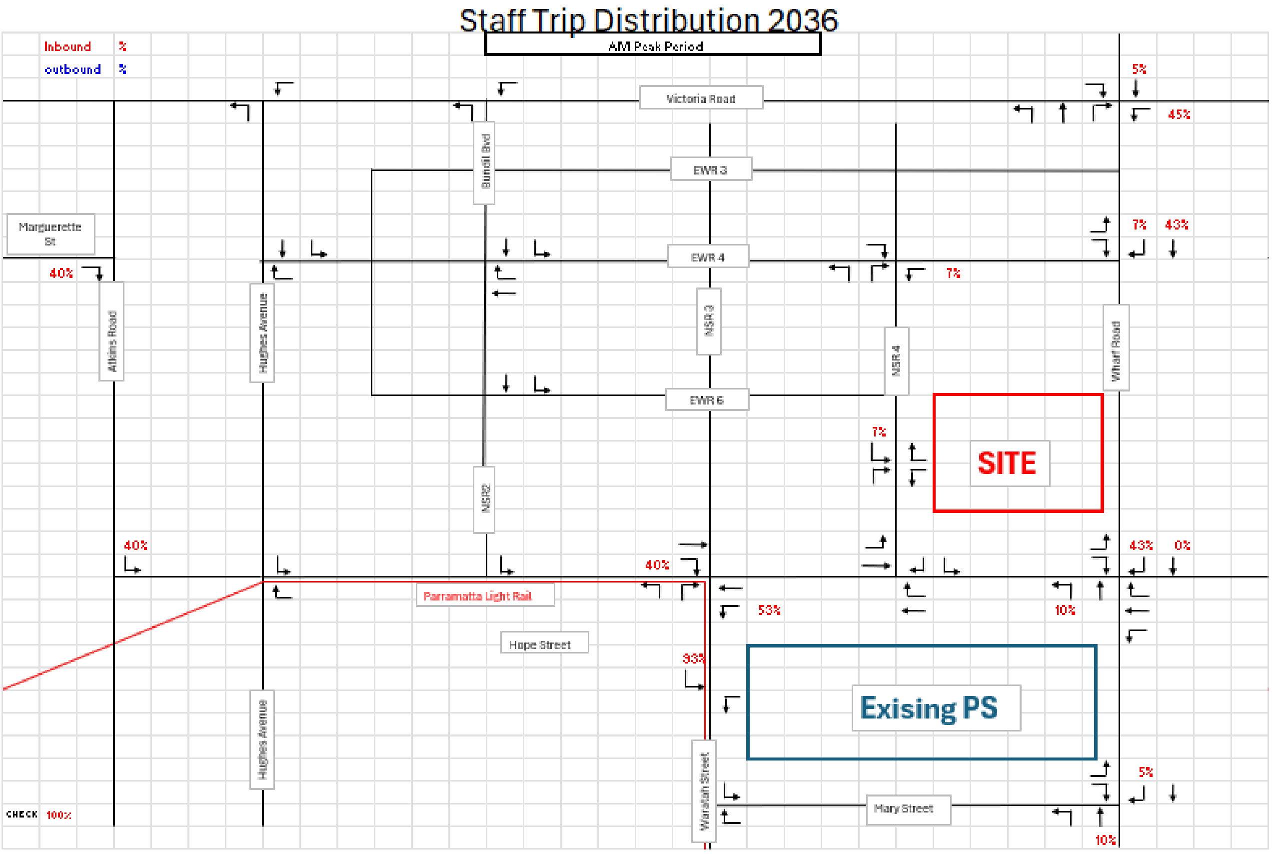


Figure 50: Staff Inbound Vehicle Trip Distribution - 2036 AM

The proposed staff traffic distribution is shown above in Figure 50. It is noteworthy to mention the PM traffic distribution assumes similar distribution splits for staff outbound movements, the one difference is vehicles travelling east on Victoria Road are assumed to turn right on Mary Street onto Wharf Road and access Victoria Road via Adelaide Street. These assumptions were made based on site observations and google maps analysis. Further details are provided in Appendix C.

11.2.4 Staff Vehicle Trip Volumes 2036

As previously mentioned in Table 34 as a worst-case scenario, applying the base case travel mode, results in a vehicle demand of **70 vehicle movements inbound** during the AM peak period. The proposed vehicle movements have been applied to the distribution percentages on the external road network and are detailed below in Figure 51.

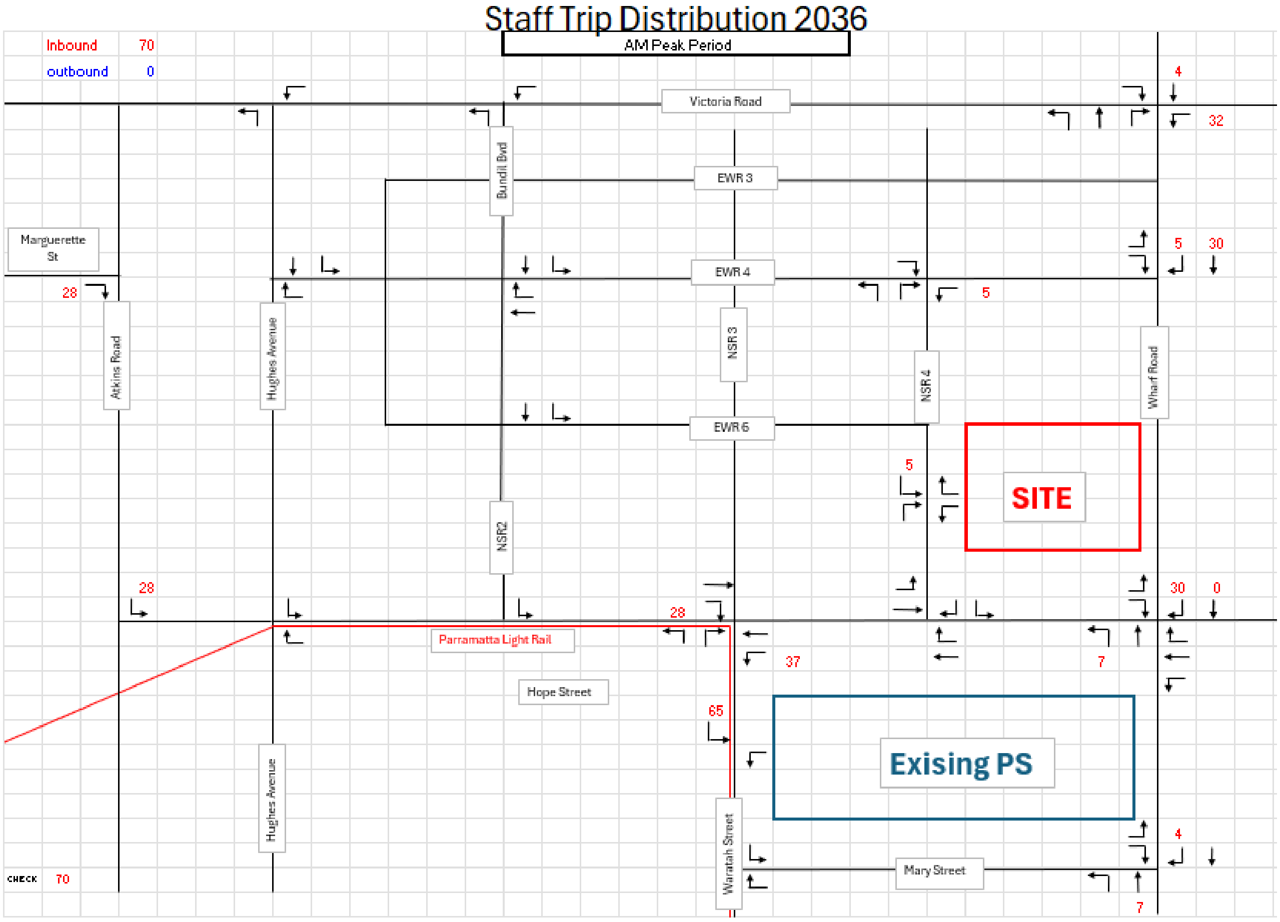


Figure 51: Staff Inbound Vehicle Trips- 2036 AM

As shown above in Figure 51, the proposed 70 inbound vehicle movements have been applied to proposed traffic distributions. Specifically reviewing the existing Wharf Road / Hope Street / Lancaster Avenue intersection 30 vehicles will turn right onto Hope Street from Wharf Road and 7 vehicles will turn left from Wharf Road onto Hope Street.

11.2.5 MPHS Student and Staff Vehicle Trip Volumes

As previously mentioned in Table 33 and Table 34 as a worst-case scenario, applying the base case travel mode results in a total student and staff vehicle demand of **259 inbound vehicle movements and 189 outbound vehicle movements** during the AM peak period. The proposed vehicle movements have been applied to the distribution percentages on the external road network and are detailed below in Figure 49.

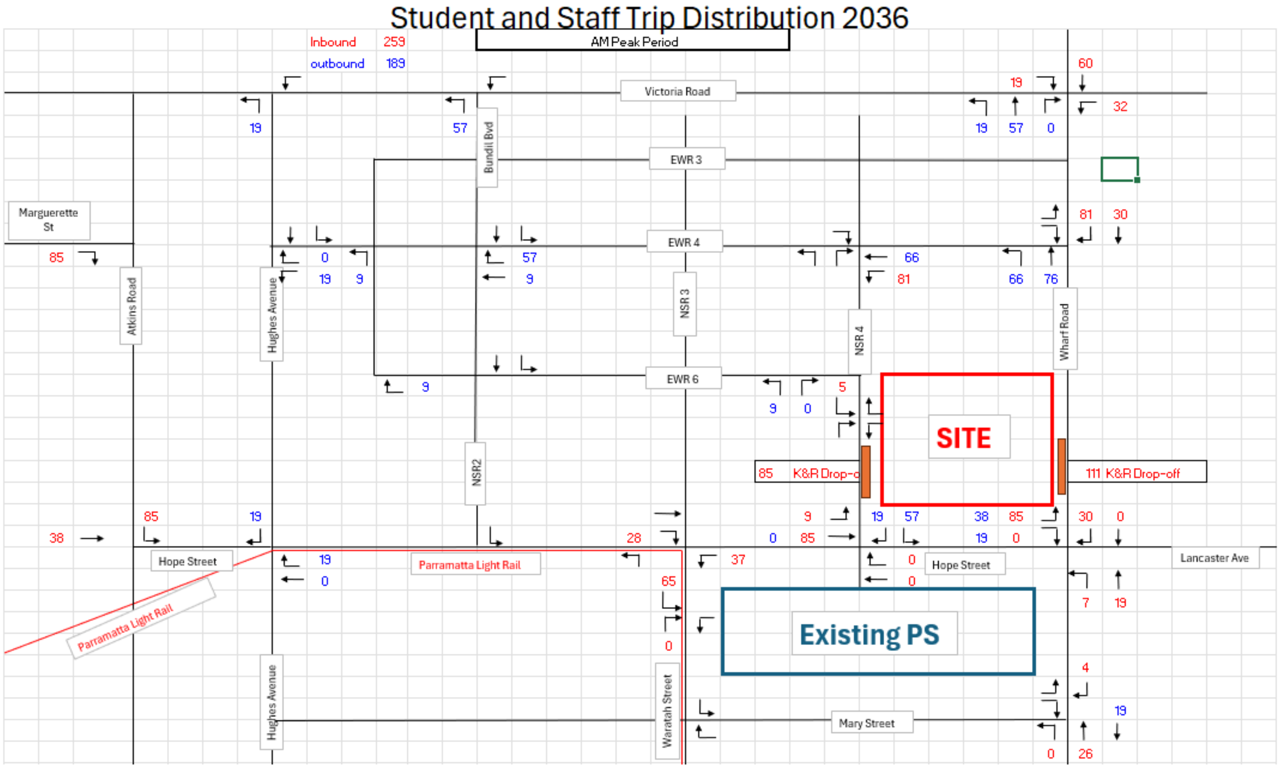


Figure 52: Student and Staff Inbound and Outbound Vehicle Trips- 2036 AM

As shown above in Figure 52, the proposed 259 inbound and 189 outbound vehicle movements have been applied to proposed traffic distributions. Specifically reviewing the existing Wharf Road / Hope Street / Lancaster Avenue intersection a total of 198 vehicles associated with the MPHS are anticipated to travel through this intersection during the peak hour period. Detailed traffic distribution analysis is provided in Appendix C.

11.3 Traffic Generation (Melrose Park North Precinct)

As explained in Section 1.8.2, the TMAP examined the transport characteristics of the development for Melrose Park Precinct (north and south) so that a consolidated suite of infrastructure upgrades and other strategies can be provided to allow for the development of all Melrose Park. It provided an in-depth analysis of the projected traffic generation for the Melrose Park Precinct and has been endorsed by TfNSW. Initially, detailed Aimsun traffic modelling was conducted and concluded the precinct can accommodate up to 11,000 dwellings providing the required infrastructure identified in the TMAP is delivered (Section 1.8.2), the internal road network is anticipated to be completed by Sekisui 2026.

Following the TMAP traffic modelling, Pentelic Advisory updated the Aimsun modelling and completed detailed SIDRA traffic modelling as part of the Melrose Park North Internal Street Network (DA 1100/2021), reference can be made to the Melrose Park North Internal Street Network, Traffic Report (Ref: TIAv02 dated 07/12/2022). The approved updated traffic modelling reflects changes since the TMAP's finalisation. One significant update in the modelling includes the addition of a primary school for approximately 800 students on the proposed MPHS site. The modelling assumed that most students would come from nearby areas and walk to and from school.

The specific traffic generation for a future primary school on the MPHS site, as incorporated into the updated Aimsun model and SIDRA models, are outlined in Table 35 below.

Table 35: Proposed Primary School Traffic Generation (Ultimate 2036)

Source: Melrose Park North Internal Street Network, Traffic Report, Pentelic Advisory

Land Use	Metric	Quantum	Morning Car Trip Generation Rate	Morning Peak Car Trips	Evening Car Trip Generation Rate	Evening Peak Car Trips
Primary school	Students	800	0.255 per student	204	0.05 per student	40
Primary school	Staff	47	0.2 per staff	9	0.2 per staff	9

As shown in Table 35, a morning car trip generation of 0.255 vehicle trips for students and 0.2 vehicle trips for staff was applied, equating to **408 student vehicle trips** (204 inbound, 204 outbound) during the morning peak period. The commuter evening trip generation of 0.05 vehicle trips per student were applied, equating to **80 student vehicle trips** (40 inbound, 40 outbound) during the evening commuter peak period. A trip generation of 0.2 vehicle trips per staff was applied, equating to **9 vehicle trips** (0 inbound, 9 outbound) during the evening commuter peak period. Whilst an afternoon school peak period, typically between 2:30-3:30pm was not modelled it is understood afternoon school traffic volumes would be similar to the morning peak period, if not lower.

It is noteworthy to mention, these trip generation rates, especially for staff are considered low when compared to the existing travel mode survey results for other schools detailed in Table 13 and Table 14, however these trip rates were considered reasonable given the school is proposed to cater for the demand associated with the new Melrose Park Precinct. In summary the total traffic volumes associated with the school as part of the Melrose Park Nort Precinct are summarised below:

- AM peak period – 417 vehicle trips (213 inbound, 204 outbound)
- PM commuter peak period – 89 vehicle trips (40 inbound, 49 outbound)

It is also noteworthy to mention, whilst the Melrose Park North Precinct traffic modelling modelled the proposed site as a primary school, it is expected there would be a negligible difference, if not a lower traffic generation rate for a high school, given more high school students typically walk and travel to / from school via public transport.

11.3.1 Comparison Between Melrose Park North PS & MPHS Traffic Volumes

To avoid double counting of additional traffic associated with the proposed MPHS it is important to take into account the above school traffic volumes which were captured in the Melrose Park North Precinct.

A comparison between the previously modelled ‘primary school’ traffic volumes as part of the Melrose Park North Internal Street Network, Traffic Report and the worst-case scenario for the proposed MPHS provides a summary and shows the differences in traffic volumes.

Table 36: Traffic Generation Comparison – Melrose Park Precinct

	Melrose Park North 'Primary School'	Proposed MPHS	Difference
Morning Peak	417	448	+31 vehicles
School Afternoon Peak	-	448	Not modelled
Commuter Afternoon Peak	89	67[11]	-22 vehicles

As shown in Table 36, as a worst-case scenario it is assumed MPHS may generate an additional 31 vehicles during the morning peak period and a reduction of -22 vehicles in the commuter peak period when compared to the previously modelled 'primary school' traffic volumes as part of Melrose Park North Internal Street Network, Traffic Report.

The traffic modelling assessments were conducted for the 2036 AM and PM network peak periods and therefore traffic modelling was not completed for the school afternoon peak period, however this is considered acceptable given the background traffic during the school afternoon peak is anticipated to be lower than the afternoon commuter peak period.

It is also noteworthy, to reiterate the proposed MPHS traffic generation has assumed a worst-case scenario by applying the baseline car travel mode splits to maximum student and staff numbers. If the proposed moderate or reach travel mode targets were adopted the proposed MPHS would generate even less traffic as detailed below:

Moderate Target

- AM peak period: 407 vehicles (231 inbound, 176 outbound)
- PM commuter peak period: 61 vehicles (35 inbound, 3 outbound)

This would result in a net reduction of **-10 vehicle trips** during the morning peak period and **-28 vehicle trips** during the commuter peak period when compared to the previously modelled 'primary school' traffic volumes as part of the Melrose Park North precinct.

Reach Target

- AM peak period: 232 vehicles (138 inbound, 94 outbound)
- PM commuter peak period: 35 vehicles (14 inbound, 21 outbound)

This would result in a net reduction of **-185 vehicle trips** during the morning peak period and **-54 vehicle trips** during the commuter peak period when compared to the previously modelled 'primary school' traffic volumes as part of the Melrose Park North precinct.

It is therefore evident, the proposed MPHS will not generate any additional traffic than what has been analysed and approved as part of the Melrose Park North Precinct. The MPHS proposal is therefore considered to have no material impact to the operation of the surrounding road network and such is consider acceptable.

Details of the Aimsun traffic modelling results are provided below in Section 11.4.

[11] 15% traffic generation applied to afternoon commuter peak in accordance with Trip Generation, Schools Report 2014

11.4 Traffic Modelling

11.4.1 Interpretation of Modelling Results

The commonly used measure of intersection performance, as defined by TfNSW, is vehicle delay. SIDRA Intersection determines the average delay that vehicles encounter and provides a measure of the level of service. A Level of Service of D or better is generally considered acceptable operation.

Table 37 shows the criteria that SIDRA Intersection adopts in assessing the level of service.

Table 37: SIDRA Level of Service Criteria

Level of Service (LOS)	Average Delay per vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but crash study required
D	43 to 56	Near capacity	Near capacity, crash study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

11.4.2 Traffic Modelling Results (Melrose Park North Precinct)

The model used to assess the impacts of the Melrose Park North precinct examined the following key internal intersections:

1. Hughes Avenue/Linden Grove
2. Hughes Avenue/Hope Street
3. NSR-2/Hope Street
4. Hope Street/NSR-3/Waratah Street
5. NSR-4/Hope Street
6. Wharf Road/Hope Street
7. Wharf Road/Taylor Street
8. Wharf Road/EWR-4
9. NSR-2/EWR-4
10. NSR-3/EWR-4
11. NSR-4/EWR-4
12. NSR-4/EWR-6
13. NSR-3/EWR-6
14. NSR-2/EWR-6
15. NSR-2/EWR-3

The intersection locations are illustrated in Figure 53.

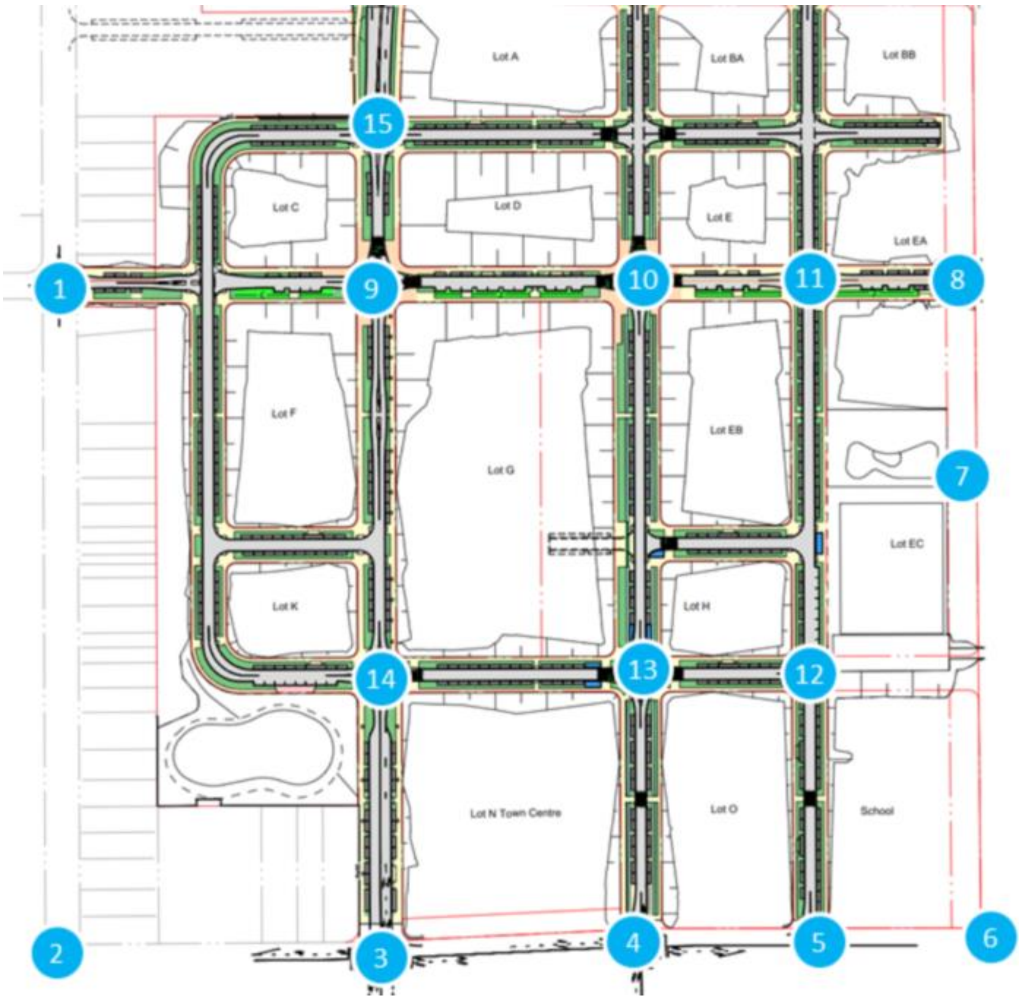


Figure 53: Modelled Internal Intersection Locations

Source: Melrose Park North Internal Street Network, Pentelic Advisory

The SIDRA intersection results have been extracted from the Melrose Park North Internal Street Network, Traffic Report and are shown in Table 38 below for peak period conditions for 2036 considering full development of the Melrose Park Precinct. Details to the SIDRA result can be achieved from the traffic report in Appendix C.

It is noteworthy to mention, whilst the internal road network is intended to be completed before opening year of the school. The developers voluntary planning agreement (VPA) requires works including roads and footpaths to be completed prior to development occupation. Meaning if the road network is not constructed no students will live within this area and there will be no demand from students from this area.

Table 38: 2036 Intersection Performance

Source: Melrose Park North Internal Street Network, Pentelic Advisory

ID	Intersection	Recommended Control	Morning Peak		Evening Peak	
			Average Delay	LoS	Average Delay	LoS
1	Hughes Av/Linden Gr	Roundabout	12	A	11	A
2	Hughes Av/Hope St	Signals	36	C	33	C
3	NSR-2/Hope St	Signals	30	C	30	C
4	NSR-3/ Hope St	Signals	35	C	33	C
5	NSR-4/Hope St	Give way	7	A	11	A
6	Wharf Rd/Hope St	Give way	20	B	33	C
7	Wharf Rd/Taylor St	Give way	8	A	10	A
8	Wharf Rd/EWR-4	Give way	10	A	14	A
9	NSR-2/EWR-4	Roundabout	11	A	10	A
10	NSR-3/EWR-4	Roundabout	9	A	9	A
11	NSR-4/EWR-4	Give way	9	A	12	A
12	NSR-4/EWR-6	Give way	7	A	9	A
13	NSR-3/EWR-6	Roundabout	9	A	9	A
14	NSR-2/EWR-6	Roundabout	10	A	9	A
15	NSR-2/EWR-3	Give way	9	A	7	A

Source: Melrose Park North Internal Street Network, Pentelic Advisory

As shown in Table 38, the above SIDRA results demonstrate that the road network will operate satisfactorily under the forecast 2036 traffic volumes during the morning and evening peak periods. Whilst no traffic modelling has been completed without the school site it is understood if a scenario excluding the school was modelled it would only improve the traffic conditions further.

The intersections of Hope Street with Hughes Avenue, NSR-2 and Waratah Street have been modelled conservatively assuming conditional light rail phases along Hope Street are called every cycle. This also results in increased delay at the intersection of Hope Street / Wharf Road. In practice, it is anticipated the arrival of light rail vehicles will run every 7.5 minutes (8 times per hour) and therefore these intersections will operate with a lower delay and LoS.

However, even under this conservative assumption, these intersections would still perform satisfactorily under the forecast 2036 traffic volumes.

11.4.3 Traffic Modelling Results (Melrose Park Town Centre)

In addition, updated SIDRA traffic modelling was also completed as part of the Melrose Park Town Centre (DA 764/2022), the traffic modelling was informed by the Melrose Park North Internal Street Network, Traffic Report. Reference can be made to the Melrose Park Town Centre Traffic report (Ref: 2240RevB dated 27/07/2023) in Appendix E.

As part of the Melrose Park Town Centre approval, in the interim NSR-2 / Hope Street (ID 3) will be upgraded to a standard 'priority control' T-Junction prior to the introduction of PLR Stage 2. This interim layout is shown in Figure 54 and includes a dedicated right turn bay for traffic turning from Hope Street into NSR-2.

NSR-3/ Hope Street (ID 4) is also required to be upgraded prior to the introduction of PLR Stage 2 to a roundabout. This interim layout is shown in Figure 55 and show a pedestrian/cyclist refuge now integrated with the temporary roundabout at the NSR-3 / Hope Street intersection.

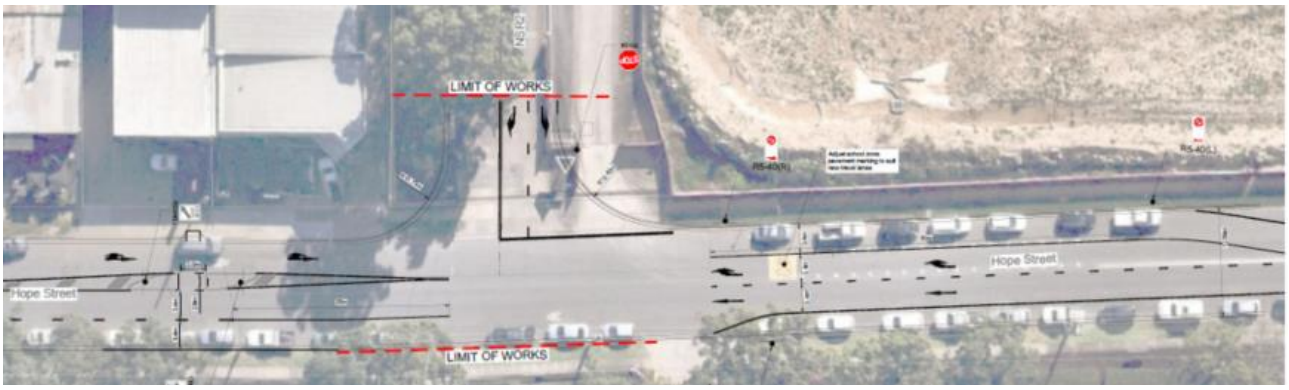


Figure 54: Interim Arrangements – NSR-2 & Hope Street
Source: Melrose Park Town Centre TIA (DA 764/2022)

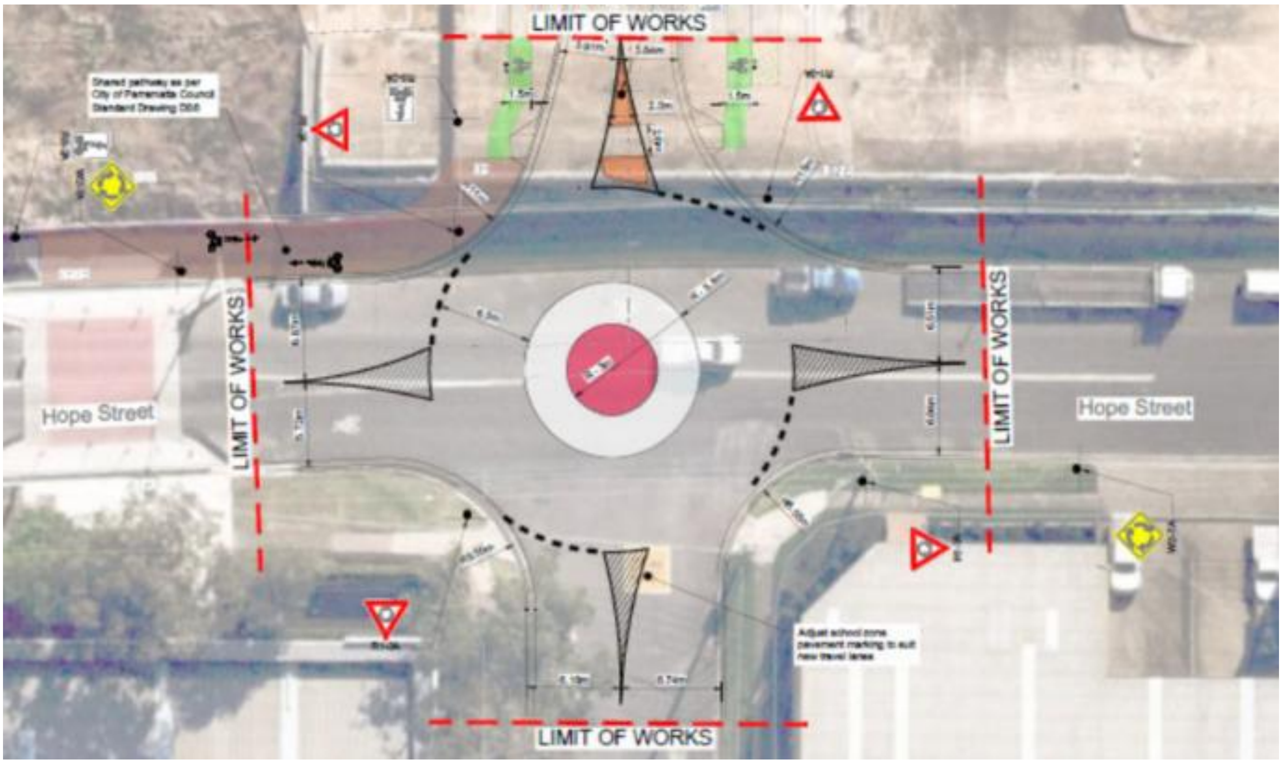


Figure 55: Interim Arrangements – NSR-3 & Hope Street
Source: Melrose Park Town Centre TIA (DA 764/2022)

The SIDRA intersection results have been extracted from the Melrose Park Town Centre, TIA and are shown in Table 39 below. It is understood the interim traffic models have included traffic volumes associated with Melrose Park North Precinct, including the vehicle trips associated with the MPHS site.

Table 39: Melrose Park Town Centre Interim Intersection Performance

Source: Melrose Park Town Centre TIA,

ID	Intersection	Control	Morning Peak		Evening Peak	
			Average Delay	LoS	Average Delay	LoS
3	NSR-2/Hope St	Stop	12	A	11	A
4	NSR-3/ Hope St	Roundabout	10	A	10	A

As shown in Table 39, the above SIDRA results demonstrate that the intersections will operate well, with a LoS A in the interim until the PLR Stage 2 is delivered. The above intersections also have an abundance of spare capacity in both the morning and afternoon peak periods.

As per discussions with Council during the TWG on 11th September 2024 it is anticipated the intersection upgrades will be implemented prior to opening year 2027 of MPHS.

11.4.4 Response to CoP Traffic Assessment Requests

During consultation, CoP have raised traffic comments in a formal letter dated 19th December 2024. The below comments have been extracted from the letter and a response is provided below:

Intersection of Hope Street and Wharf Road

"A combined raised pedestrian and cyclist crossing will be required in Hope Street at Wharf Road and at Wharf Road just north of Hope Street (other crossing facilities may be required subject to further assessment as part of the REF). These crossing facilities are however likely to create issues with road safety and traffic flow at the Hope/Wharf intersection such as vehicles queuing in Wharf Road either blocking the intersection or obstructing sight lines for vehicles in Hope Street that are either continuing straight through or turning right. Should the crossing be relocated further north in Wharf Road, there is a concern that it will be away from the pedestrian desire lines and therefore, may not be used. Accordingly, as a result of the school development, an interim roundabout will need to be constructed to ensure safe pedestrian and traffic flow.

It is noted that at previous TWG meetings, SINSW mentioned that an option may be explored to bring forward the construction of Traffic Signals at this intersection. For this option to be supported by Council, an in principle approval will be needed from TfNSW prior to any REF approval.

With regards to a proposal by City of Ryde to restrict access to Lancaster Avenue to left in, left out, please note that this will be insufficient in resolving Council's Safety concerns at this location.

TTW take into consideration Council's comments and note the following:

- Based on the student location assessment completed in Section 4.2, it is understood the majority of students will be located in the northern portion of the catchment. Based on this analysis it is assumed approximately 20 students will utilise the existing pedestrian refuge crossing on Hope Street / Wharf Road intersection. From our assessment the desire line for a crossing opportunity is further west on Hope Street as shown in Figure 34. Locating a crossing in this location will better facilitate students crossing to the southern side of Hope Street to utilise bus services. It will also better facilitate staff walking to / from the MPPS car park. It is therefore considered acceptable to retain the existing pedestrian refuge at the Hope Street / Wharf Road intersection and not upgrade it to a raised crossing, based on the low pedestrian volumes. Locating the raised crossing further west on Hope Street will relieve some congestion and improve sightlines at the Hope Street / Wharf Road intersection.

- The proposal will provide a raised pedestrian crossing on the northern leg of Wharf Road. In relation to blocking the intersection it is understood a roundabout may assist in providing safer pedestrian and traffic flow, however a roundabout will not completely mitigate traffic and pedestrian flows i.e. there is still a possibility for vehicle queuing with the installation of a roundabout as the pedestrians will continue to have priority. The above traffic modelling shows the Hope Street / Wharf Road intersection will operate at a LOS B in the AM peak period and LOS C in the PM peak period which is considered satisfactory. Opening year of the school will be operating at much lower pedestrian and traffic volumes than modelled and therefore these results are a worst-case scenario. If Council are concerned about the potential traffic and pedestrian safety impacts SINSW may explore an option to have the raised crossings patrolled to alleviate potential traffic congestion. However, it is important to reiterate, these peak pedestrian and traffic flows are considered as a worst-case scenario which typically last for 15-30 minutes throughout an entire day. Retention of the existing giveaway intersection is therefore considered acceptable, given the intersection has sufficient capacity. Traffic management measures can be implemented as part of a mitigation measure if Council are concerned with safety aspects.

- In relation to bringing forward the construction of traffic signals at this intersection. A high-level review of TfNSW signal warrants has been completed. It is understood traffic volumes and proposed pedestrian crossing numbers would not meet the required warrants and are significantly lower than what TfNSW require to provide traffic signals. As a result, no further investigation of implementing traffic signals has been completed or consulted with TfNSW.

Modelling and Mode Share

All modelling and assumptions regarding mode share will be heavily scrutinised by Council. It is important that modelling for the intersection of Hope Street and Waratah Street be based on up-to-date traffic counts (ideally for typical Tuesday to Thursday noting lower traffic volumes may be present on a Monday or Friday due to current Work from Home trends). Relying solely on the Melrose Park North DA and TMAP modelling will not be sufficient as Council has observed that in some directions, the modelling showed almost half the amount of traffic in the eastbound direction in Hope Street than what Council has observed through their own traffic counts.

Following the above, comment TTW provided a response to Council to further justify the proposed mode share targets, this is included in Appendix F. As detailed in Section 3, the mode share targets have been based on the student location analysis and the objectives set out in the TMAP which aim to achieve higher active and public transport mode shares. Nevertheless, the traffic assessment considers the travel mode scenario which results in the largest travel demand as the most conservative approach. i.e. applying the baseline travel modes for car travel rather than the targets, and applying the maximum 'reach' for students that live within a 15min walking distance to the school for walking travel mode.

In relation to CoP request of completing new traffic counts, TTW also provided further information to Council, this is included in Appendix F. TTW note that providing new traffic counts would not provide accurate background traffic and given the the level of assumptions required to confirm future year background traffic. It is deemed most appropriate to adopt the approved 2036 background traffic from the Melrose Park North Street Network Traffic Report. This assessment is considered extremely conservative given the assessment is adopting baseline travel mode scenarios and applying them to 2036 background traffic. In practice given the level of public infrastructure, particularly the introduction of the light rail directly adjacent to the site private vehicle travel to / from the site will be much lower than the baseline travel modes.

11.4.5 Traffic Summary

In summary, based on the traffic modelling completed as part of the TMAP and the detailed Melrose Park North Internal Street Network, Traffic report, and Melrose Park Town Centre, Traffic report which generally capture the proposed traffic associated with MPHS, it is concluded that the traffic generation of MPHS would be accommodated within the local road network, while there may be a slight increase (by a maximum of 31 vehicles) in traffic generation it is noted the increase would have no material impact on the surrounding road network given all intersections modelled operate at a satisfactory level with spare capacity. Furthermore, computer modelling techniques available to analyse intersection performances are not sensitive to such small changes in traffic volumes and hence, such an assessment is not considered to be required. The traffic impacts of the proposed development are therefore considered acceptable.

11.5 Cumulative Impacts

11.5.1 Melrose Park Primary School Redevelopment

As previously discussed, given the Melrose Park Precinct is undergoing substantial development and growth, the majority of traffic generation associated with Melrose Park Precinct is captured in the TMAP. The MPHS site was identified as an 800-student primary school site, the traffic generation associated with this site has been allocated to the MPHS development given the MPHS was land zoned as a school.

It is understood the TMAP has accounted for traffic generation associated with the existing MPPS, however (at the time of writing) there is a proposal by SINSW to redevelop the MPPS school site to increase student capacity to approximately 1,000 students.

This future student demand has not been captured within the TMAP or updated traffic modelling has not been completed. It is understood the MPPS project is in early planning stages and traffic volumes are yet to be confirmed. A detailed traffic assessment including traffic modelling incorporating both MPHS and MPPS at full development will be completed as part of the MPPS traffic report.

Section 12 Mitigation Measures

Table 40 summarises the physical infrastructure and operational measures that will support the transport needs of the proposed high school and allow the project to achieve acceptable performance and safety.

Table 40: Mitigation Measures

Project Stage	Mitigation Measures	Section reference

Design	**Infrastructure Upgrades**
	▪ Construction of 2 wombat crossings, including one on Wharf Road and one on Hope Street to facilitate safe and controlled pedestrian movements
	▪ An additional wombat crossing will be provided by the developer Sekisui, located along NSR-4, adjacent to the proposed MPHS main access
	▪ Consolidation of 2 bus zones on the south side of Hope Street to provide a new 63 metre bus zone.
	▪ Provision of signposted K&R zones on eastern side of NSR-4 (68 metres) and the western side of Wharf Road (60 metres)
	▪ Provision of 2 indented DDA K&R bays along the eastern side of NSR-4 adjacent to the main access.
	▪ Footpath widening along eastern side of NSR-4 and western side of Wharf Road, providing full width footpath at the K&R zones
	▪ Provision of 84 on-site bicycle parking spaces for students plus 6 bicycle parking spaces for staff, along with change rooms, showers, and lockers to act as EOTF for staff. Bicycle parking will be provided in stages. Stage 1 will provide 46 bicycle parking spaces for students and 4 spaces for staff. Stage 2 will provide an additional 38 bicycle parking spaces for students and 2 spaces for staff.
	▪ Provision of on-site waste collection and loading zone to accommodate vehicles up to and including a 10.8 metre waste truck. Provision of an on-street loading zone along the northern side of Hope Street, to accommodate vehicles up to and including an 8.8 metre MRV
	▪ Provision of a total of 44 staff car parking spaces, comprising of the following:
	  ▪ Stage 1 – 29 car spaces (5 spaces on MPHS and 24 car spaces on MPPS site)
	  ▪ Stage 2 – 44 car spaces (5 spaces on MPHS and 39 car spaces on MPPS site)
	MPHS stage 1 operation restricted until Stage 1 MPPS car park is completed. MPHS Stage 2 operation restricted until Stage 2 MPHS car park completed
		Pedestrian access – Section 5
		Cyclist access – Section 6
		Vehicular access – Section 10
		Parking facilities – Section 10
		Cyclist facilities – Section 6
		K&R zones – Section 9
		Bus bays – Section 7
		Service vehicles – Section 8
		Swept path analysis – Appendix B

Project Stage	Mitigation Measures	Section reference
Operation	Staggering of bell times between the existing MPPS and MPHS by approximately 20 minutes (timing subject to confirmation once the schools are operational)	Refer to School Transport Plan (lodged separately with this REF)
Operation	Implementation of a School Transport Plan (noting a Preliminary version has been prepared by TTW and submitted separately with this REF), which may include measures such as: ▪ Regular communication and reminders to the school community ▪ Regular monitoring of school operations and traffic conditions around the site. For example, if certain points along the road network are becoming congested, the school can encourage parents to use alternative approach routes and/or K&R zones to spread vehicular traffic (refer to Section 9 for discussion of multiple kiss & ride zones) ▪ Regular data collection and monitoring of transport strategy progress ▪ Publishing a Travel Access Guide ▪ Seeking a Travel Coordinator for the school (subject to availability); and ▪ Maintaining a governance framework between SINSW, Council, and TfNSW. ▪ Seeking additional bus services to the site, through coordination of enrolment and depersonalised location data with Transport for NSW on an ongoing basis.	Refer to the Preliminary School Transport Plan (lodged separately with this REF)
Construction	Implementation of CTMP once a contractor has been appointed to ensure construction traffic is managed during the construction phase. Noting a preliminary Construction Traffic Management Plan has also been developed by TTW to assess and manage traffic impacts expected to occur during construction works and accompanies this REF.	Refer to the Preliminary Construction Management Plan (lodged separately with this REF)

Section 13 Conclusion

Subject to implementing the recommendations / mitigation measures set out in Section 12 of this report, the conclusion of this assessment is that the proposed Activity is not likely to significantly affect the environment in relation to traffic and transport matters.

The overall transport strategy for the proposed new high school in Melrose Park is as follows:

- Provide a sustainable transport strategy, prioritising active and public transport and discouraging travel by private vehicle
- Encourage and facilitate pedestrian movements within a walkable local catchment through provision of infrastructure such as pedestrian crossings and safety devices such as pedestrian fencing
- Encourage and facilitate cyclist movements across the wider catchment by connecting to existing and proposed shared paths (and maintaining these for public usage) and providing on-site facilities for both students and staff
- Encourage and facilitate public transport activity by providing additional capacity to a consolidated bus zone along Hope Street, and working with TfNSW to provide additional routes and services for the growing school population over time
- Accommodate service vehicles on the site with a dedicated on-site loading dock for vehicles up to 10.8 metres waste truck, separated from the staff car park and pedestrian areas. The provision of an on-street loading zone, on the northern side of the Hope Street to provide convenient courier deliveries
- Facilitate K&R activity while discouraging its uptake, with provision of multiple K&R zones to distribute traffic and associated footpath infrastructure for high intensity areas, and implement a School Transport Plan to encourage and advertise the range of alternative transport options available
- Facilitate car parking activity while discouraging its uptake, with provision of on-site car parking for 55% of staff when the school is at full capacity, achieving a shift from higher initial usage to this lower percentage usage over time, in parallel to the growth of the student and staff population at the school.
- As a worst-case scenario, MPHS will generate 488 vehicle trips during the morning and afternoon school peak period and 39 vehicle trips during the afternoon commuter peak period. The approved traffic modelling completed for Melrose Park North Internal Street Network, Traffic Report, noted the MPHS site would generate a total of 213 vehicle trips during the morning peak period and 49 vehicle trips during the afternoon peak period. When compared to the proposed MPHS proposal this only equates to an additional 46 vehicles during the morning peak period and a reduction of 10 vehicles during the afternoon commuter peak period as a worst-case scenario. This is considered to be a negligible impact, especially as computer modelling techniques available to analyse intersection performance are not sensitive to such small changes in traffic volumes and hence, updated traffic modelling is considered not required.
- As previously discussed, the TMAP undertook a precinct wide study with more detailed SIDRA traffic modelling being completed as part of the Melrose Park North Internal Street Network, Traffic Report (DA 1100/2021) and Town Centre, Traffic Report (DA 764/2022). These assessments investigated the full development of the Melrose Park Precinct including the proposed MPHS rezoned as a primary school. The modelling undertaken demonstrated the surrounding road network would accommodate the precinct traffic generation within the local road network.
- Within the vicinity of the MPHS all intersections are shown to operate at a satisfactory level of LoS A-C, showing spare capacity. Therefore, despite updated traffic modelling not being completed for the site it is considered the surrounding road network has an abundance of spare capacity to accommodate the proposed MPHS.

This overall strategy has been proposed to and discussed with both Council and TfNSW during ongoing project liaison through 2 TWG meetings for the project. Meetings have been held with these authorities in December 2023 and September 2024, and the project has refined the transport strategy during that period in response to feedback received.

Overall, the transport provisions of this project across all travel modes have been selected and developed in order to provide a sustainable, safe, and efficient site. These provisions include physical infrastructure works on- and off-site, along with management measures to be implemented during operation of the school. While school sites generate significant volumes of travel demand in short periods of time, the proposed transport strategy is considered an appropriate balance and is demonstrated to provide appropriate outcomes for the site.

Prepared by	Prepared by	Reviewed by	Approved by
TTW (NSW) PTY LTD	**TTW (NSW) PTY LTD**	**TTW (NSW) PTY LTD**	**TTW (NSW) PTY LTD**
			
EMMA COWDERY	**MICHAEL PARTADINATA**	**MARIA MULHOLLAND**	**MICHAEL BABBAGE**
Traffic Engineer	Traffic Engineer	Senior Traffic Engineer	Associate (Traffic)

Appendix A Correspondence Between SINSW & TfNSW

Michael Partadinata

From: Mukhwinder Athwal <Mukhwinder.ATHWAL@transport.nsw.gov.au>
Sent: Friday, 23 August 2024 8:57 AM
To: Maria Mulholland
Cc: Sabal Sharma
Subject: Re: Melrose Park HS - Bus Service changes due to PLR2 (524 & 802W)

[External Email]: Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Maria,

Thank you for the email.

Bus planning which related to PLR2 is at an early stage (Reg Melrose Park precinct - mainly discussions are around bus stop location, suitability of the roads for buses and length of the bus zones inside the development) Unfortunately, I don't have any information to share at this point of time regarding changes to bus routes (If any). I'm sure that the existing connectivity to the school for students will be maintained by PT in future and there may be an opportunity to do minor tweaks depending on the SSTS data, with a consideration to funding and operational constraints.

Regards,
MA

Kind Regards,

Mukhwinder Athwal
Senior Service Planner
Planning and Programs
Greater Sydney
Transport for NSW

T 0436 458 587
231 Elizabeth Street
Sydney, NSW 2000

NSW GOVERNMENT | Transport for NSW
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OFFICIAL

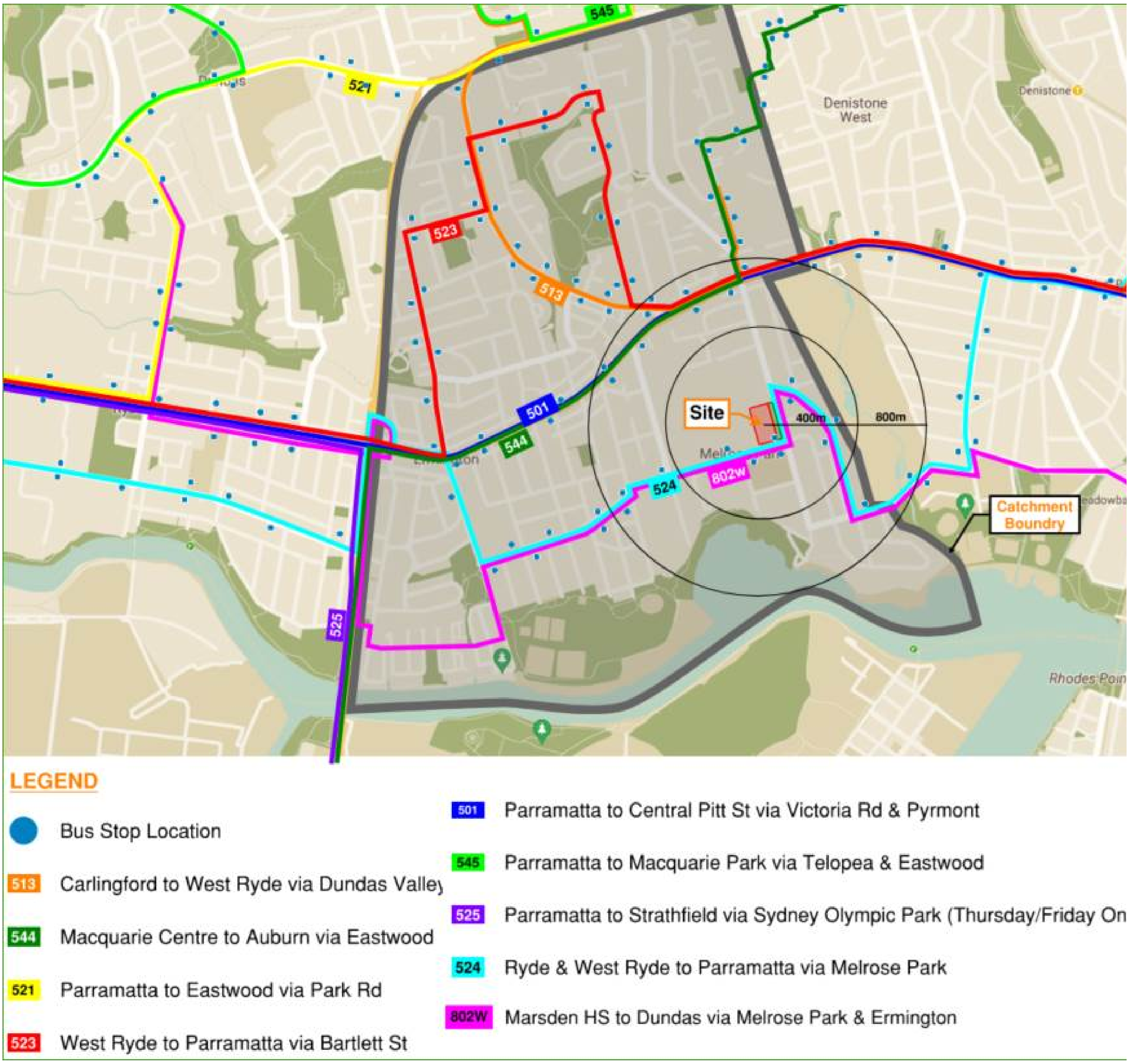
From: Maria Mulholland <Maria.Mulholland@ttw.com.au>
Sent: Thursday, August 22, 2024 11:55 AM
To: Mukhwinder Athwal <Mukhwinder.ATHWAL@transport.nsw.gov.au>

Cc: Sabal Sharma <sabal.sharma@ttw.com.au>
Subject: Melrose Park HS - Bus Service changes due to PLR2 (524 & 802W)

CAUTION: This email is sent from an external source. Do not click any links or open attachments unless you recognise the sender and know the content is safe.

Hi Mukhwinder,

Hope you are well. I am currently reviewing the existing bus services as part of the Melrose Park High School Project (located on the corner of Wharf Road, Melrose Park).
Currently there are 2 services that service the site, 525 and 802W. I understand these services will be rerouted as part of the PLR2 project. Have you any further information you can provide in relation to changes to these services?
Ideally, we are hoping these services can be retained plus a potential option to modify service 523 to cater for students living in the north of the catchment.



Any information would be greatly appreciated. We are scheduling to present an update of this school at the next Parramatta TWG meeting.

Kind regards,
Maria

Maria Mulholland | Senior Traffic Engineer

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TTW Engineers | Sydney

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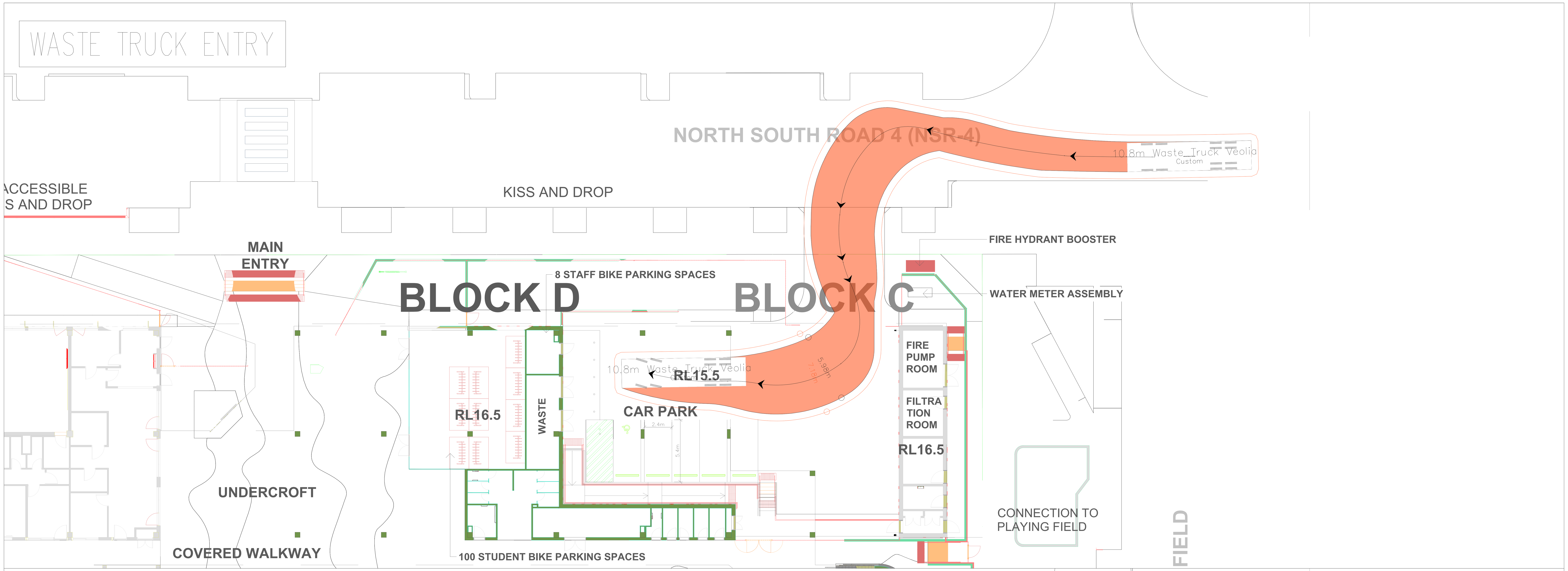
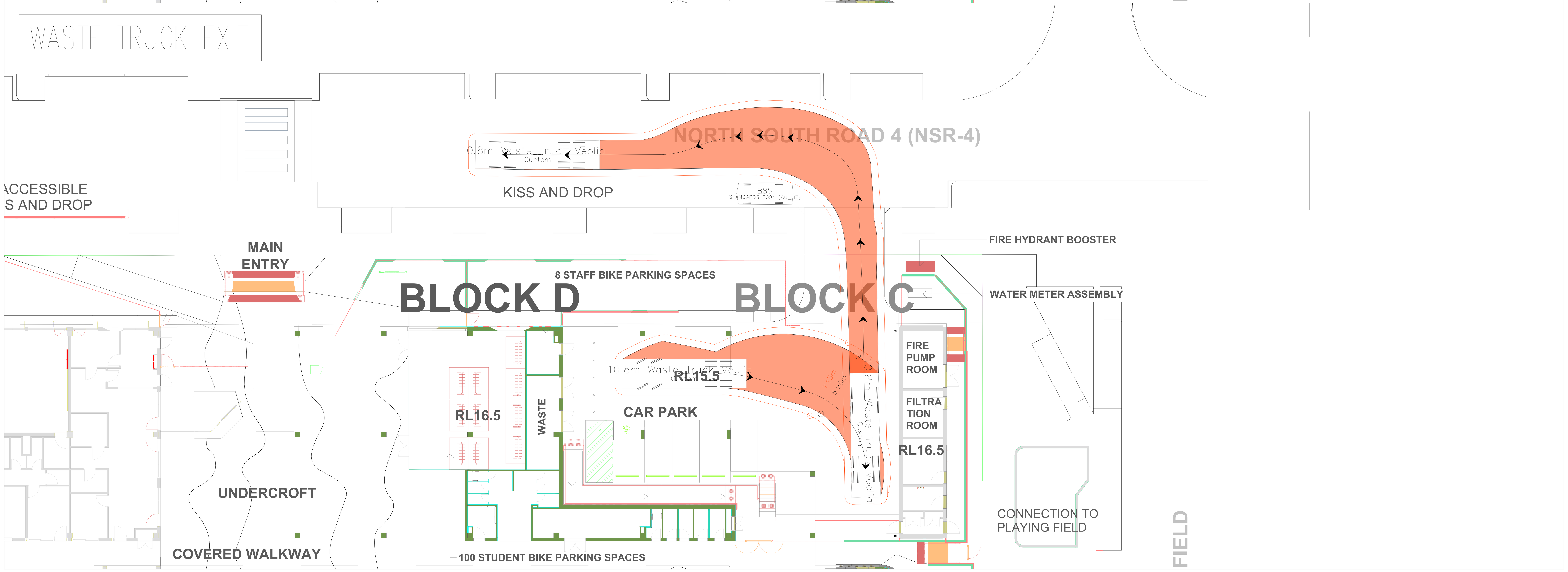
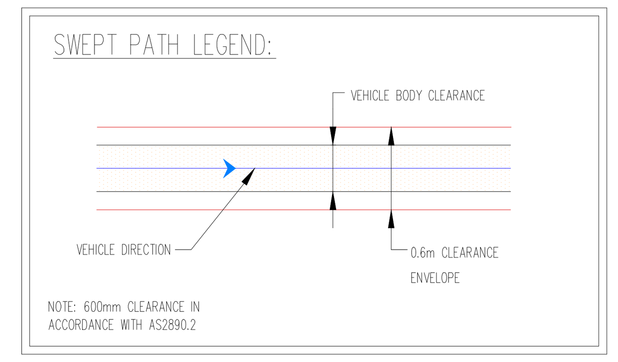
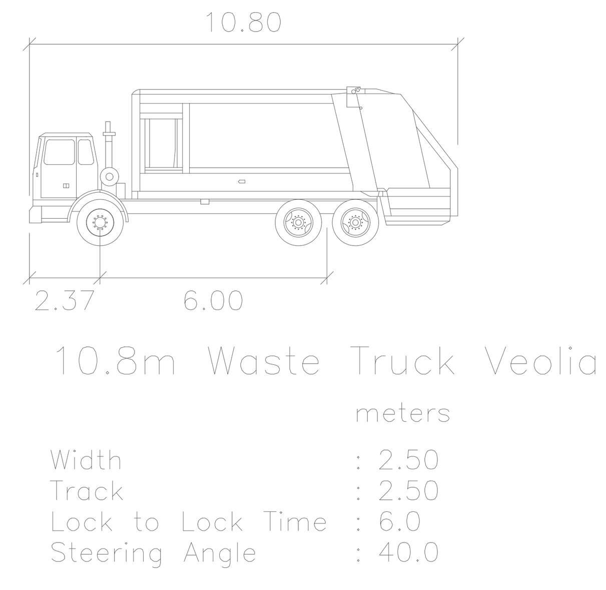
Appendix B Swept Path Analysis

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING C01









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Rev	Description	Eng	Draft	Date
1	ISSUE FOR REF SUBMISSION	MP	MP	21.01.25

Architect
NBRS
4 GLEN STREET
MILSONS POINT NSW 2061

Engineer
TTW Structural Civil Traffic Façade
612 9439 7288 | Level 6, 73 Miller Street, North Sydney, NSW 2060

Project
MELROSE PARK HIGH SCHOOL

Sheet Subject
10.8m WASTE TRUCK ENTRY & EXIT SWEPT PATH

Scale : A1	Drawn	Authorised
1:200	MP	MM

Job No	Drawing No	Revision
231605	TTW-00-SK-TR-00001	1

Plot File Created: Jan 21, 2025 - 9:25am

Appendix C MPHS Traffic Distribution

Trip Generation - Stage 1

Trip Generation as per our proposed travel mode estimates / PUDO calculations

Student Vehicle Volume

Student Traffic Generation		Baseline	Moderate Target	Reach Target
		HS	HS	HS
Student number		560	560	560
Mode share split	K&R	27%	25%	15%
	Driver	2%	2%	0%
Travel demand	K&R	151	140	84
	Driver	11	11	0
Occupancy Rate	K&R	1.6	1.6	1.6
	Driver	1	1	1
Vehicle volume	K&R	95	88	53
	Driver	11	11	0
Vehicle volume (Total)		106	99	53
Trips rate		2 trips per students	2 trips per students	2 trips per students
Total trips		211	197	105
Morning Peak (AM)				
in		106	99	53
out		106	99	53
Afternoon Peak (PM)				
in		106	99	53
out		106	99	53

Staff Vehicle Volume

Staff Traffic Generation		Baseline	Moderate Target	Reach Target
		HS	HS	HS
Staff number		52	52	52
Mode share split	Driver	87%	55%	50%
	Passenger	2%	15%	10%
Travel demand	Driver	45	29	26
	Passenger	1	8	5
Occupancy Rate	Driver	1 staff member per car	1 staff member per car	1 staff member per car
	Passenger	1.6	1.6	1.6
Vehicle volume	Driver	45	29	26
	Passenger	1	5	3
Vehicle volume (Total)		46	33	29
Total trips		46	33	29
Morning Peak (AM)				
in		46	33	29
out		0	1	0
Afternoon Peak (PM)				
in		0	1	0
out		46	33	29

Total Vehicle Volume

Total Traffic Generation	Baseline	Moderate Target	Reach Target
	HS	HS	HS
Students and Staff number	612	612	612
Total Travel demand	209	188	115
Vehicle volume	152	132	82
Total trips	**257**	**231**	**82**
Morning Peak (AM)			
in	152	132	82
out	106	100	53
Afternoon Peak (PM)			
in	106	100	53
out	152	132	82

Notes
1. Students number is retrieved from TWG V03
2. The mode split target is retrieved from TWG V03
3. Staff split is assumed to be 100% as a conservative assessment
4. Traffic volume has been assumed as the most conservative assessment during the peak period.

Trip Generation - Stage 2

Trip Generation as per our proposed travel mode estimates / PUDO calculations

Student Vehicle Volume

Student Traffic Generation		Baseline	Moderate Target	Reach Target
		HS	HS	HS
Student number		1000	1000	1000
Mode share split	K&R	27%	25%	15%
	Driver	2%	2%	0%
Travel demand	K&R	270	250	150
	Driver	20	20	0
Occupancy Rate	K&R	1.6	1.6	1.6
	Driver	1	1	1
Vehicle volume	K&R	169	156	94
	Driver	20	20	0
Vehicle volume (Total)		189	176	94
Trips rate		2 trips per students	2 trips per students	2 trips per students
Total trips		378	353	188
Morning Peak (AM)				
in		189	176	94
out		189	176	94
Afternoon Peak (PM)				
in		189	176	94
out		189	176	94

Staff Vehicle Volume

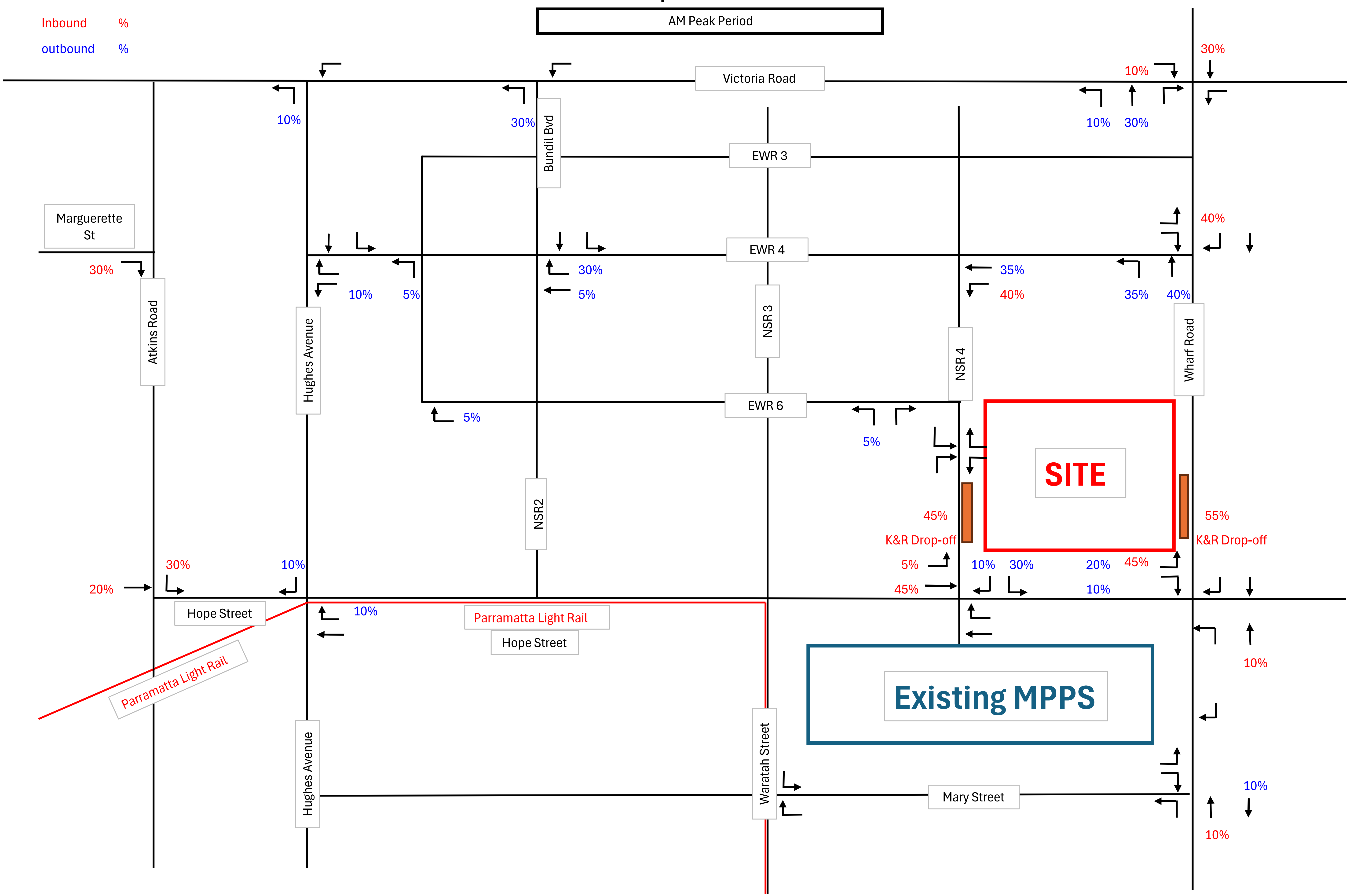
Staff Traffic Generation		Baseline	Moderate Target	Reach Target
		HS	HS	HS
Staff number		79	79	79
Mode share split	Driver	87%	55%	50%
	Passenger	2%	15%	10%
Travel demand	Driver	69	43	40
	Passenger	2	12	8
Occupancy Rate	Driver	1 staff member per car	1 staff member per car	1 staff member per car
	Passenger	1.6	1.6	1.6
Vehicle volume	Driver	69	43	40
	Passenger	1	7	5
Vehicle volume (Total)		70	51	44
Total trips		70	51	44
Morning Peak (AM)				
in		70	51	44
out		0	0	0
Afternoon Peak (PM)				
in		0	0	0
out		70	51	44

Total Vehicle Volume

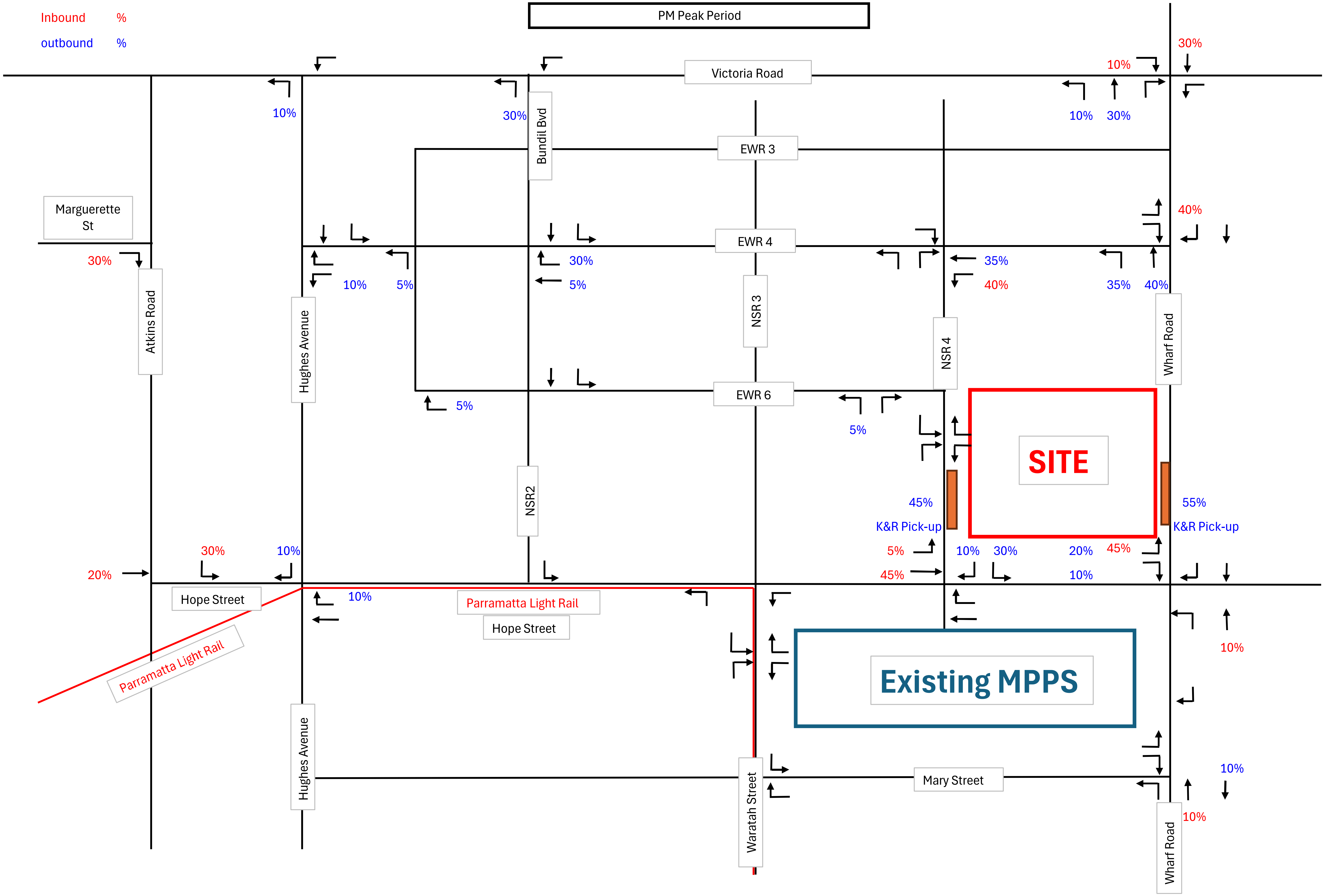
Total Traffic Generation	Baseline	Moderate Target	Reach Target
	HS	HS	HS
Students and Staff number	1079	1079	1079
Total Travel demand	360	325	197
Vehicle volume	258	200	133
Total trips	**447**	**403**	**232**
Morning Peak (AM)			
in	259	227	138
out	189	176	94
Afternoon Peak (PM)			
in	189	176	94
out	259	227	138

Notes
1. Students number is retrieved from TWG V03
2. The mode split target is retrieved from TWG V03
3. Staff split is assumed to be 100% as a conservative assessment
4. Traffic volume has been assumed as the most conservative assessment during the peak period.

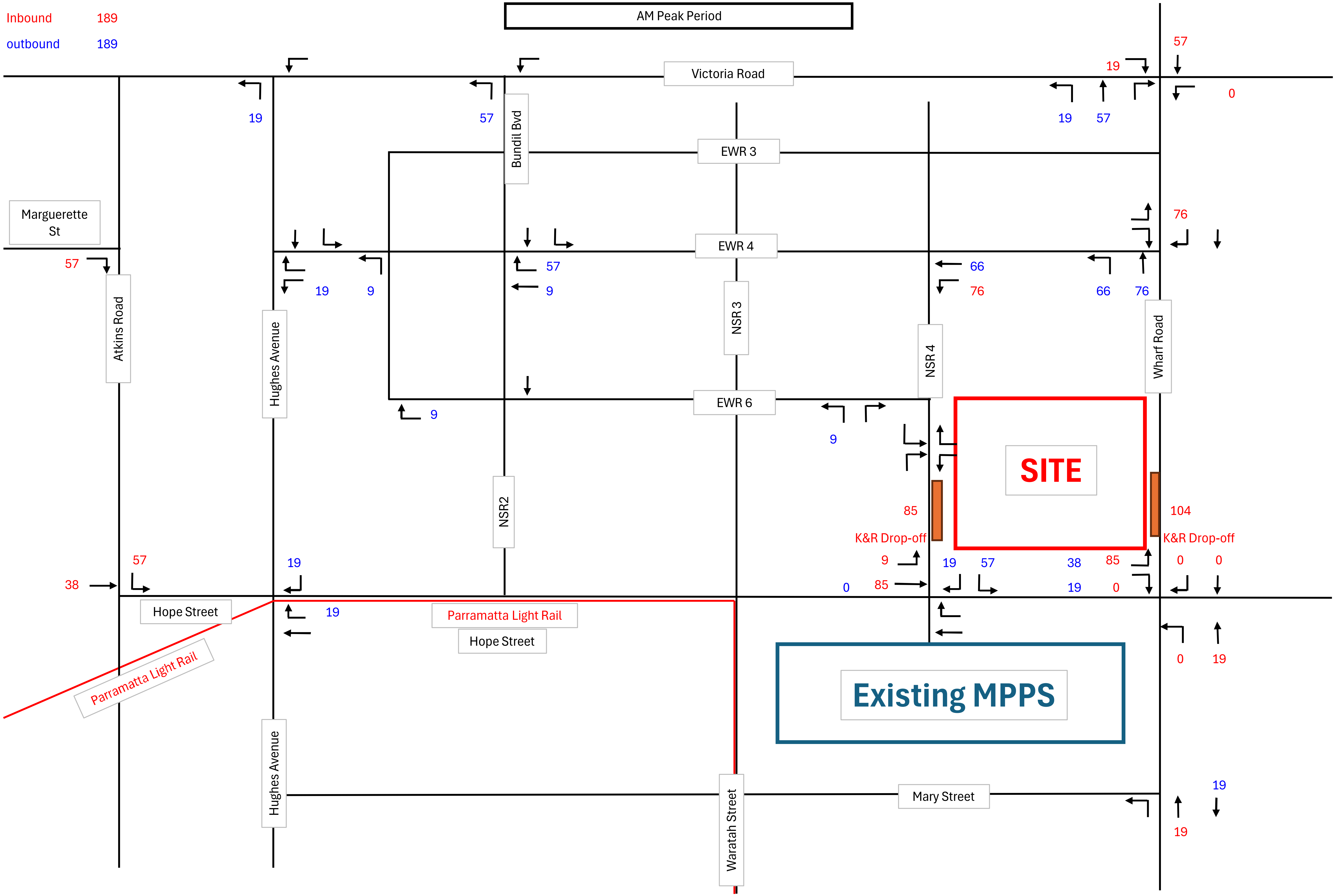
Student Trip Distribution 2036



Student Trip Distribution 2036



Student Trip Distribution 2036



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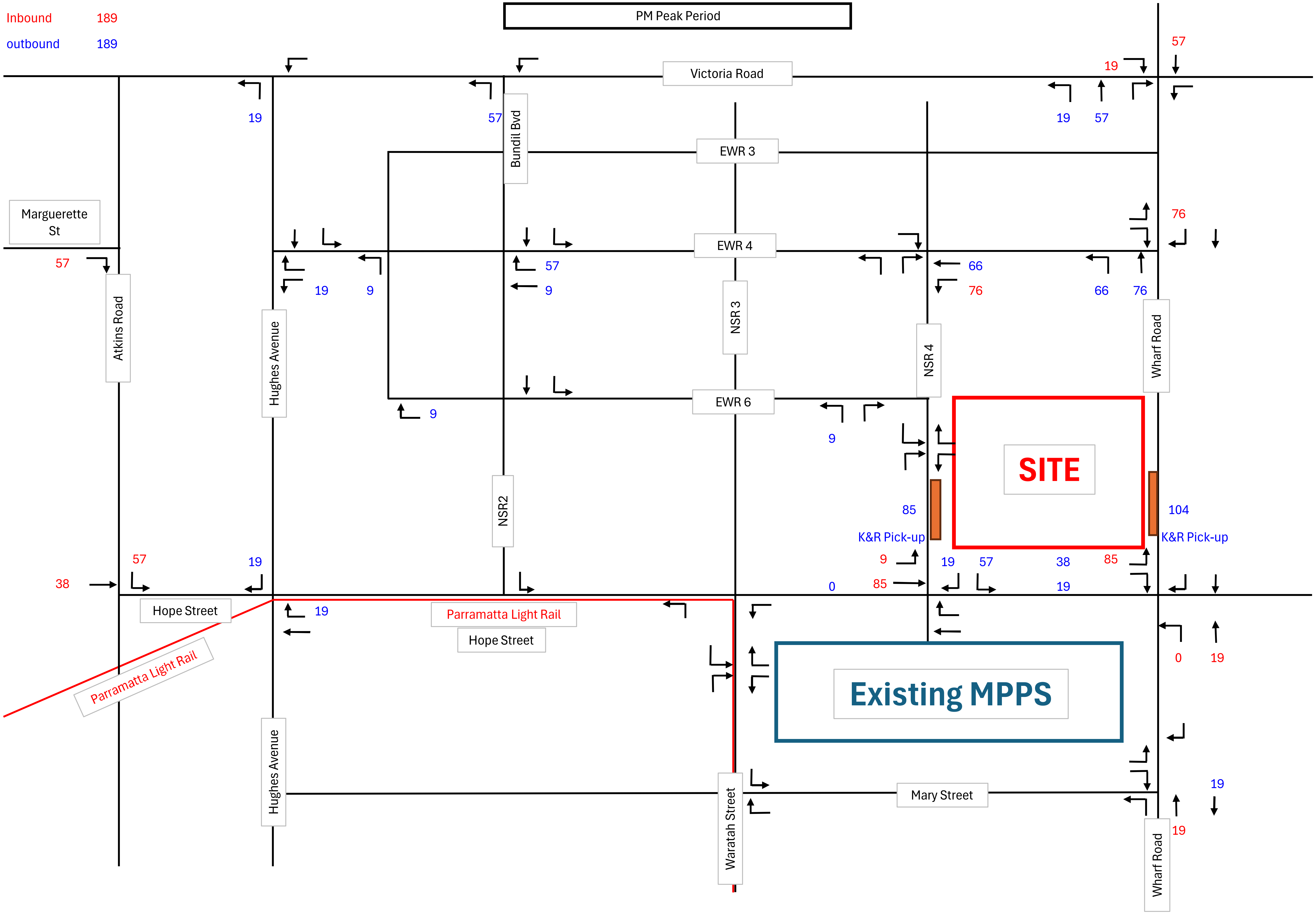
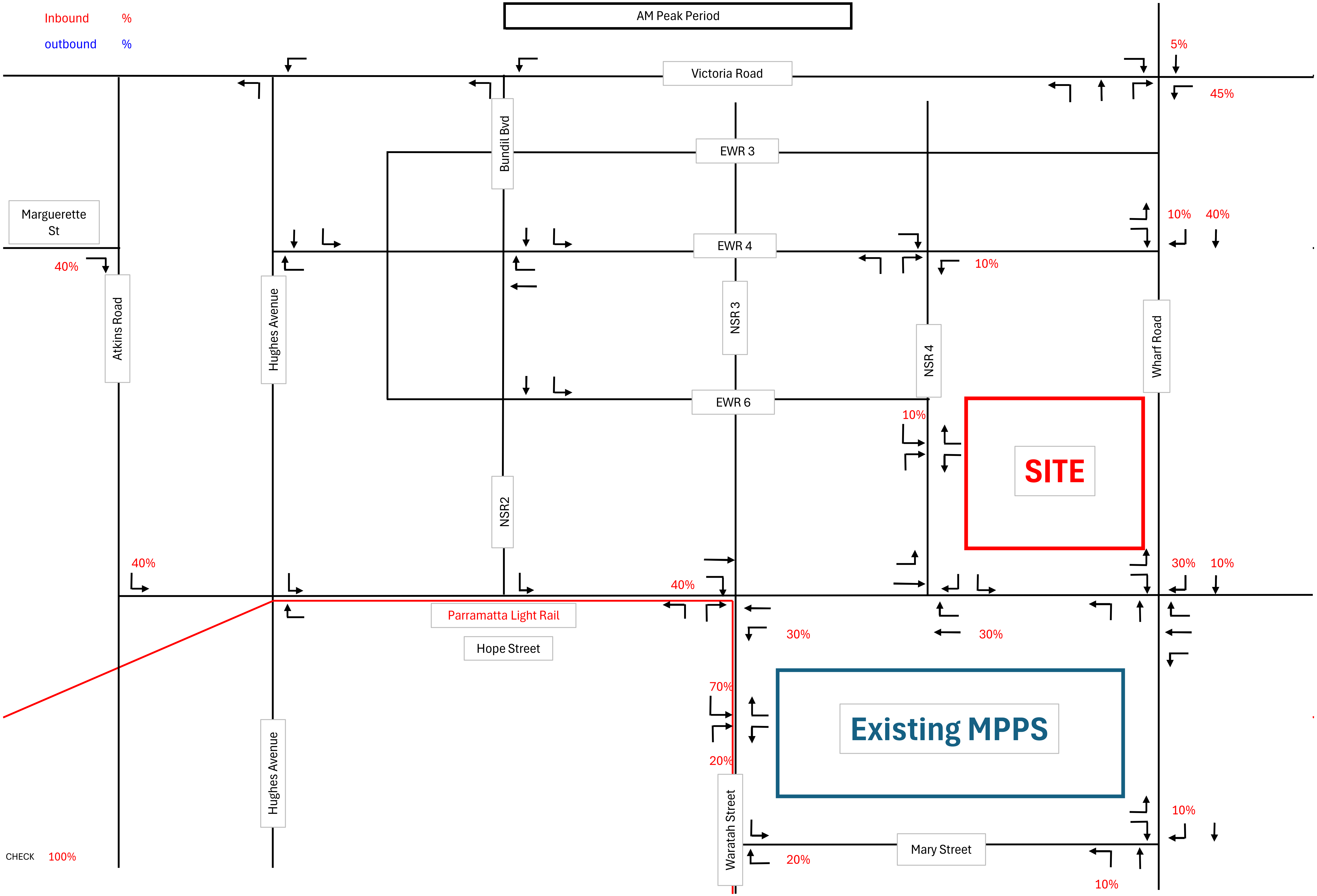
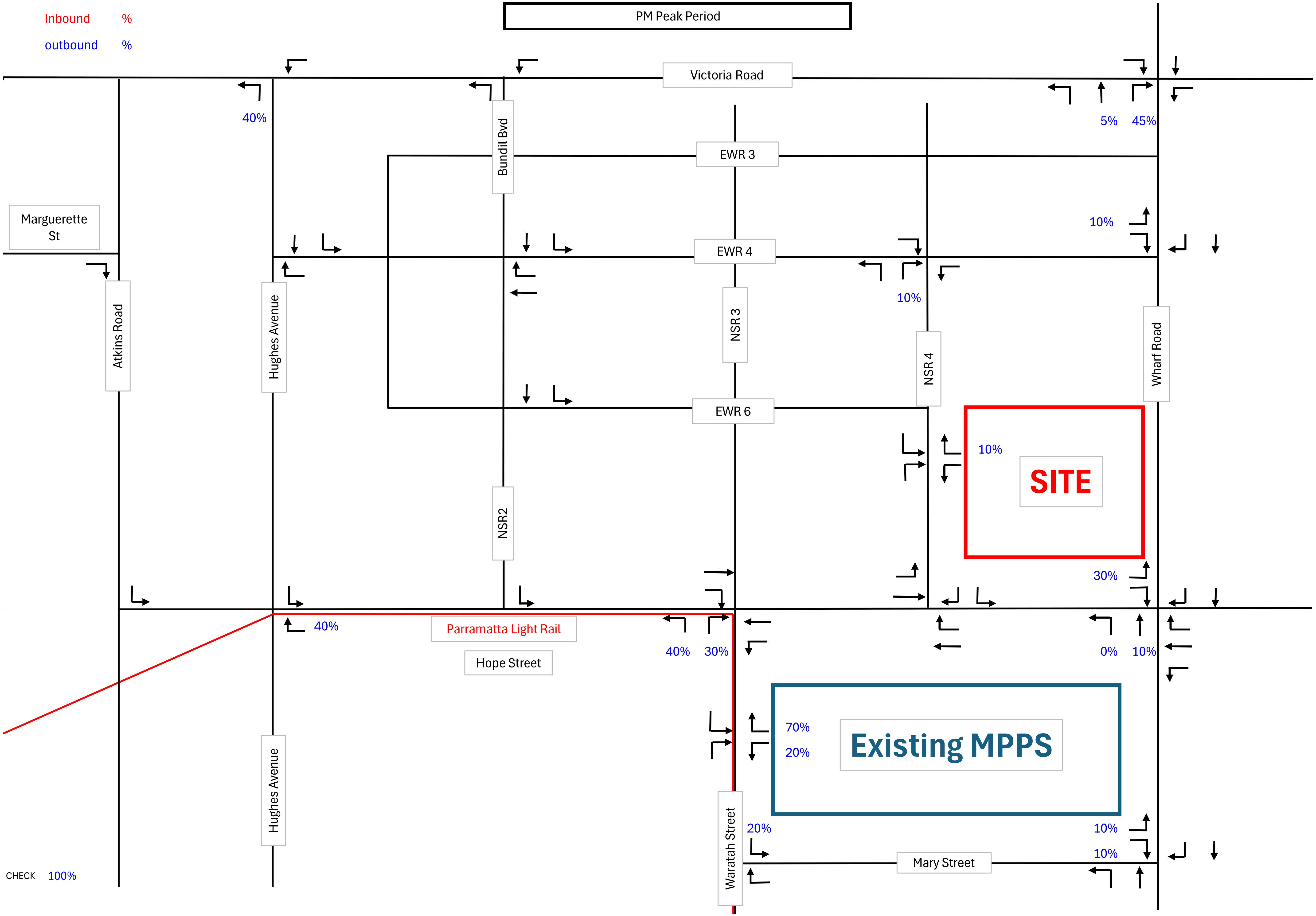


Staff Trip Distribution 2027



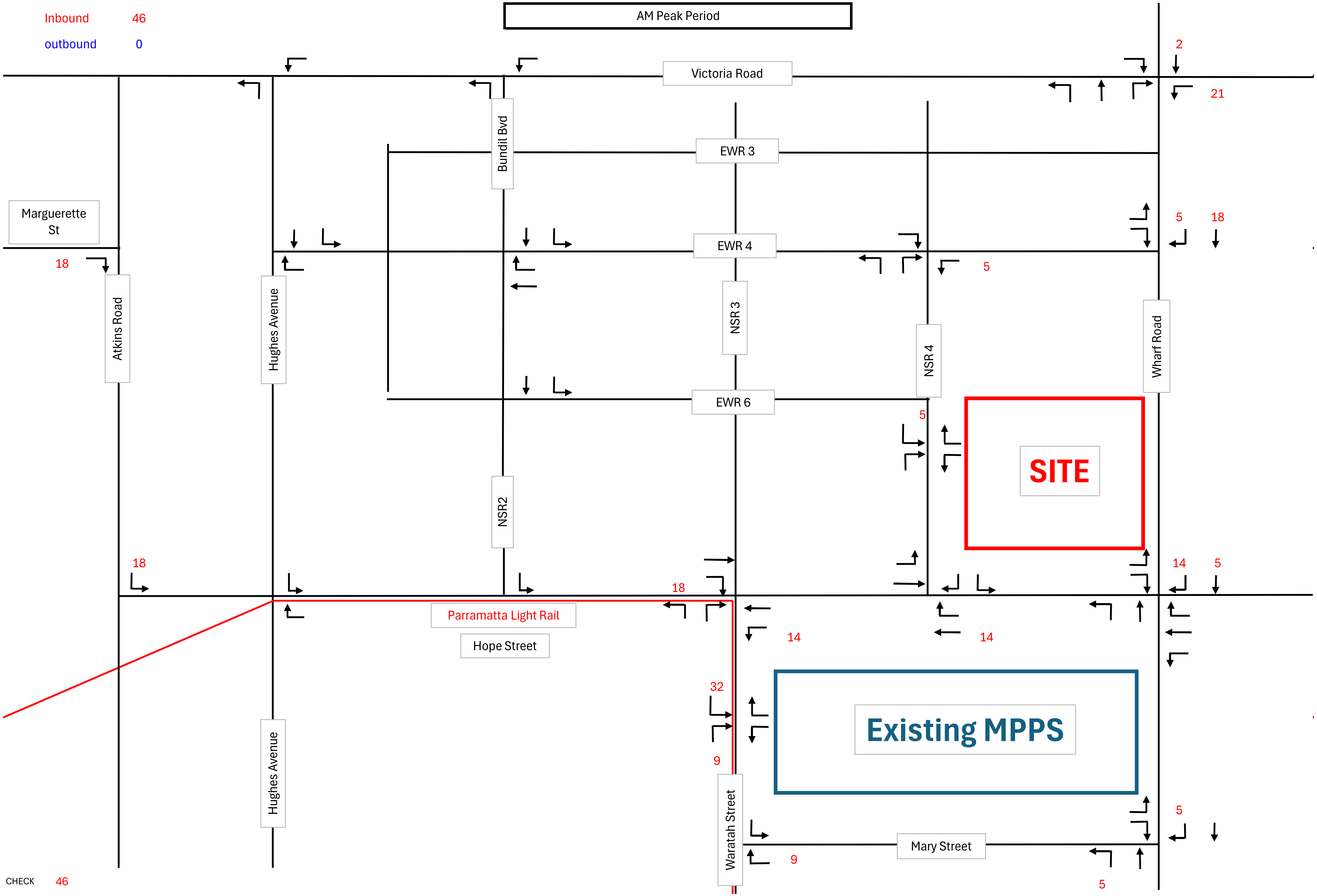
Staff Trip Distribution 2027

PM Peak Period

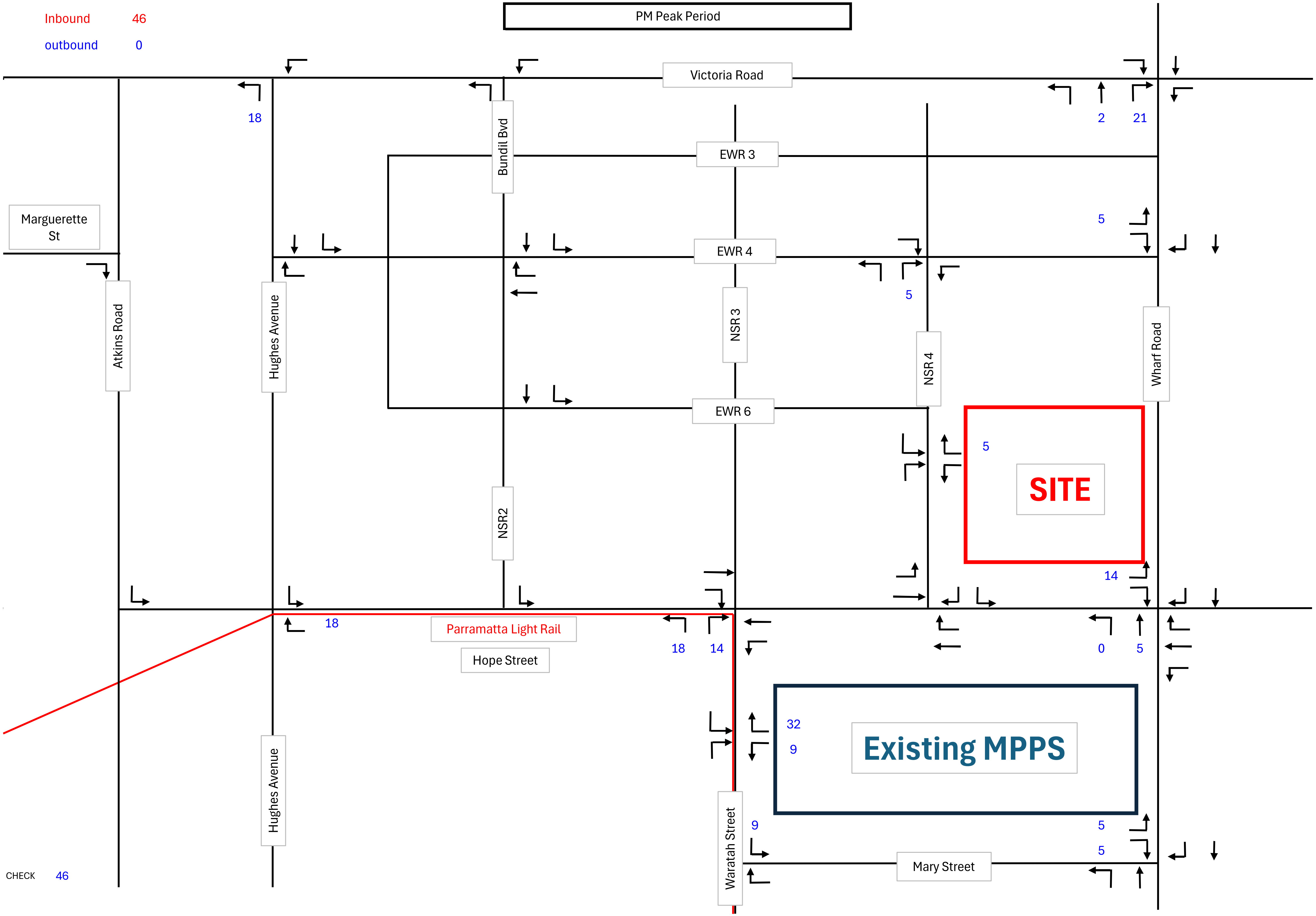


Staff Trip Distribution 2027

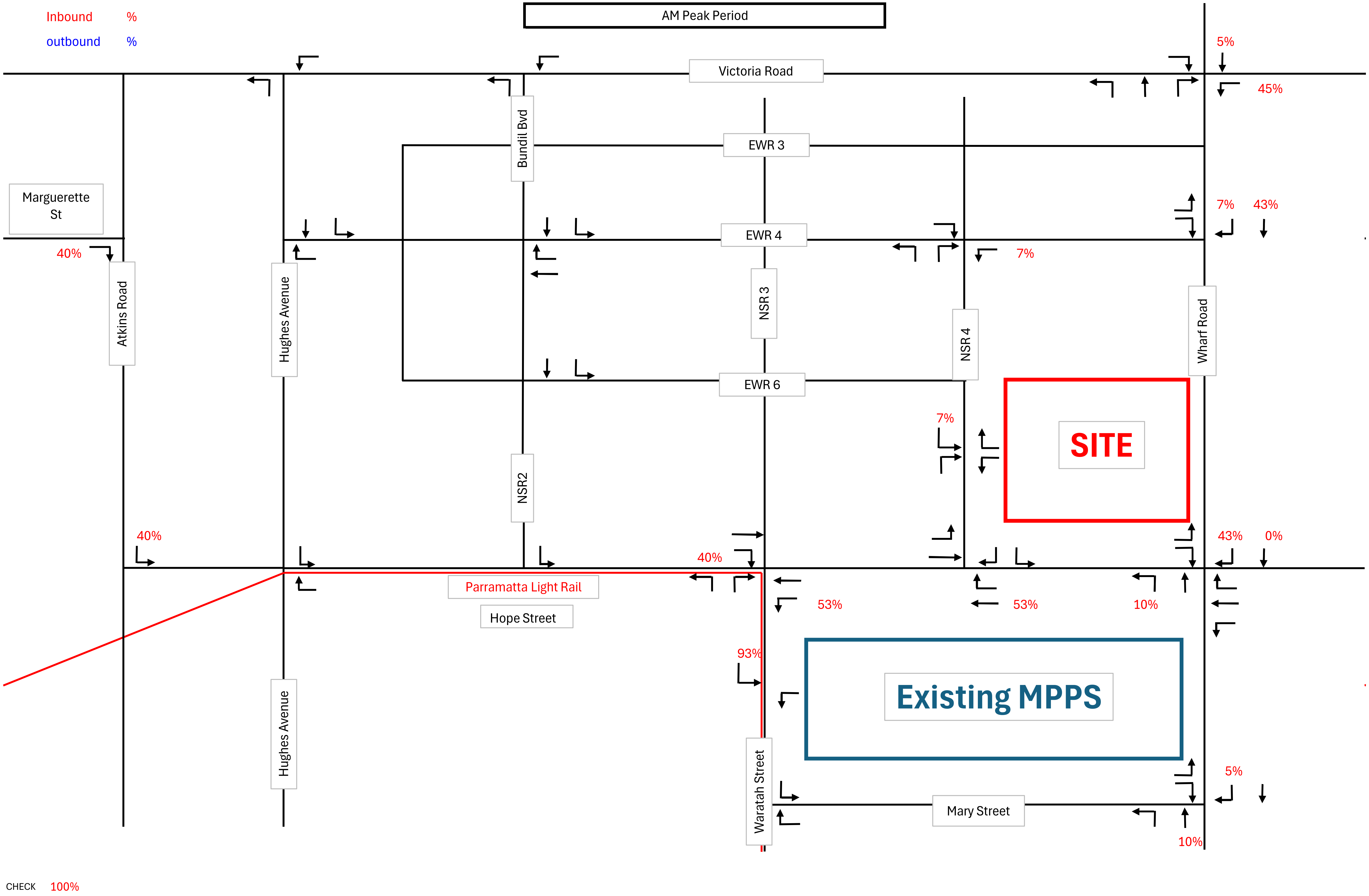
AM Peak Period



Staff Trip Distribution 2027



Staff Trip Distribution 2036



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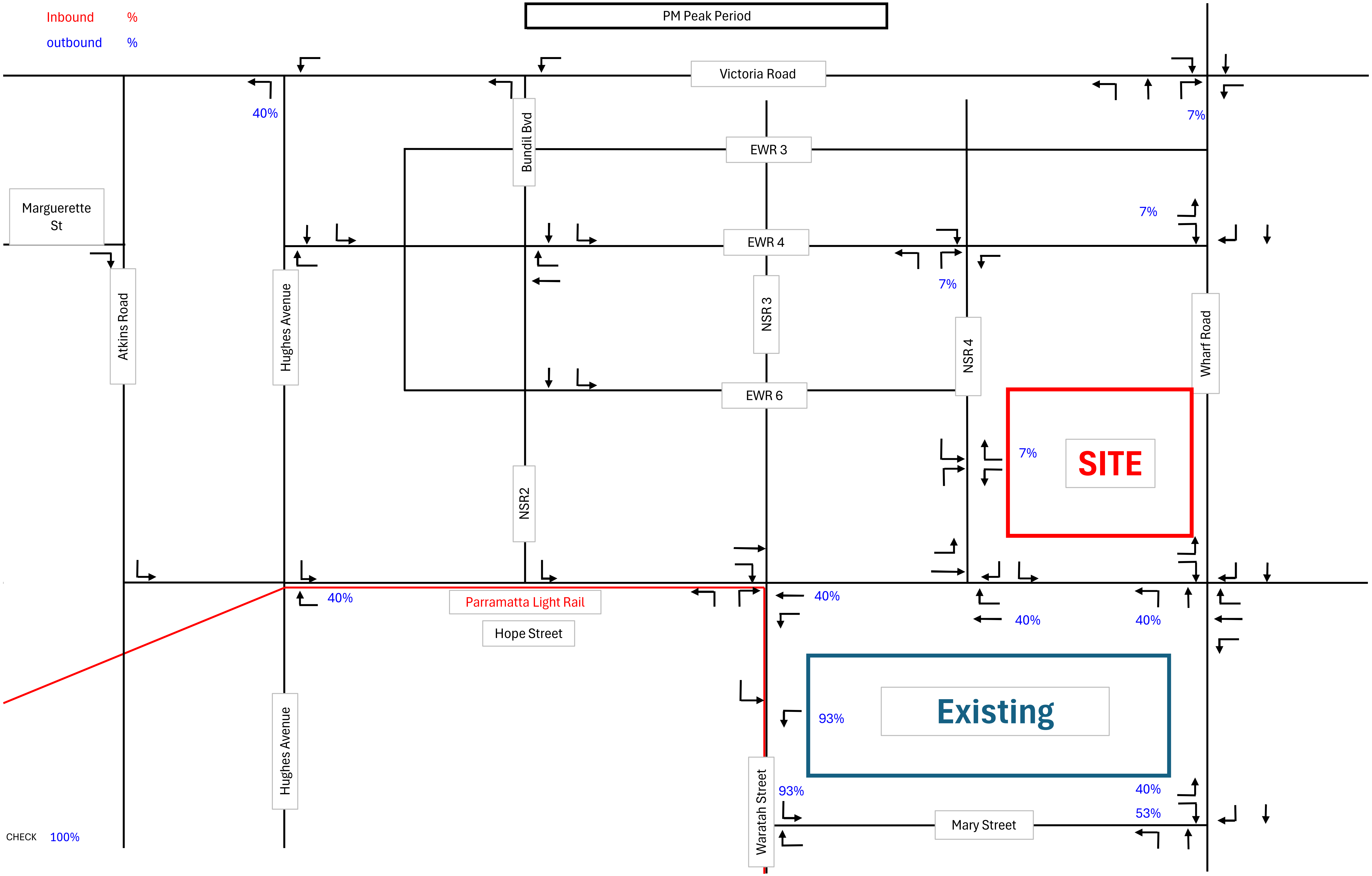
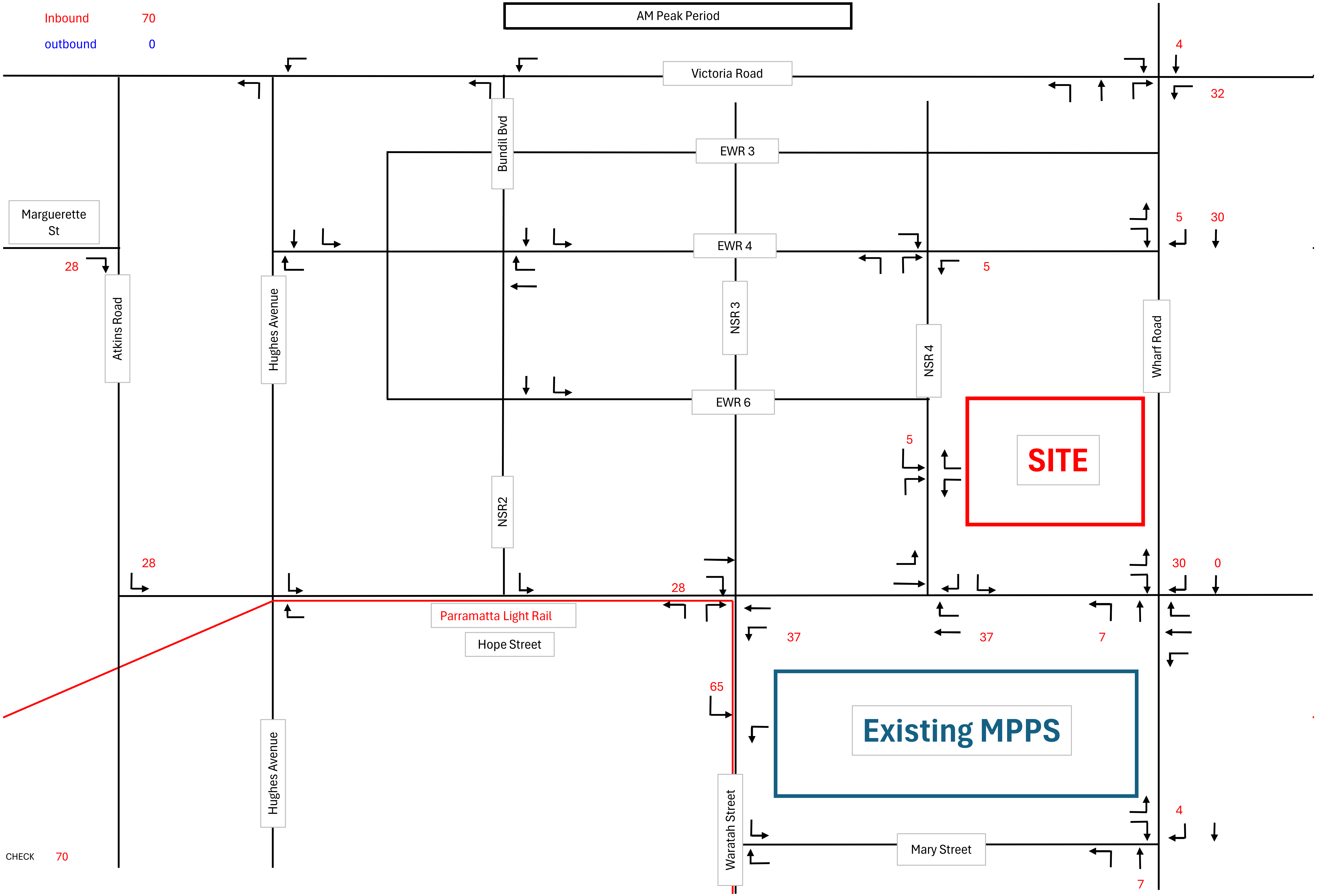


Staff Trip Distribution 2036



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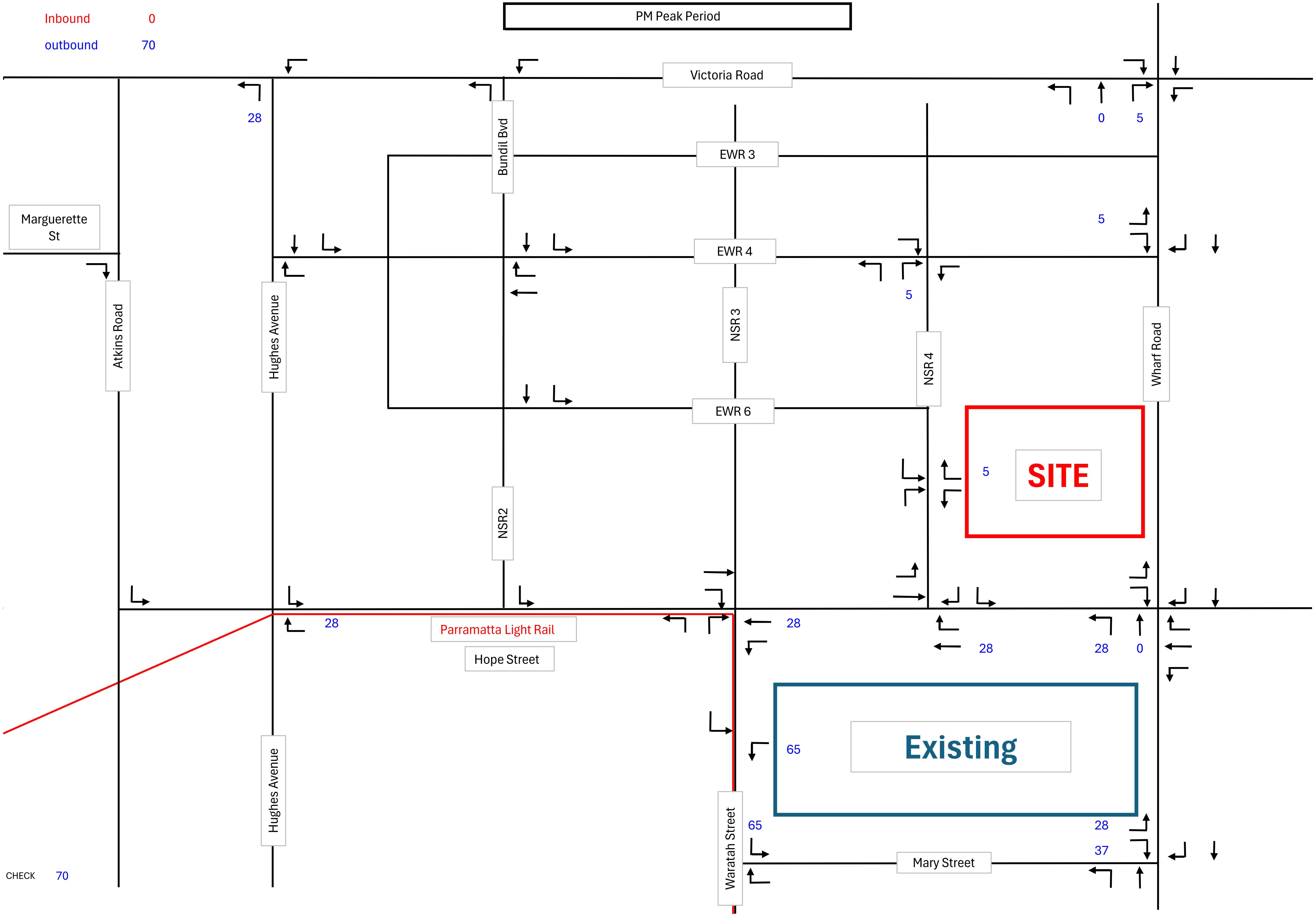
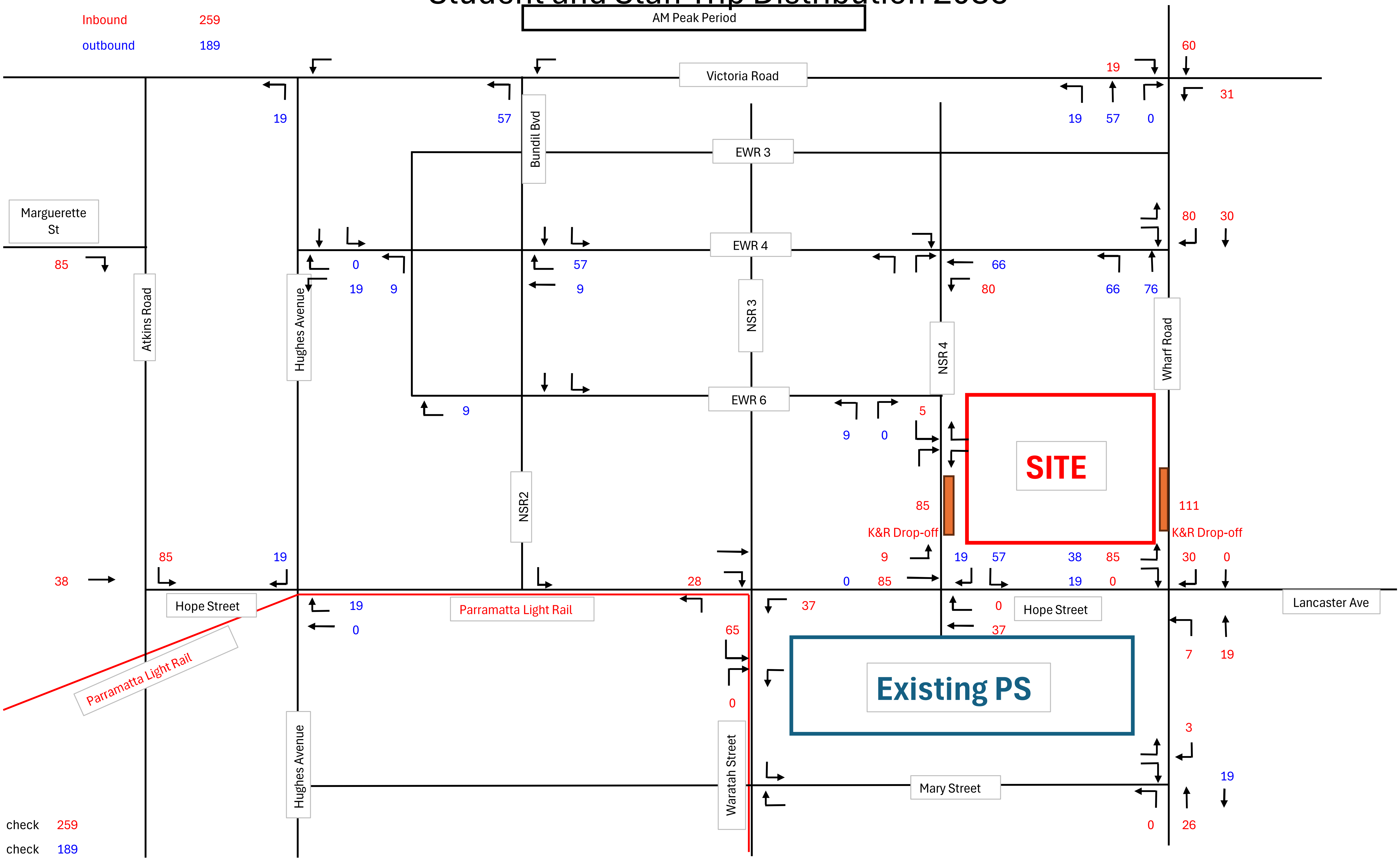
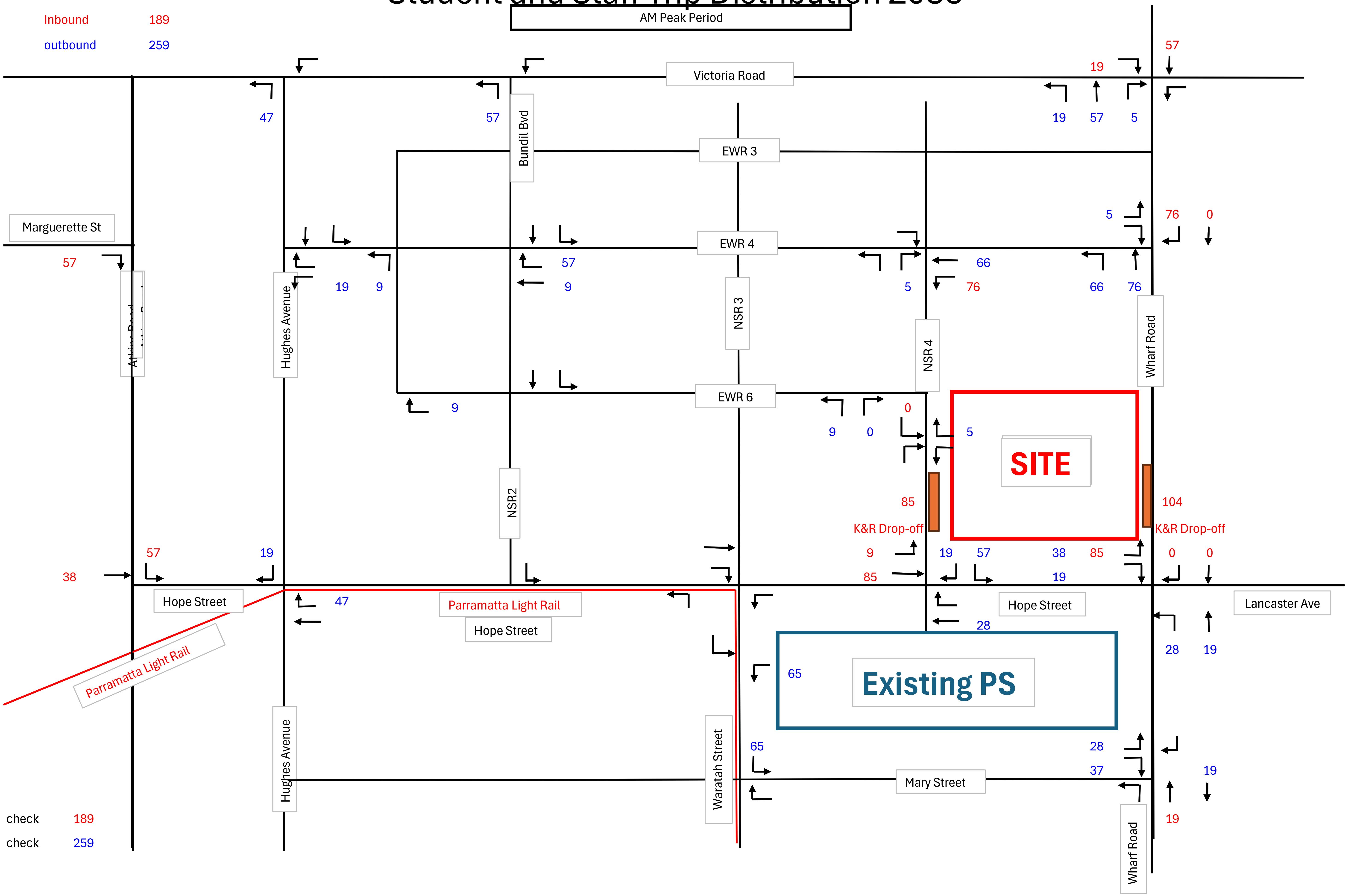


Student and Staff Trip Distribution 2036

AM Peak Period



Student and Staff Trip Distribution 2036



Appendix D Melrose Park North Internal Street Network Traffic Report – SIDRA Results

MELROSE PARK

38-42, 44-44A & 82-84 Wharf Road, 33 Hope Street Melrose Park and 27-29 Hughes Avenue Ermington

Traffic Report for:

Melrose Park North Internal Street Network (DA1100/2021)

Prepared for mProjects

07 December 2022

CONTENTS

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PROJECT	Melrose Park North Internal Street Network - DA	**DATE**	7 December 2022
COMPANY	Pentelic Advisory Pty Ltd	**STATUS**	FINAL
AUTHOR	Steven Konstas	**REVISION**	02
CLIENT	mProjects	**FILE NUMBER**	
FILE NAME	20221207 Melrose Park North Traffic Study Internal Roads TIAv02		

1 INTRODUCTION

1.1 Background

This traffic report has been prepared by Pentelic Advisory Pty Ltd (Pentelic) on behalf of mProjects (the Applicant) to accompany a development application (DA) for early works, public domain and infrastructure development at Melrose Park North (the site). This report has been prepared to assess the performance of the proposed internal street network for the site addressing post DA comments from Parramatta City Council issued to the applicant on 15 June 2022.

Melrose Park is located along the northern banks of the Parramatta River, 6km east of Parramatta CBD and northeast of the Greater Parramatta to Olympic Park Peninsula (GPOP) Urban Renewal Area. The development will renew the existing 25-hectare industrial area to provide new residential dwellings along with retail and commercial space as well as a new primary school. Proposed to be completed by 2036, the site comprises the land to the north of Hope Street, bounded by Wharf Road, Hughes Avenue and Victoria Road. The location of Melrose Park North Precinct is shown in Figure 1.

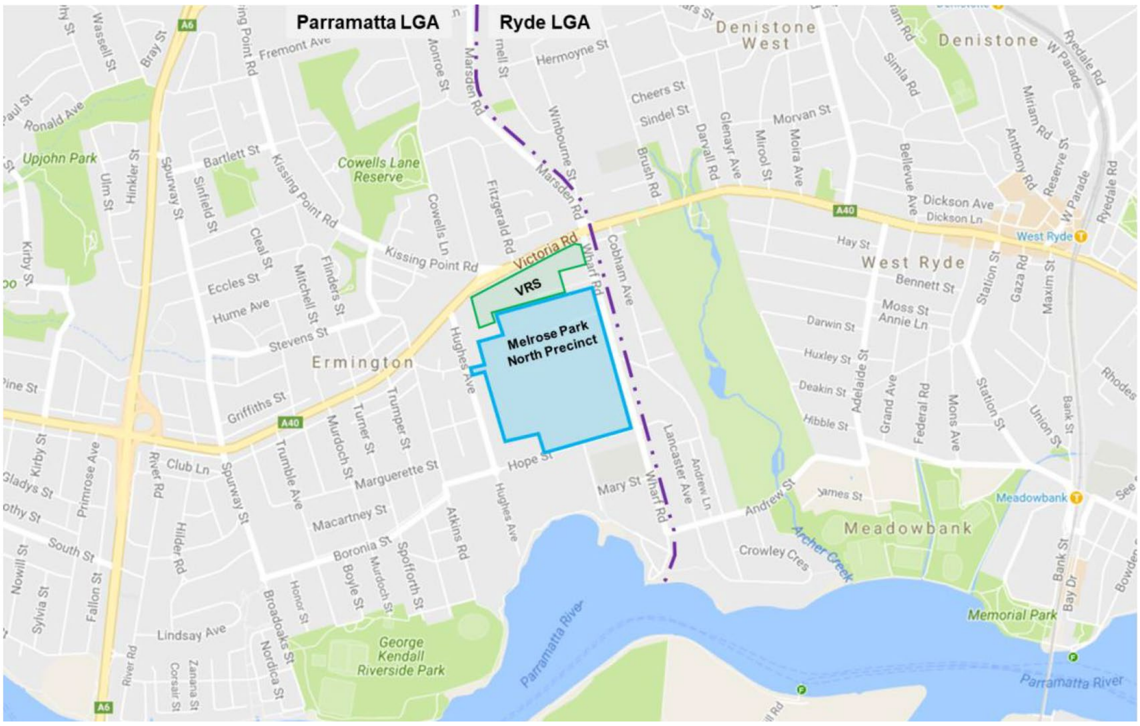


Figure 1 – Melrose Park North Precinct site location

Source: Keylan Consulting

1.2 Purpose of this report

This traffic report summarises the assessment of the performance of the internal street network for Melrose Park North Precinct and its interface with the surrounding road network.

The purpose of this report is to:

- Document the inputs, assumptions and methodology for the assessment of the proposed site internal street network.
- Provide an overview to the Melrose Park North Precinct following the approval of the Melrose Park Transport Management Accessibility Plan (TMAP) in January 2019.
- Address the post DA comments from Parramatta City Council regarding the local street network design layout of the site at granular (micro) level for the following intersections:

– Hughes Avenue and EWR-4
– Wharf Road and Hope Street
– NSR-2 and NSR-3 and Hope Street

- Present the network performance for the internal streets and intersections within the site using AIMSUN and SIDRA modelling for the ultimate build out and traffic demands for both Melrose Park North and South Precincts in 2036.
- Develop suitable intersection configurations for the local street network within the site using AIMSUN and SIDRA modelling to support the internal street designs developed by Northrop as part of their Civil Engineering Design Package.

1.3 Previous TMAP for Melrose Park

The applicant has previously completed an approved Transport Management and Accessibility Plan (TMAP) in January 2019 for the entire Melrose Park Precinct to support the approved rezoning of Melrose Park North site. In preparing this traffic report, the previous AIMSUN mesoscopic model developed for the Melrose Park TMAP has been utilised and referenced accordingly throughout this document. The reader should consult the referenced Melrose Park TMAP report for recommendations on the transport outcomes of the broader area of Melrose Park.

1.4 Approach and methodology framework

Traffic modelling is a core component of this report to evaluate and develop suitable internal local intersection configurations for the Melrose Park North Precinct site as part of the subject development application. The traffic impacts associated with the approved rezoning of Melrose Park North site and the cumulative impacts of Melrose Park South site have been considered as part of this assessment.

Figure 2 below outlines the methodology framework adopted as part of this assessment. The AIMSUN model developed for the Melrose Pak TMAP (January 2019) has been used to determine network demand and turning movement flows at local intersections within the site for full build-out 2036. The AIMSUN model outputs have been used for both SIDRA intersection and mesoscopic simulation models to develop intersection configurations for the site.

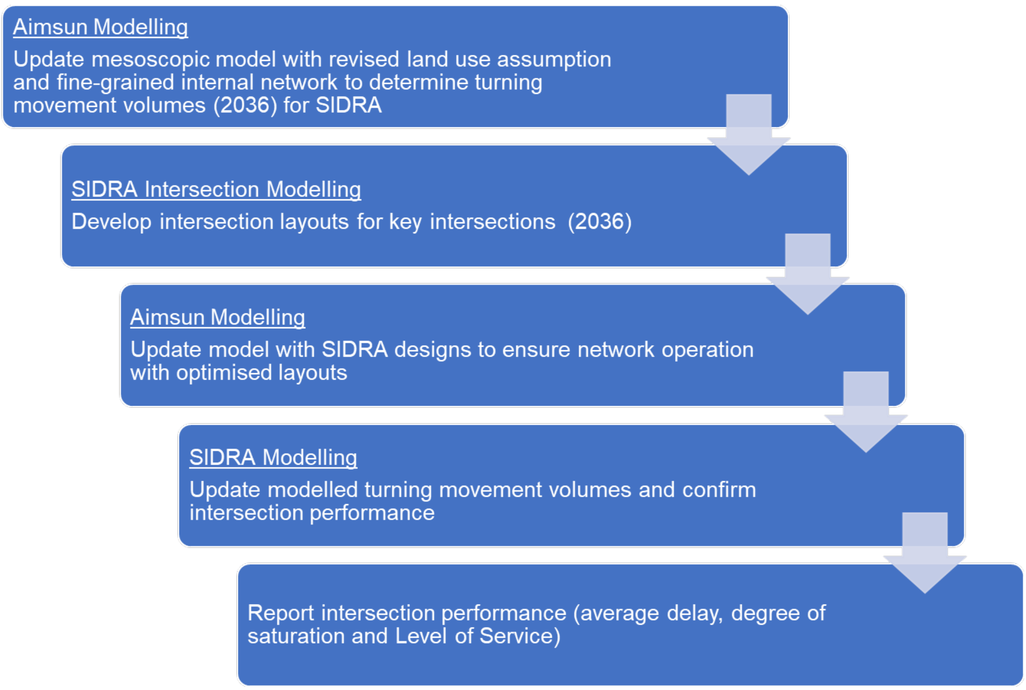


Figure 2 – Traffic modelling process

1.5 Assumptions

This traffic report is based on several key assumptions:

- Melrose Park North Precinct has been assumed to be completed by 2036, including the proposed upgrades to Victoria Road, Wharf Road and Kissing Point Road shown in the Melrose Park TMAP (January 2019).
- Traffic models prepared for the Melrose Park TMAP (January 2019) have been used as the basis of traffic assignment and assessment of the internal intersections within Melrose Park North Precinct. This includes assumptions regarding trip generation, mode share and distribution of trips to and from the site.
- The cumulative development impacts of both the Melrose Park North and South Precincts as well as background traffic forecasts for the 2036 horizon year have been included as part of this assessment.
- Parramatta Light Rail Stage 2 has been assumed to be in place by 2036, based on the alignment currently exhibited for investigation by Transport for NSW. In the vicinity of Melrose Park, this is along Boronia Street, Hope Street and Waratah Street, with streets that intersect with the light rail alignment controlled by traffic signals and operating a frequency of eight (8) services per hour during peak periods, as previously assumed in the Melrose Park TMAP (January 2019).
- A primary school has been assumed as part of the Melrose Park North Precinct in addition to the land uses originally assessed as part of the Melrose Park TMAP. This school is assumed to cater to 800 students and generate trips in addition to those previously assessed as part of the Melrose Park TMAP.
- The internal street network is based on the revised master plan provided by Parramatta City Council to the applicant.
- Detailed civil engineering drawings of the public domain, pedestrian and bicycle facilities, urban traffic control devices, road design and swept turning path analysis for the internal street network has been prepared by Northrop for the applicant in a report titled *Melrose Park Public Domain – Civil Engineering Report*.

1.6 Structure of this report

The structure of the remainder of this document is as follows:

- **Section 1** – *Introduction*: provides an overview of the purpose of this report, the assessment methodology and the and the key inputs and assumptions to the assessment.
- **Section 2** – *Transport Context*: provides and overview of the development and the surrounding transport context.
- **Section 3** – *Proposed Development Application*: provides the details of the proposed development, including changes to the master plan street network layout proposed by Parramatta City Council and the details of the proposed internal street network forming part of the assessment.
- **Section 4** – A*ppraisal of the Internal Street Network*: provides an overview of the assessment process, the results and findings of traffic modelling to assess the internal street network performance, and the intersection configurations.
- **Section 5** – *Summary and Conclusions*: provides a summary of the key findings of the assessment and identifies any key conclusions with the proposed internal street network for Melrose Park North.

2 TRANSPORT CONTEXT

This section sets out the local transport context for the Melrose Park and provides an overview of the existing local transport environment including the roads, public transport, active transport surrounding the Melrose Park North Precinct.

2.1 Road network

2.1.1 Existing road network

Victoria Road

Victoria Road is a State Road providing access between Parramatta and the western end of Anzac Bridge. It is currently carrying approximately 60,000 vehicles per day and there are approximately 2,000 bus services provided along Victoria Road on a weekly basis in the vicinity of the site. Whilst serving as a primary arterial road and movement corridor, there is still a significant amount of direct access to properties on both sides of the road in the vicinity of the Melrose Park site.

There is significant traffic congestion at nearby intersections on Victoria Road during peak hours. There are delays and queues eastbound in the morning peak at both signalised intersections with Wharf Road / Marsden Road and Kissing Point Road. Similar delays and queues exist in the evening peak at the Wharf Road / Marsden Road intersection.

Wharf Road

Wharf Road is a local road which provides direct access to properties on both sides of the road. Its main function is to facilitate the convenient and safe movement of local traffic to and from Victoria Road. Wharf Road generally provides two traffic lanes with parking on both sides and has a posted speed limit of 50km/h.

Hope Street

Hope Street is a local road which provides direct access to properties on both sides of the road. The Boronia Street-Hope Street-Andrews Road corridor distributes traffic within residential and industrial areas. These roads form a link between the local and higher order road network. Hope Street generally provides two traffic lanes with parking on both sides and has a posted speed limit of 50km/h.

Hughes Avenue

Hughes Avenue is a local road which provides direct access to properties on both sides of the road. This road generally provides two traffic lanes with parking on both sides and has a posted speed limit of 50km/h.

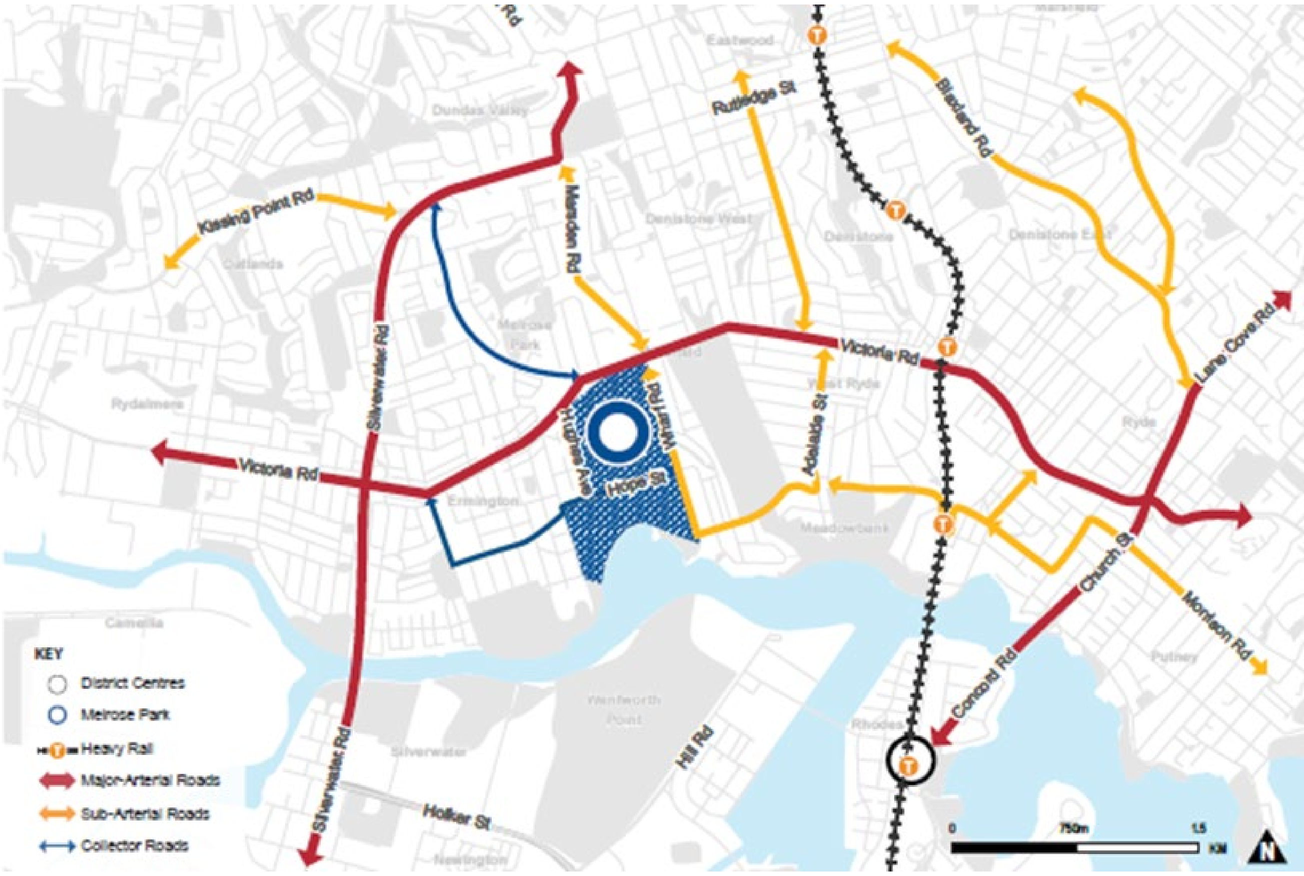


Figure 3 – Existing road network surrounding Melrose Park

Source: Melrose Park Transport Management and Accessibility Plan (Jacobs, 2019)

2.1.2 Future road network

The approved Melrose Park Transport Management and Accessibility Plan (TMAP), recommended the future upgrade of Victoria Road between Hughes Avenue and Wharf Road incorporating the following key design features:

- Connection of the existing eastbound and westbound bus lanes between Hughes Avenue and Cobham Avenue
- A new southern leg at the existing signalised intersection of Victoria Road and Kissing Point Road
- Extension of right turn bay from Victoria Road to Kissing Point Road
- Widening of Wharf Road on approach to Victoria Road

The schematic concept plan prepared as part of the Melrose Park TMAP of the proposed future upgrade of Victoria Road is shown in Figure 4.

Figure 4 – Proposed Victoria Road upgrade as approved in the Melrose Park TMAP

Source: Melrose Park Transport Management and Accessibility Plan (Jacobs, 2019)

2.2 Public transport

2.2.1 Existing public transport network

A network of rapid, frequent and local bus services along Victoria Road fronting Melrose Park exists between Parramatta CBD and Sydney CBD. These routes provide a direct and frequent service between Melrose Park, West Ryde, Top Ryde, Sydney CBD and Parramatta CBD. While there is generally spare passenger capacity on these services in the vicinity of Melrose Park, as bus routes get closer to Sydney CBD, bus congestion on Victoria Road and in Sydney CBD start to constrain passenger capacity on these routes.

Other existing local bus routes serving Melrose Park include:

- Route 513 – Carlingford to Meadowbank Wharf
- Route 523 – Parramatta – West Ryde
- Route 524 – Parramatta – West Ryde
- Route 544 – Auburn – Macquarie Centre

A private shuttle bus service is currently in operation between the Melrose Park North site connecting Meadowbank Railway Station and Meadowbank Ferry Wharf between 6:00am to 10:00am and 3:00pm to 7:00pm (weekdays only). This free bus shuttle stops at nine convenient points along the above route and is currently patronised by Melrose Park North residents wishing to connect with either train or ferry services.

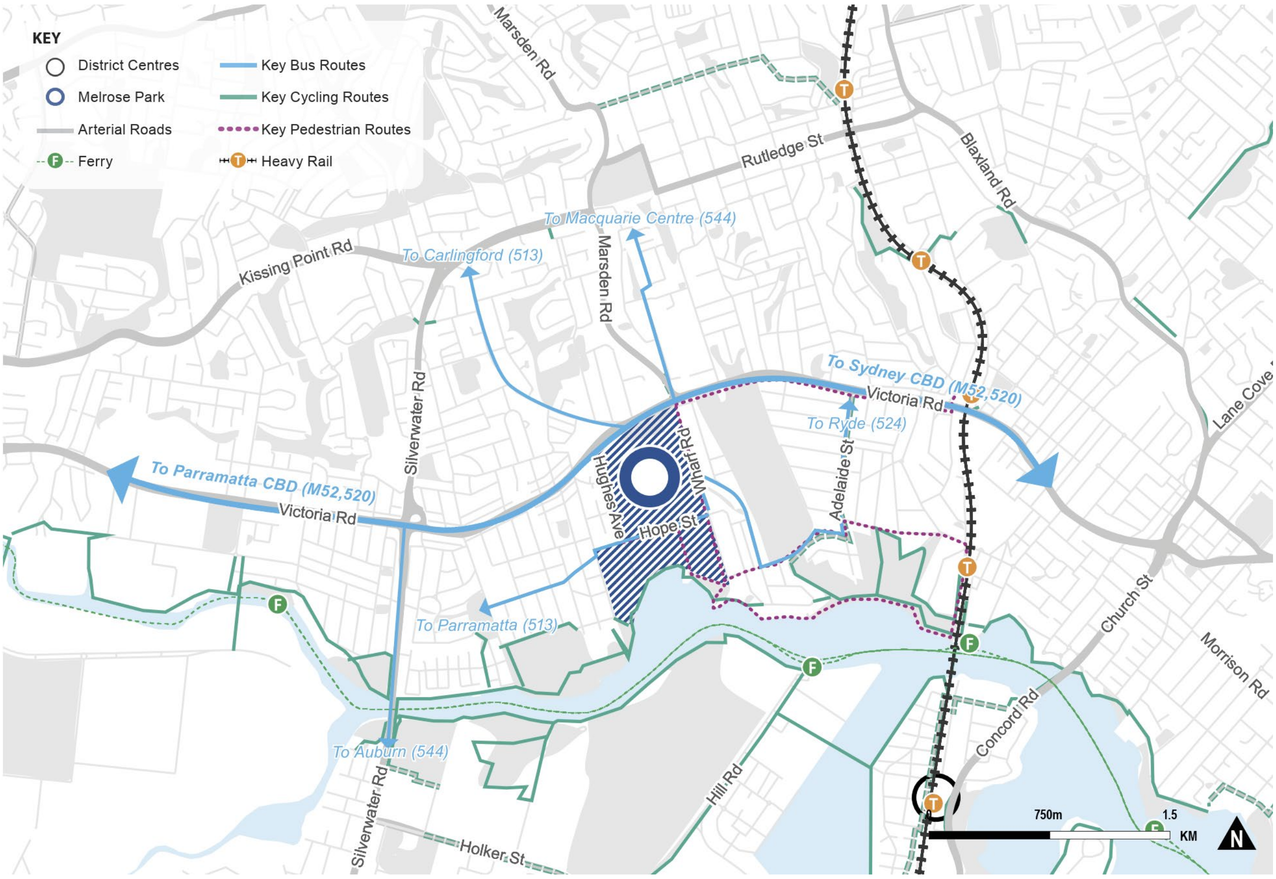


Figure 5 – Existing public transport network surrounding Melrose Park

Source: Melrose Park Transport Management and Accessibility Plan (Jacobs, 2019)

2.2.2 Future public transport network

Significant investment in new and upgraded transport infrastructure will support the development Melrose Park and the growth of Greater Parramatta to Olympic Park Peninsula (GPOP). There are already several critical infrastructure projects committed by NSW Government in and around Melrose Park which will influence the location and enable residential and employment growth to occur as identified in NSW Governments' Future Transport 2056 document.

The key city-shaping and city-serving transport infrastructure enablers planned and committed by NSW Government to support Melrose Park and GPOP include:

- Sydney Metro West
- Parramatta Light Rail Stage 2

Sydney Metro West

TfNSW is currently planning Sydney Metro West, a new metro line connecting Parramatta and Sydney central business districts. This project will be located on a corridor between the Parramatta River and existing T1 Western Line. The currently proposed rail alignment (shown in Figure 6) envisages new railway stations at Westmead, Parramatta, Sydney Olympic Park, the T9 Northern Line, the Bays Precinct and at Sydney CBD and is expected to be able to move up to 40,000 passengers an hour in each direction.

This offers an excellent public transport opportunity for Melrose Park by:

- Providing a high frequency, fast rail connection to both the Sydney CBD and Parramatta CBD. Trains departing as frequently as every 2 minutes.

- Providing significant additional rail capacity which will relieve the currently constrained heavy rail network. The new line will be able to carry up to 40,000 people per hour in each direction.

For Melrose Park to benefit from the new east-west connectivity that Sydney Metro West will provide, a fast, direct, high frequency intermediate service linking Melrose Park to the future metro station at Sydney Olympic Park.

Figure 6 – Sydney Metro West proposed alignment

Source: Transport for NSW

Parramatta Light Rail Stage 2

Paramatta Light Rail Stage 2 (PLR Stage 2) is currently at the planning stage and has received $600 million funding from NSW Government to start works and commence detail planning. The corridor connects Parramatta CBD with Sydney Olympic Park via Melrose Park using South Street, Boronia Street, Hope Street, Waratah Street, new bridge across Parramatta River, Hill Road, Australia Avenue and Carter Street. The proposed alignment of PLR Stage 2 is shown in Figure 7 as depicted in the recently released Environmental Impact Statement (EIS).

This offers an excellent public transport opportunity for Melrose Park North by:

- Better integrating Parramatta CBD with Rydalmere, Melrose Park, Wentworth Point and Sydney Olympic Park
- Providing an attractive and accessible service and the potential to reduce the need for car trips and car-parking use at Melrose Park
- Facilitating the development of higher density housing through better urban design and urban form at future light rail stops on Hope Street and Wharf Road.
- It will also provide a new bridge crossing of Parramatta River linking Melrose Park and Wentworth Point with bus and light rail including an active transport link.

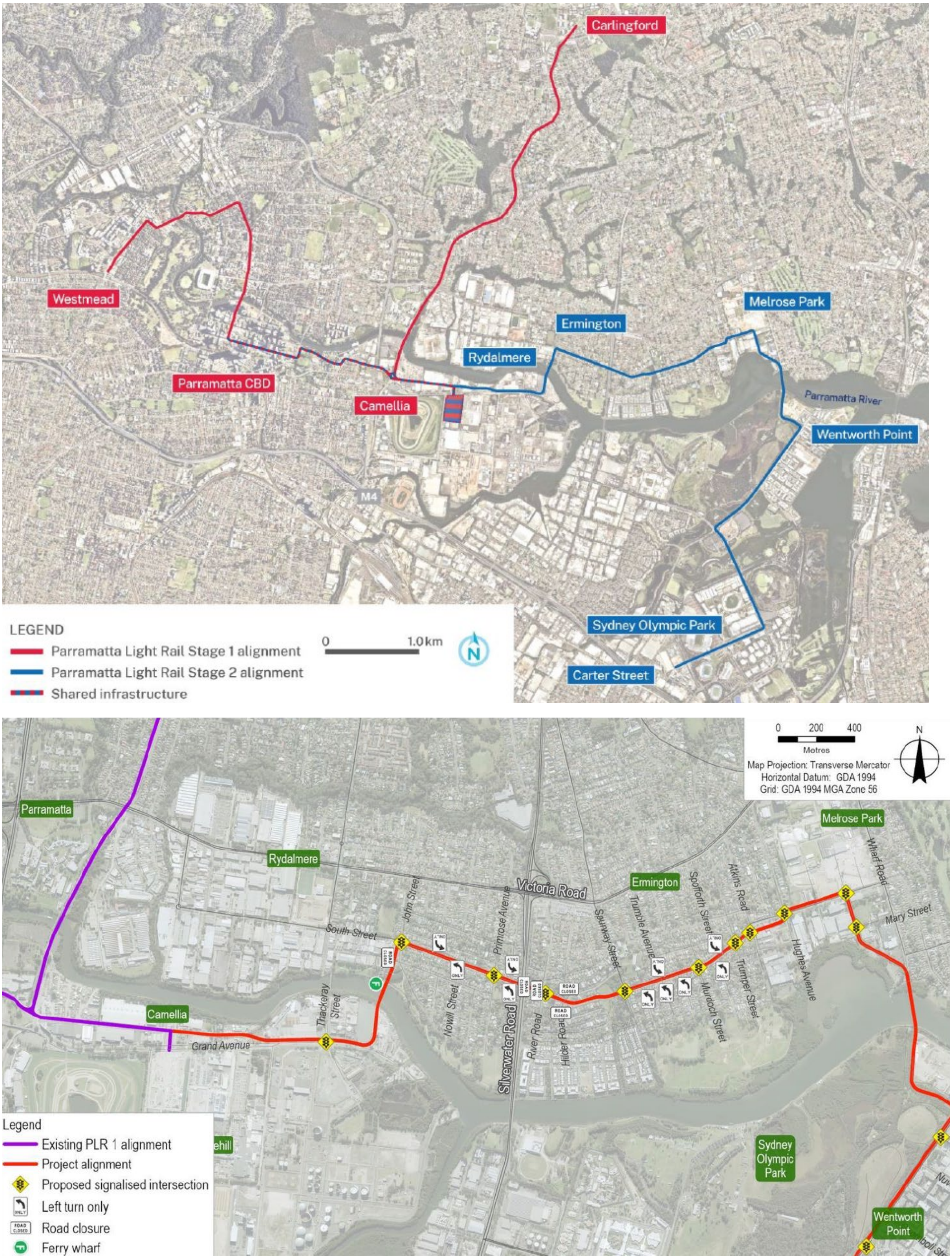


Figure 7 – Parramatta Light Rail Stage 2 Environment Impact Statement (EIS)

Source: Transport for NSW (2022)

2.3 Active transport network

Existing off-road and low-difficulty on-road cycling routes around the Melrose Park site are shown in Figure 8. The key cycle routes surrounding Melrose Park include:

- **Parramatta River Northern Foreshore Pathway**: an active transport shared path, this is a recreational and commuter cycle connection that extends as far as Meadowbank ferry wharf running along the Parramatta River to the south of Melrose Park.
- **Melrose Park (southern precinct) to West Ryde**: this local cycle route connects the southern foreshore to Victoria Road via Andrew Street and Adelaide Street.
- **Connections to Parramatta River Southern Foreshore**: an active transport shared path, these connections across the Paramatta River at Silverwater Road and Concord Road allow recreational and commuter cycle connection to the southern foreshore of Parramatta River.
- **Connections to Wentworth Point and Sydney Olympic Park:** a new active and public transport bridge (200m long) across the Parramatta River has been identified as a key piece of infrastructure for PLR Stage 2 which will have a transformative impact for both Melrose Park. The bridge will used by initially by buses before light rail is implemented and will ensure Melrose Park is a highly accessible precinct for both residents accessing Sydney Olympic Park and beyond.

The *Parramatta Bike Plan* (*City of Parramatta Council, 2017*) also proposes the following additional routes through and around Melrose Park:

- **North-South through-site connection**: Proposed along the alignment of North-South Road 2, this local off-road route would provide a connection from the Parramatta River foreshore to Victoria Road.
- **Hope Street Regional cycle route**: Proposed on-road along the alignment of Boronia Street and Hope Street, this would link up to the regional route connecting into Parramatta.

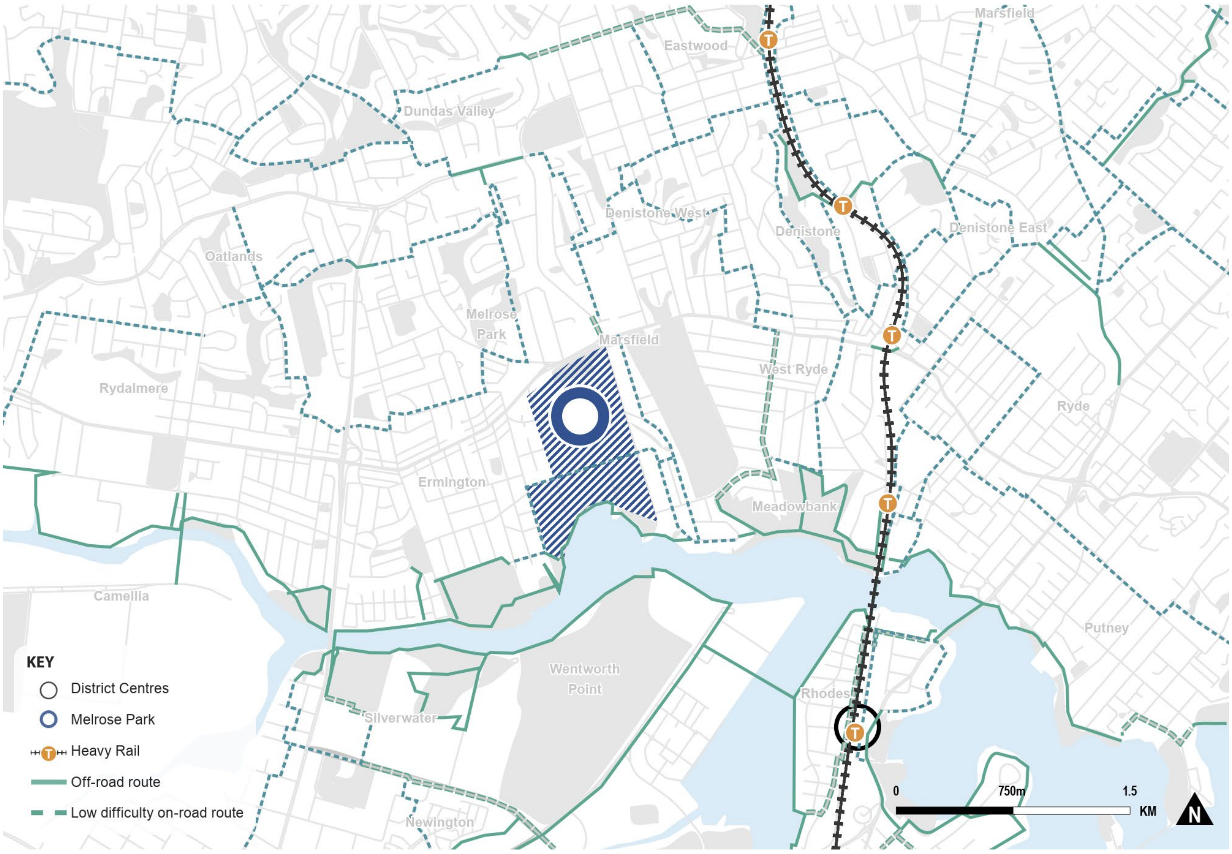


Figure 8 – Cycle routes surrounding Melrose Park

Source: Melrose Park Transport Management and Accessibility Plan (Jacobs, 2019)

2.4 Existing operational performance

2.4.1 Existing midblock performance

The existing midblock traffic density outputs using the AIMSUN model from the Melrose Park TMAP (January 2019) for the morning and evening peak periods are shown in Figure 9 and Figure 10 respectively. The modelled traffic density during the 2017 base year shows the following performance characteristics for the existing surrounding network at Melrose Park:

- Hope Street on approach Hughes Avenue eastbound shows some minor congestion in the morning and westbound in the evening peak periods.
- Victoria Road on approach to Wharf Road is congested in the eastbound direction during both peak periods due to a combination of delays at this intersection and the reduction in eastbound traffic lanes on Victoria Road to accommodate the eastbound bus lane in the morning peak period.
- Wharf Road on approach to Victoria Road due to delays at this intersection and heavy traffic flows on Victoria Road.

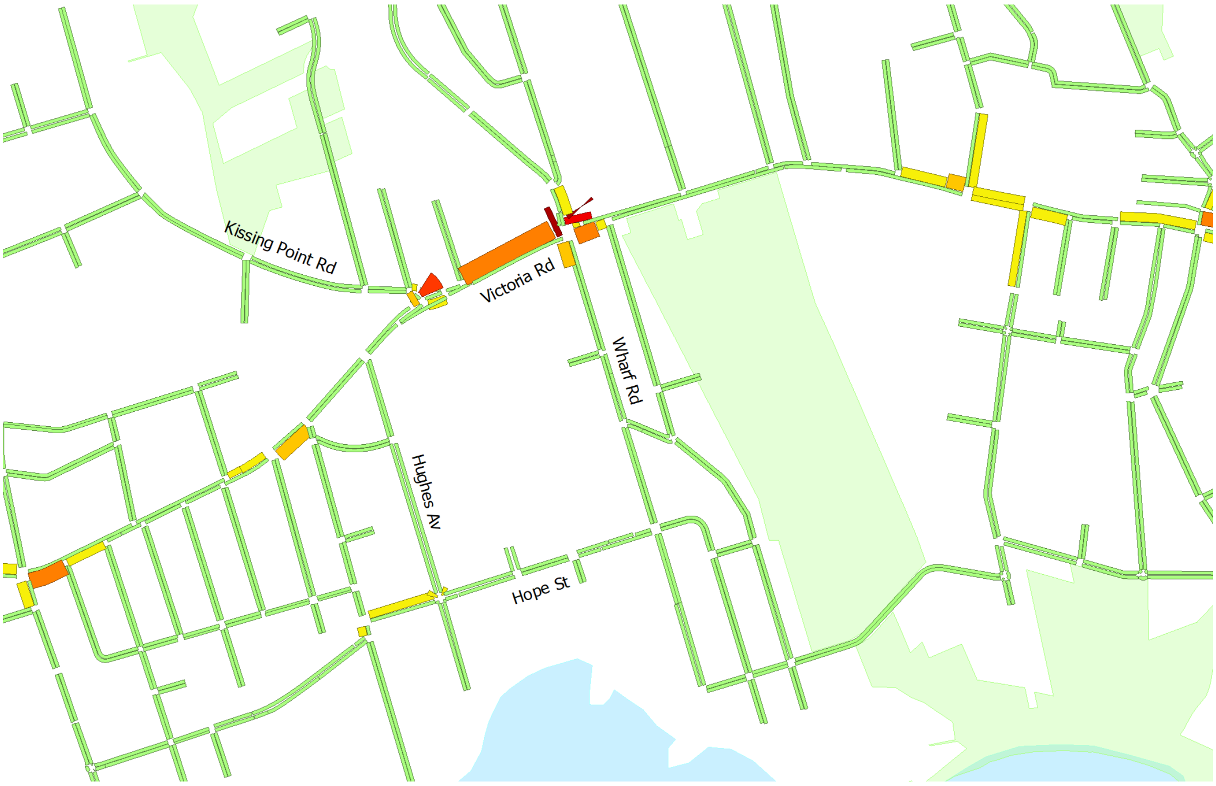


Figure 9 – 2017 Morning peak modelled traffic density

Source: Melrose Park Transport Management and Accessibility Plan (Jacobs, 2019)

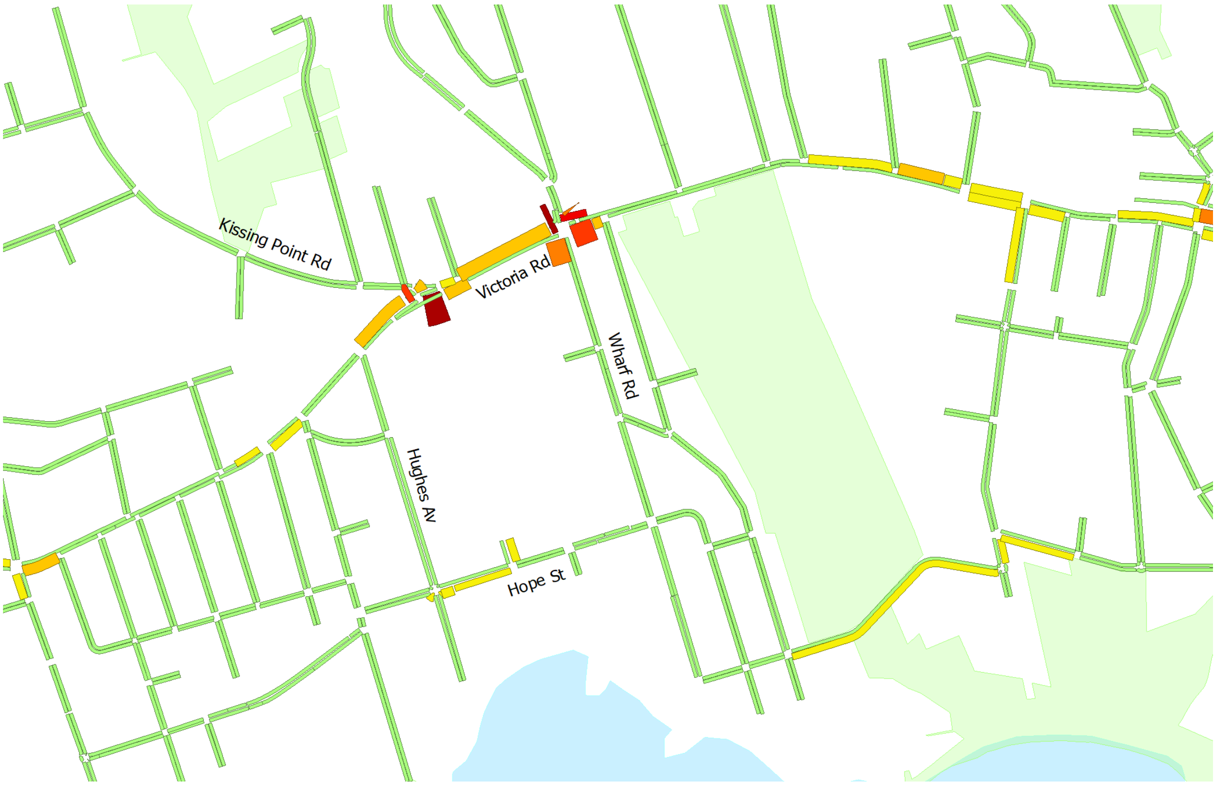


Figure 10 – 2017 Evening peak modelled traffic density

2.4.2 Existing intersection performance

The performance of these intersections during the morning and evening peak period has been assessed using SIDRA Intersection modelling software. Intersection performance is measured based on Level of Service (LOS). The Level of Service of an intersection is defined by the average delay for vehicle travelling through the intersection during the peak period. For priority-controlled intersections and roundabouts, the delay for the highest-delay movement is used and for signalised intersections, the weighted average delay for all movements is used. A summary of the Level of Service criteria for intersections is provided in Table 1.

Table 1 – Level of Service Criteria for intersections

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabouts	Give Way and Stop Signs
A	<14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but with accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control	At capacity, requires other control modes
F	>70	Unsatisfactory	Unsatisfactory

A summary of modelled intersection performance during morning and evening peak periods from the Melrose Park Aimsun model (*Melrose Park TMAP, 2019*) are shown in Table 2. The local intersection performance shows that the intersections surrounding the Melrose Park North site all operate well, which operate at Level of Service A and Level of Service B during the morning and evening peak periods.

Table 2 – Existing intersection performance

ID	Intersection	Morning Peak		Evening Peak	
		Av Delay	LoS	Av Delay	LoS
1	Victoria Road/Hughes Avenue (priority control)	1	A	2	A
2	Hughes Avenue/Hope Street (roundabout)	20	B	7	A
3	Waratah Street/Hope Street (priority control)	7	A	9	A
4	Hope Street/Wharf Road (priority control)	4	A	13	A

3 PROPOSED DEVELOPMENT APPLICATION

This section provides an overview of the proposed internal street network and traffic/land uses within Melrose Park North (the site), the traffic generation assumptions and the calculation for full build-out of the Melrose Park Precinct

3.1 Proposed street network

The proposed internal street network (marked in red) for the site is shown in Figure 11 which forms part of the development application (DA/1100/2021) for early works, site remediation, earthworks, public domain and internal street network. The key changes in the proposed street network from the Aimsun mesoscopic simulation network modelled as part of the Melrose Park TMAP (January 2019) include:

- Roundabouts at the intersections of NSR-2 and NSR-3 with EWR-4 and EWR-6
- No direct vehicular access connections to Wharf Road from EWR-3 and EWR-6
- Roundabout at the intersection of Hughes Avenue and Linden Grove
- Reduced connections along east-west streets to allow for larger blocks between NSR-2 and NSR-3 and between NSR-4 and Wharf Road
- Straight alignment of EWR-4 between Wharf Road and Hughes Avenue as proposed by Parramatta City Council's recent master plan for the Melrose Park North site

Other key features of the street road network for the Melrose Park North site include:

- Signalised intersections on Hope Street along the alignment of the proposed Parramatta Light Rail Stage 2 route at Hughes Avenue, NSR-2, NSR-3 and Waratah Street providing access to new Town Centre (Lot N) as per the original TMAP.
- Priority (give-way) control at all other internal intersections with the site
- Access to blocks within Melrose Park North to be provided on internal streets with no direct access from Wharf Road, Hope Street or Hughes Avenue
- No direct vehicular access connection from EWR-4 to Taylor Avenue at Wharf Road
- Upgrade of the intersection of Hughes Street and Linden from the existing priority intersection to a roundabout (originally proposed as a priority-controlled intersection in the Melrose Park TMAP)

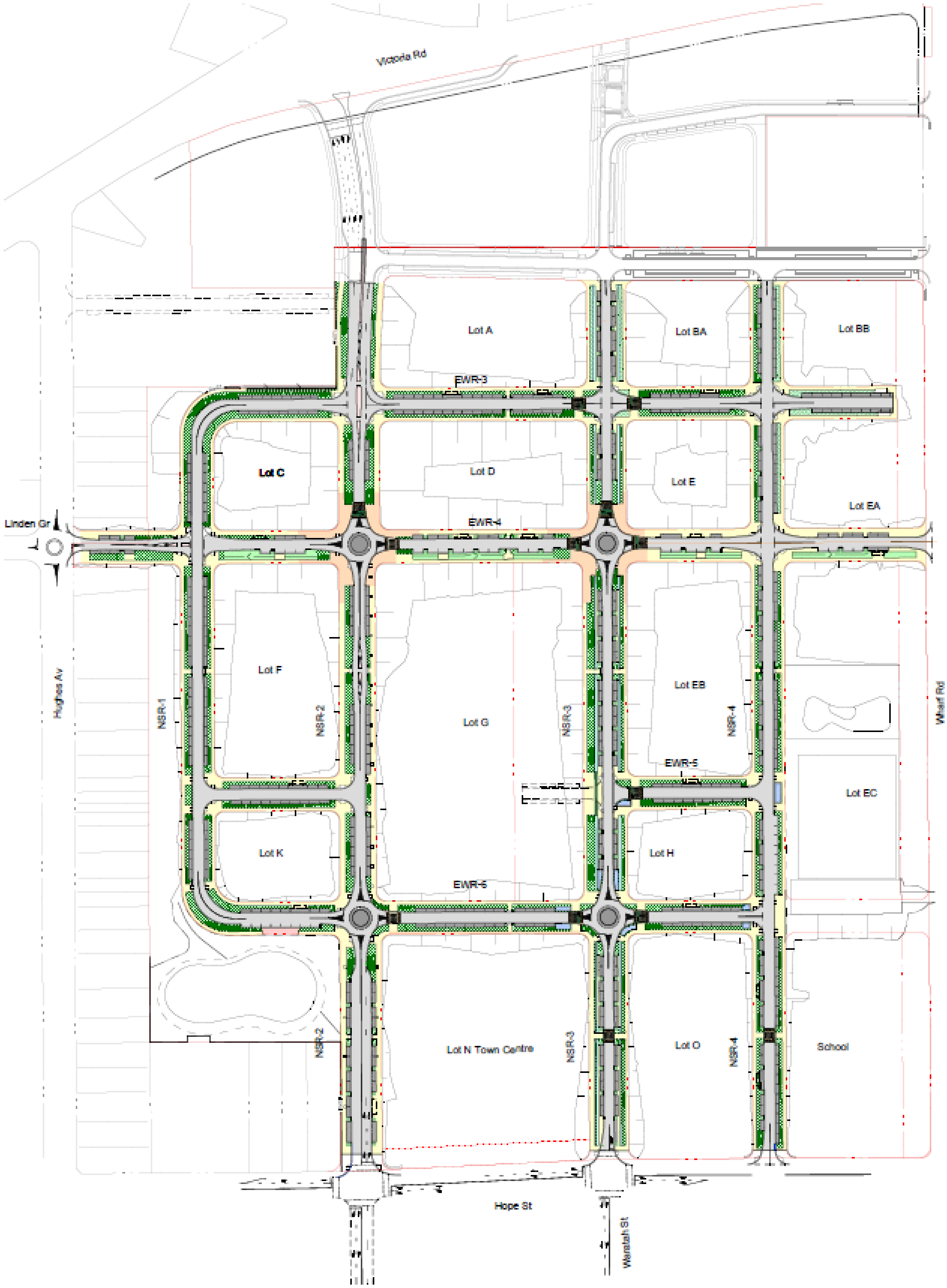


Figure 11 – Melrose Park North proposed internal street network as part of development application

Source: Northrop

3.2 Proposed street cross sections

The alignment of streets and intersections support the urban structure and form proposed for Melrose Park North. Street cross sections have been dimensioned to support the aims of the Melrose Park North structure plan and are shown in **Appendix A**:

- Main collector streets such as NSR-2 in the core are proposed to have 12.8m wide carriageways capable of providing either four travel lanes or two travel lanes and two parking lanes.
- The local streets are proposed to generally have 11.0m wide carriageways which would be capable of providing two travel lanes plus a parking lane on each side.
- The street sections have been developed on the basis that there will be a safe, amenable and attractive pedestrian environment in all streets. Similarly, cycling will be promoted through a network comprising dedicated bicycle facilities and streets that are made safe for cycling through traffic planning, carriageway design and streetscape treatments.

3.3 Proposed land uses

The overall proposed land uses for Melrose Park North and South for residential, retail and commercial quantum's remain unchanged from the previous Melrose Park TMAP (January 2019). The only change is the inclusion of a primary school for approximately 800 students within Melrose Park North site. This school will be in the south-west corner of the site adjacent to Hope Street and Wharf Road and will be accessed from EWR-6. It is anticipated that most students attending this new school will be from the surrounding area and travel to/from the school within walking distance.

It is noted that the final constructed dwelling yield on the Bartlett Site was 1,070. In order to provide a conservative assessment of traffic impacts, the original assumption of 1,200 dwellings has been retained. A summary of the proposed land uses for both Melrose Park North (the site) and South Precincts assumed as part of this traffic assessment is provided in Table 3 and Figure 12.

Table 3 – Proposed land uses in Melrose Park North and South (total precinct area)

Land Use	Metric	Quantum
High density residential (Bartlett Site)	Dwellings	1,200*
High density residential (balance of Melrose Park)	Dwellings	9,886
Commercial (North and South)	Gross Floor Area	19,400
Retail (North and South)	Gross Floor Area	15,600
Primary school (North)	Students	800

**Assumed Melrose Park TMAP yield*

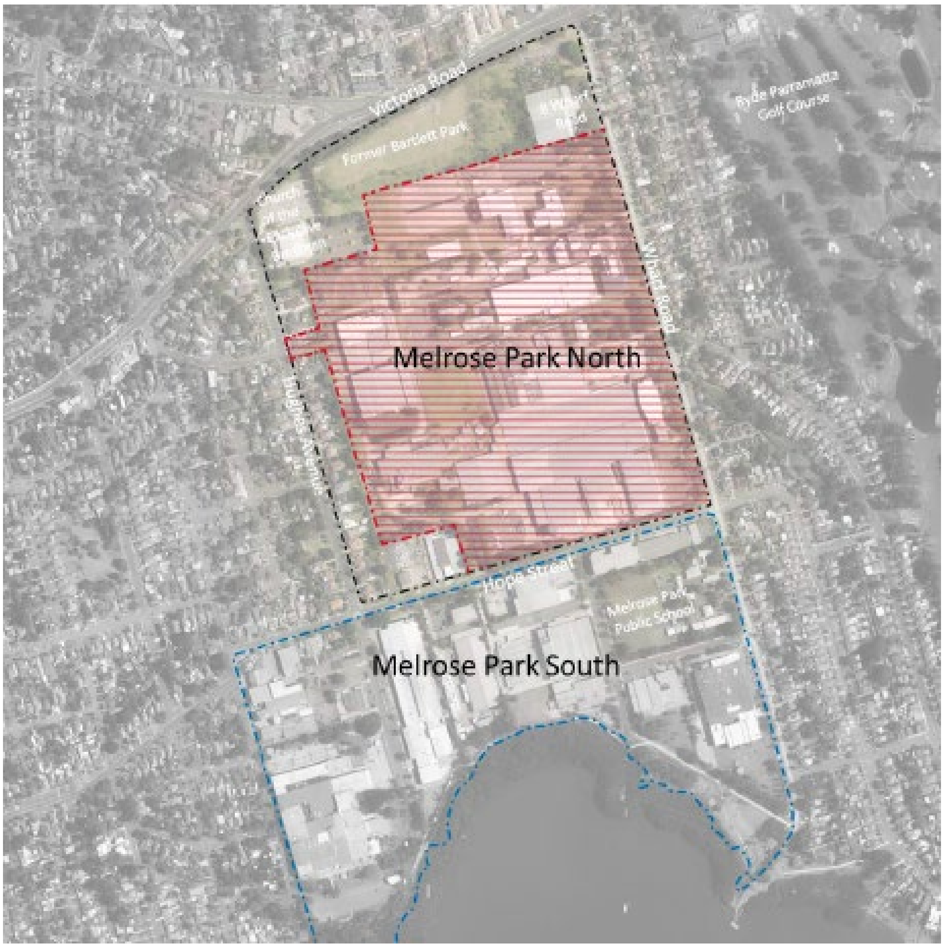


Figure 12 – Melrose Park North and South Precinct

Source: Keylan Consulting

3.4 Trip generation

A summary of the peak hour car trip generation based on the proposed land uses and the trip generation rates assumed as part of the original Melrose Park TMAP is provided in Table 4 for 2036.

Table 4 – Melrose Park North and South Precinct traffic generation (ultimate build-out 2036)

Land Use	Metric	Quantum	Morning Car Trip Generation Rate	Morning Peak Car Trips	Evening Car Trip Generation Rate	Evening Peak Car Trips
High density residential (Bartlett Site)	Dwellings	1,200*	0.19 per dwelling	228	0.15 per dwelling	180
High density residential (balance of Melrose Park)	Dwellings	9,886	0.25 per dwelling	2,471	0.25 per dwelling	2,471
Commercial	Gross Floor Area	19,400	1.6 per 100m²	310	1.2 per 100m²	233
Retail	Gross Floor Area	15,600	2.5 per 100m²	390	5 per 100m²	780
Primary school	Students	800	0.255 per student	204	0.05 per student	40
Primary school	Staff	47	0.2 per staff	9	0.2 per staff	9
Total				***3,612***		***3,713***

**Assumed TMAP yield*

4 APPRAISAL OF INTERNAL STREET NETWORK

This section outlines the performance of the functional elements of the internal street network for Melrose Park North as part of the development application (DA/1100/2021). It outlines the intersection and network performance of the internal street network including key internal intersection configurations for the site. The AIMSUN mesoscopic simulation model from the Melrose Park TMAP (January 2019) in conjunction with SIDRA modelling have been used as the basis for assessing the internal street network for the site.

4.1 Approach to analysis

This sub-section examines the overall road network performance based on the land use estimates proposed for Melrose Park North and South Precincts and assesses the internal street network for 2036 full build-out (morning and evening peak hours). In assessing the adequacy of the internal street network to meet the proposed future land-based demands, a desired assessment criteria for street network planning and intersection performance has been developed.

Capacity and Level of Service (LOS) analysis was undertaken for the Melrose Park North internal street network. For the internal street network assessment, Level of Service D or better is defined as acceptable operation, with intersections performing at Level of Service E or worse requiring treatment or upgrade. The following key performance indicators were used to assess the merits of the internal street network and proposed intersection configuration:

- Midblock flow density (mesoscopic equivalent to queuing)
- Midblock traffic flows (based on peak hourly volumes)
- Intersection Level of Service (based on average delay)

4.1.1 Desired street network principles and service criteria

The desired street network principles and assessment criteria for internal street network for the Melrose Park North site relate to:

- Provision of a high level of traffic safety for all street users
- Provision of reasonable level of convenience for all street users
- Provision of acceptable levels of amenity on the street network from the impact of heavy through traffic flows
- Provision of adequate capacity of the internal street network to cater for predicted traffic volumes
- Adequate access and connectivity for the proposed Town Centre to support place-based transport outcomes
- Minimising impacts on the operation of adjacent streets
- Provision of sufficient space and appropriate traffic control measures for all intersections particularly along Hope Street (PLR Stage 2 route)

4.1.2 Intersections level of service

The performance of the internal street network is largely dependent on the operating performance of key intersections, which are critical capacity control points on the street network. The capacity of an urban street network is generally governed by the operation of its intersections. It is therefore appropriate to consider intersection operation as a measure of the capacity of the street network.

The criteria for evaluating the operational performance of intersections are provided by the RTA Guide to Traffic Generating Development (2002); these criteria are shown in Table 5. The criteria for evaluating the operational performance of the Melrose Park North internal intersections are based on a qualitative measure (the Level of Service) which is applied to each band based on the average delay. This average vehicle delay is equated to a corresponding Level of Service from A (best) to F (worst). Based on the performance measures shown in Table 6, a target maximum Level of Service threshold for new intersections of ***Level of Service D*** has been adopted for peak period conditions for future intersection performance within the internal local street network where practicable. Delays greater than this, particularly for the future planning of the internal street network is considered unsatisfactory.

Table 5 – Level of Service Criteria for intersections (adapted from *RTA Guide to Traffic Generating Developments, 2002*)

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabouts	Give Way and Stop Signs
A	<14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but with accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control	At capacity, requires other control modes
F	>70	Unsatisfactory	Unsatisfactory

4.2 Key intersections

The modelling approach used to assess the impacts of the Melrose Park North site examined the following key internal intersections:

1. Hughes Avenue/Linden Grove
2. Hughes Avenue/Hope Street
3. NSR-2/Hope Street
4. Hope Street/NSR-3/Waratah Street
5. NSR-4/Hope Street
6. Wharf Road/Hope Street
7. Wharf Road/Taylor Street
8. Wharf Road/EWR-4
9. NSR-2/EWR-4
10. NSR-3/EWR-4
11. NSR-4/EWR-4
12. NSR-4/EWR-6
13. NSR-3/EWR-6
14. NSR-2/EWR-6
15. NSR-2/EWR-3

A plot showing the locations of these internal intersections for the site is shown in Figure 13.

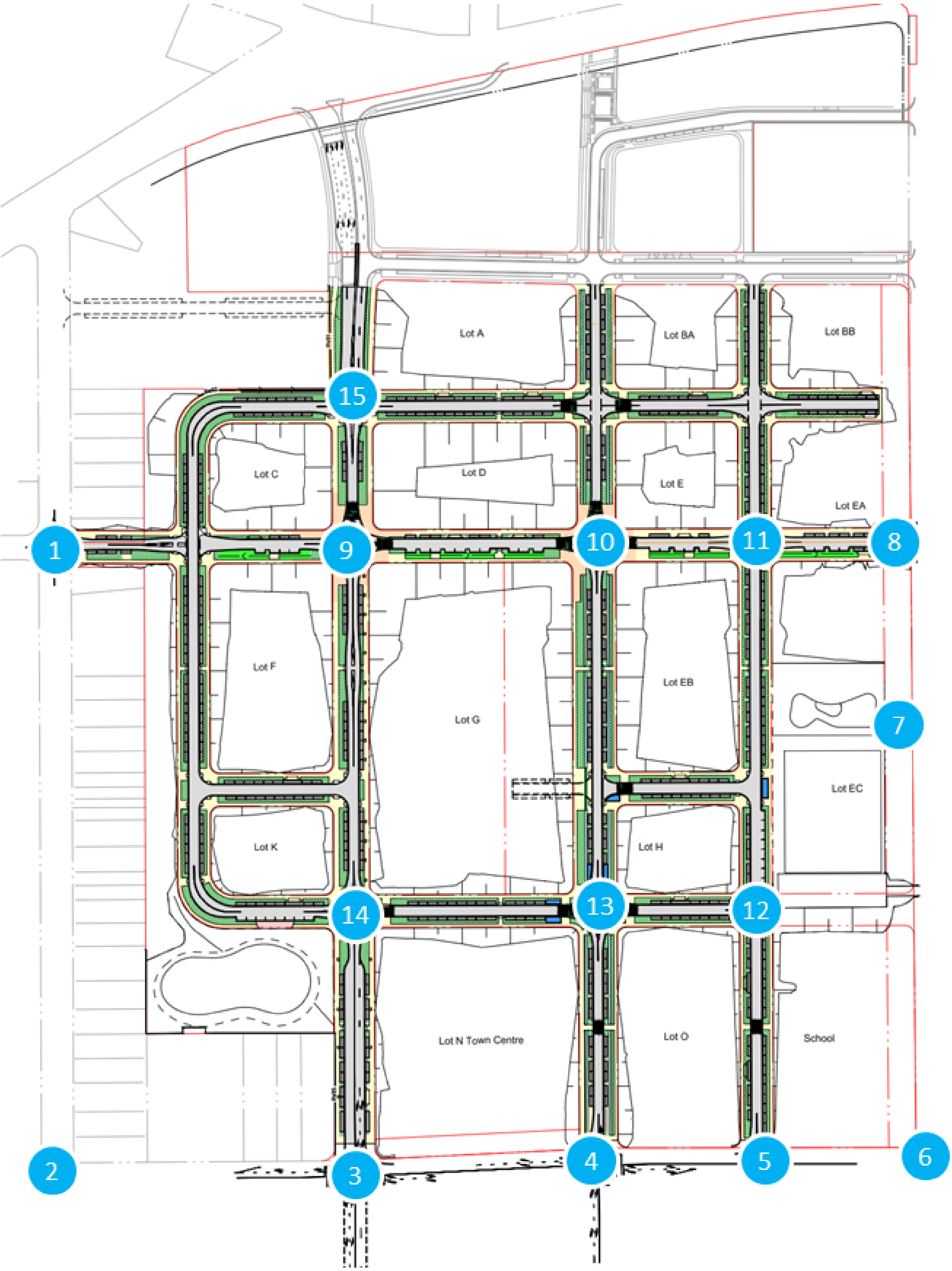


Figure 13 – Modelled internal intersection locations

4.3 Mesoscopic (AIMSUN) modelling

The Melrose Park TMAP mesoscopic traffic model has been used for the assessment of the street network performance for Melrose Park North. This model was previously developed in AIMSUN and is primarily a traffic assignment model. Developed in 2017 and used as the basis for assessment of the Melrose Park North and South Precincts in 2019.

4.3.1 Model geographical coverage

Figure 14 shows the geographic coverage of the Melrose Park mesoscopic traffic model, covering the road network between Rutledge Street to the north and Parramatta River to the south and between Silverwater Road to the west and Church Street to the east. A microsimulation area has been modelled that is bounded by Victoria Road, Hughes Avenue and Wharf Road, providing additional detail in the vicinity of the Melrose Park North site.

4.3.2 Temporal coverage

The model covers the morning and evening peak periods from 6:00am to 10:00am and from 3:00pm to 7:00pm respectively. In addition to these simulation periods, a “warm-up” period of an additional 30 minutes has been specified to sufficiently load the network at the start of each analysis period. The model covers the forecast horizon year 2036 with full development of Melrose Park (North and South).

4.3.3 Vehicle classes

The following four vehicle classes have been explicitly modelled:

- Cars: comprised of cars, taxis and light vans (all modelled as the same vehicle class), Austroads classes 1 and 2
- Trucks: comprised of small and large rigid trucks, Austroads classes 3, 4 and 5
- Heavy trucks: comprised of articulated semi-trailers and B-doubles, Austroads classes 6 and above
- Buses: modelled using fixed routes and timetables rather than demand matrices.

4.3.4 Modifications to Melrose Park TMAP AIMSUN model

The following modifications to the AIMSUN model have been undertaken for use in the traffic assessment of the internal streets within the Melrose Park North site:

- Adjustment of the Parramatta Light Rail Stage 2 alignment along Hope Street to Waratah Street (previously assumed to use Wharf Road).
- Adjustment of internal travel zone connections to reflect the locations of driveways under the revised internal street layout for Melrose Park North.
- Addition of the traffic generation potential associated with the proposed primary school located at northwest corner of Wharf Road and Hope Street.

Figure 14 – Melrose Park mesoscopic traffic model extents and microsimulation area

4.3.5 Future year traffic volumes (2036)

Plots of modelled traffic volumes for the morning and evening peak periods are shown in Figure 15 and Figure 16 respectively. Analysis of the modelled flows shows that the street hierarchy within Melrose Park North is compatible with the land use, place outcomes and range of roles that each street serves within the site (i.e. NSR-2, NSR-3 and EWR-4 all performing collector road functions). The internal street network for the site incorporates an interconnected, legible urban street grid street pattern that provides a pedestrian friendly environment and has been developed based on promoting local access rather than through regional traffic.

Figure 15 – 2036 morning peak traffic volumes (ultimate build-out)

Figure 16 – 2036 evening peak traffic volumes (ultimate build-out)

4.3.6 Future network performance (2036)

This section presents the results of mesoscopic modelling (morning and evening peak hours) completed to support the Melrose Park North internal street network, as described below. Figure 15 and Figure 16 shows the modelled traffic density during the morning and evening peak hours respectively. These modelled traffic density plots show that there would be minimal traffic congestion on all the internal streets within the Melrose Park North site, with most of the traffic congestion concentrated on Victoria Road at Wharf Road and Kissing Point Road.

Figure 17 – Morning peak 2036 modelled traffic density (ultimate build-out)

Figure 18 - Evening peak 2036 modelled traffic density (ultimate build-out)

4.3.7 Future intersection performance (2036)

The future intersection performance of the Melrose Park North site was analysed using the AIMSUN mesoscopic simulation model for peak conditions (morning and evening peak hours) for the 2036 horizon year. The analysis of the operating conditions was based on the intersection performance criteria previously described in Section 4.1.2 and Table 6.

Analysis of the modelled intersection performance from the mesoscopic simulation model shows that these intersections would all perform satisfactorily during both morning and evening peak periods for 2036. The majority of all internal intersections will operate at Level of Service A and Level of Service B during both the morning and evening peak hours.

Table 6 - Modelled 2036 intersection performance (AIMSUN mesoscopic model)

ID	Intersection	Recommended Control	Morning Peak		Evening Peak	
			Av Delay	LoS	Av Delay	LoS
1	Hughes Av/Linden Gr	Roundabout	3	A	3	A
2	Hughes Av/Hope St	Signals	10	A	15	B
3	NSR-2/Hope St	Signals	9	A	15	A
4	NSR-3/Hope St/	Signals	21	B	21	B
5	NSR-4/Hope St	Give way	4	A	5	A
6	Wharf Rd/Hope St	Give way	11	A	9	A
7	Wharf Rd/Taylor St	Give way	5	A	7	A
8	Wharf Rd/EWR-4	Give way	6	A	11	A
9	NSR-2/EWR-4	Roundabout	9	A	3	A
10	NSR-3/EWR-4	Roundabout	2	A	2	A
11	NSR-4/EWR-4	Give way	13	A	15	B
12	NSR-4/EWR-6	Give way	13	A	19	B
13	NSR-3/EWR-6	Roundabout	2	A	2	A
14	NSR-2/EWR-6	Roundabout	3	A	3	A
15	NSR-2/EWR-3	Give way	11	A	3	A

4.3.8 Key intersection plots from AIMSUN

Plots from the AIMSUN model of the assumed intersection configurations along Hope Street in the vicinity of the proposed Parramatta Light Rail Stage 2 alignment are shown in Figure 19 to Figure 22. The key signalised intersections along Hope Street at NSR-2 and NSR-3 all operate satisfactorily providing access to the proposed new Town Centre without significant impacts to light rail operations.

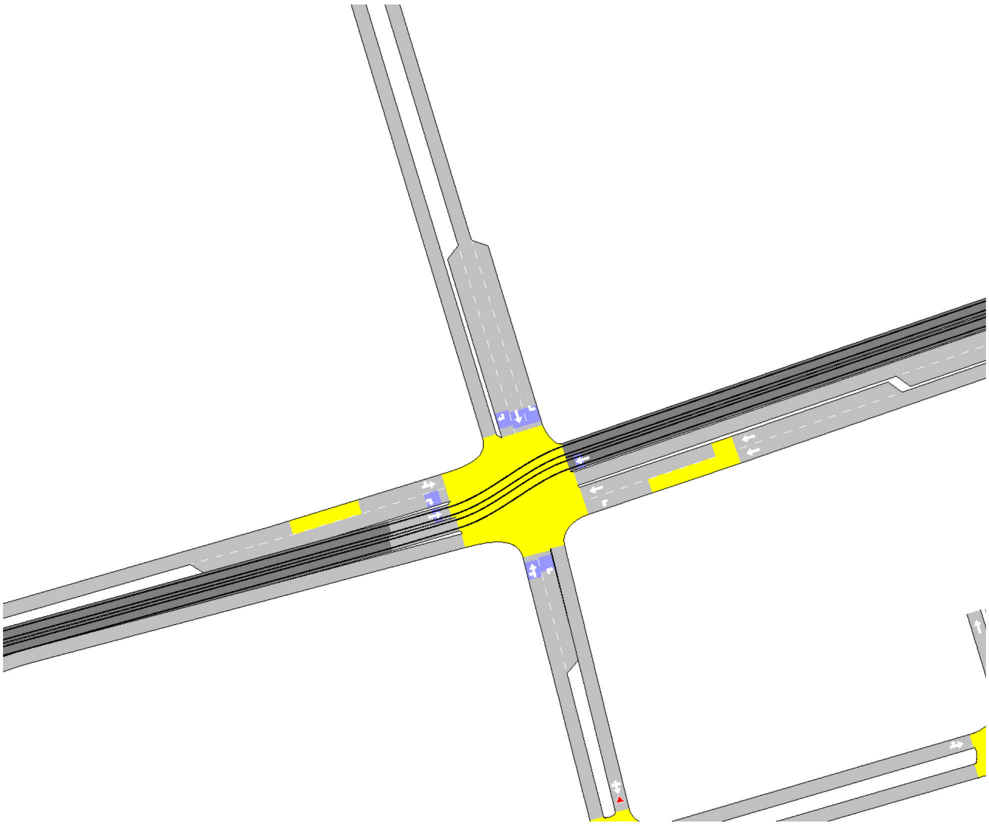


Figure 19 – Hughes Avenue and Hope Street modelled arrangement

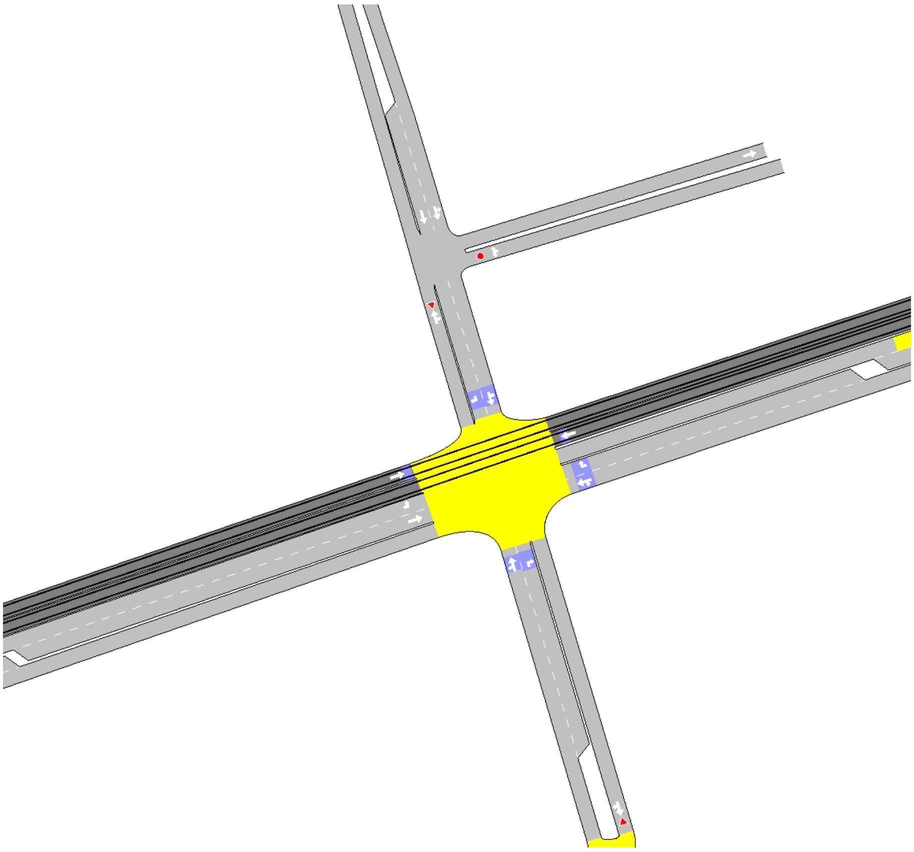


Figure 20 – North-South Road 2 (NSR-2) and Hope Street modelled arrangement

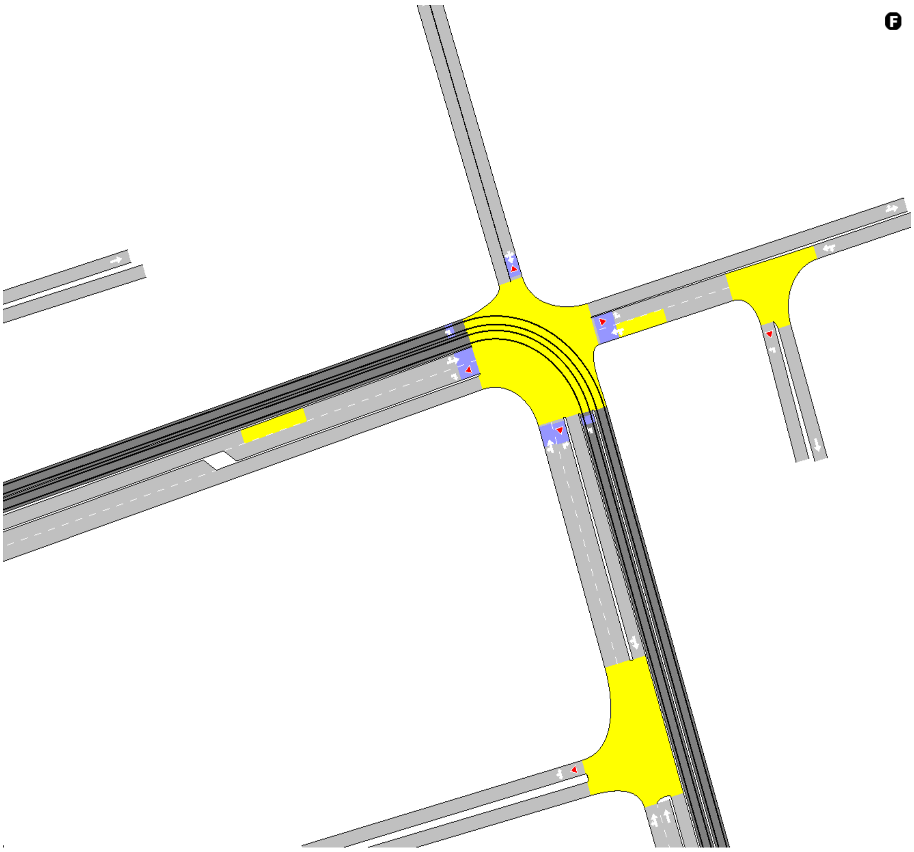


Figure 21 – North-South Road 3 (NSR-3) and Hope Street / Waratah Street modelled arrangement

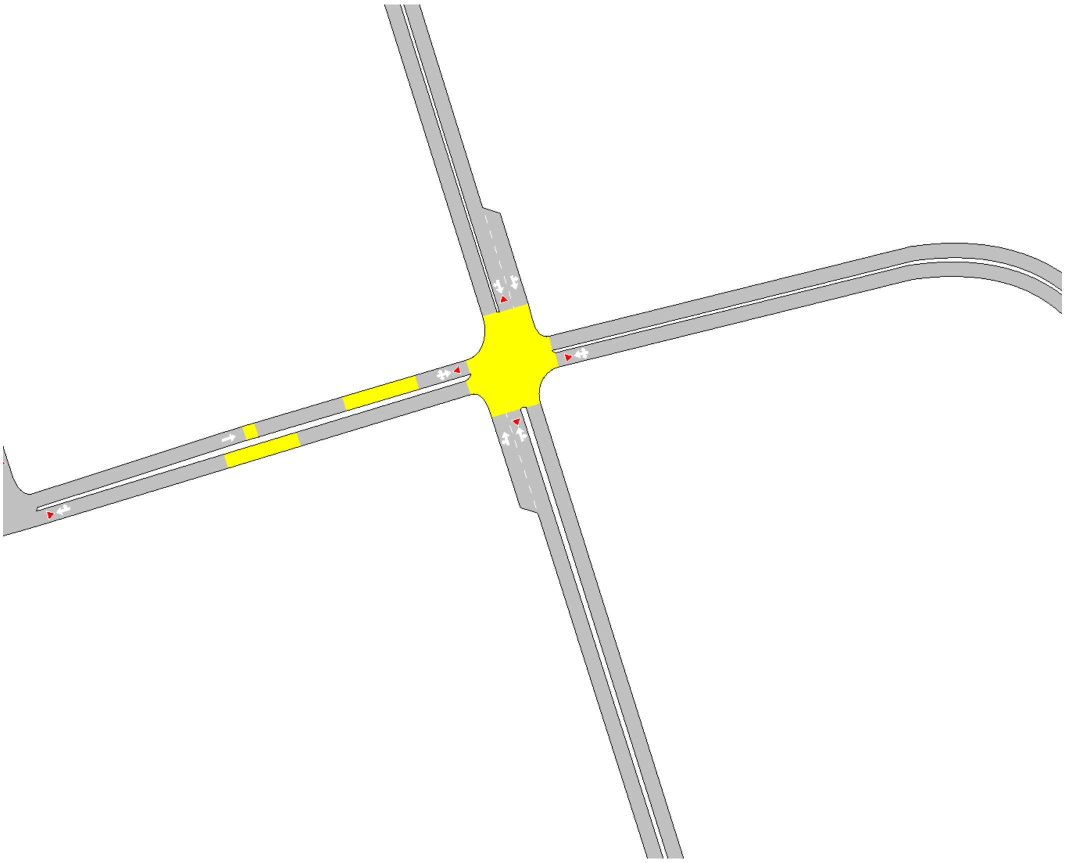


Figure 22 –Wharf Road and Hope Street modelled arrangement

4.4 Intersection (SIDRA) modelling

SIDRA analysis has been undertaken for key internal intersections within Melrose Park North site utilising the future turning volumes extracted from Aimsun and the proposed street geometry for horizon year 2036 (full build-out). The 2036 future year turning movement volumes at key intersections adopted as part of this assessment is provided in **Appendix B.** To assess the capacity and level of service of the future intersection layouts within the site, SIDRA modelling was used to calculate capacities, queue lengths and delays.

4.4.1 Interaction between Aimsun and SIDRA models

SIDRA modelling has been undertaken to assess the performance of the intersections within the site, based on traffic volume forecasts derived from the Melrose Park Aimsun mesoscopic model. Where necessary, changes to the internal intersection arrangements have been updated within the Aimsun model to ensure that they align with SIDRA arrangements, and to identify any changes in traffic volumes and assignment that may result from these changes. The process for undertaking traffic modelling of the internal streets within the site is shown in Figure 23.

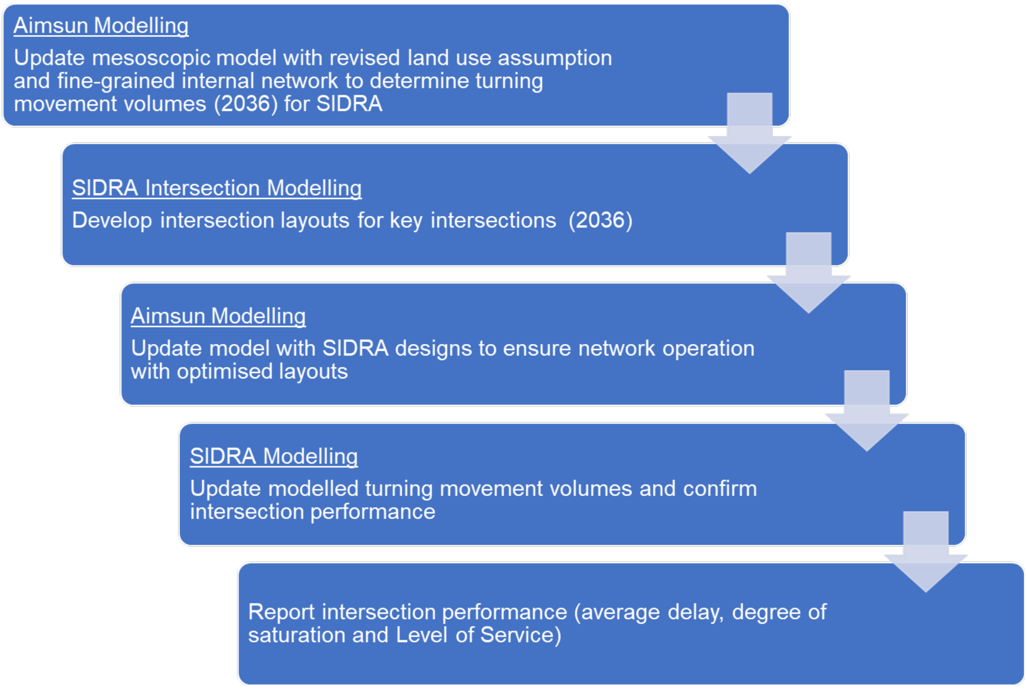


Figure 23 – Intersection modelling and design process

4.4.2 Future intersection performance (2036)

Modelled intersection performance within Melrose Park North for 2036 is provided in Table 7. Detailed SIDRA outputs are provided in **Appendix C**. Analysis of the modelled intersection performance indicate the following:

- Most intersections within the Melrose Park North internal street network would perform satisfactorily under the forecast 2036 traffic volumes during the morning and evening peak periods.
- Modelled intersection performance is generally consistent between both the AIMSUN and SIDRA models.
- The intersections of Hope Street with Hughes Avenue, NSR-2 and Waratah Street perform better under the AIMSUN model than the SIDRA model, due to the differences in the treatment of conditional light-rail phases along Hope Street. In AIMSUN, these light rail phases are triggered by the arrival of light rail vehicles, assumed to run every 7.5 minutes (8 times per hour). By contrast, SIDRA assumes that these phases are called every cycle. Even under this conservative

assumption, these intersections would still perform satisfactorily under the forecast 2036 traffic volumes.

- The signalised intersections along Hope Street at Hughes Avenue and NSR-3 due to PLR Stage 2 performs with higher delays based on SIDRA modelling, however this higher delay would still result in satisfactory performance of Level of Service C in 2036 during the morning and evening peak periods respectively.
- The signalised intersection at Hope Street and NSR-2 due to PLR Stage 2 would result in satisfactory performance of Level of Service C in 2036 during the morning and evening peak periods respectively.
- The proposed roundabout at Hughes Avenue and Linden Grove would result in satisfactory performance of Level of Service A in 2036 during the morning and evening peak periods respectively.

Overall, analysis of the modelled intersection performance indicates that all intersections within Melrose Park North would perform satisfactorily under the forecast 2036 traffic volumes.

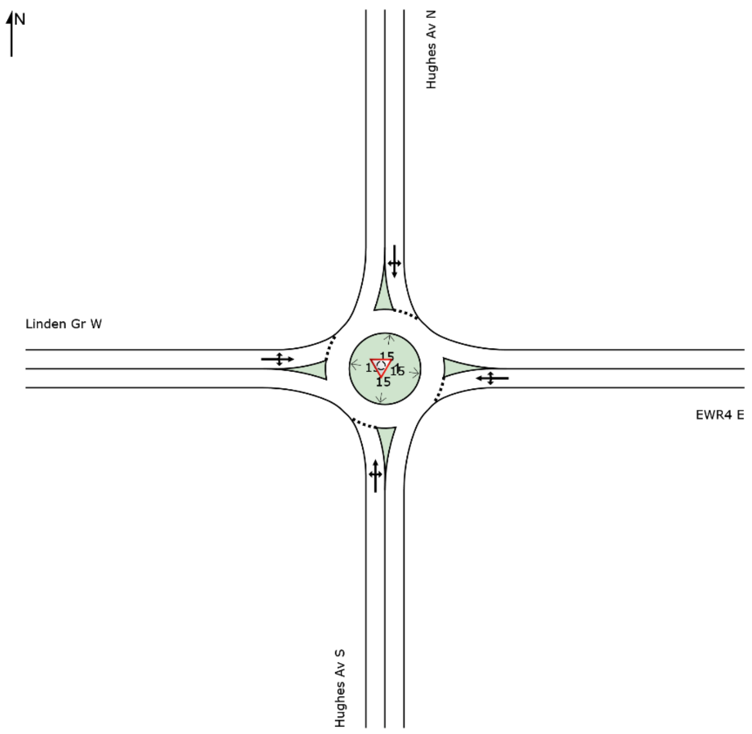
Table 7 – Modelled 2036 intersection performance (SIDRA model)

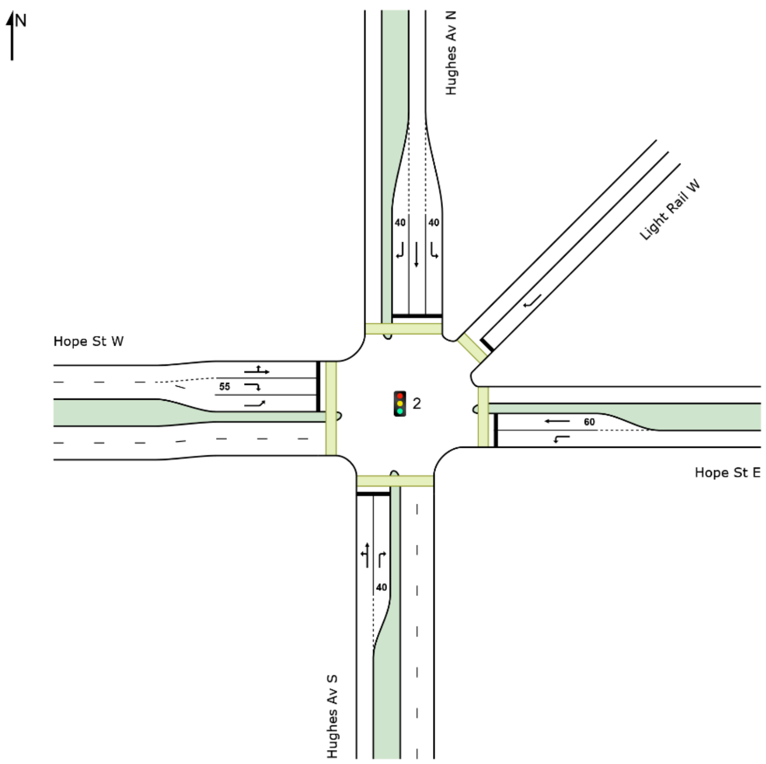
ID	Intersection	Recommended Control	Morning Peak		Evening Peak	
			Av Delay	LoS	Av Delay	LoS
1	Hughes Av/Linden Gr	Roundabout	12	A	11	A
2	Hughes Av/Hope St	Signals	36	C	33	C
3	NSR-2/Hope St	Signals	30	C	30	C
4	NSR-3/ Hope St	Signals	35	C	33	C
5	NSR-4/Hope St	Give way	7	A	11	A
6	Wharf Rd/Hope St	Give way	20	B	33	C
7	Wharf Rd/Taylor St	Give way	8	A	10	A
8	Wharf Rd/EWR-4	Give way	10	A	14	A
9	NSR-2/EWR-4	Roundabout	11	A	10	A
10	NSR-3/EWR-4	Roundabout	9	A	9	A
11	NSR-4/EWR-4	Give way	9	A	12	A
12	NSR-4/EWR-6	Give way	7	A	9	A
13	NSR-3/EWR-6	Roundabout	9	A	9	A
14	NSR-2/EWR-6	Roundabout	10	A	9	A
15	NSR-2/EWR-3	Give way	9	A	7	A

4.5 Future intersection configuration layouts (2036)

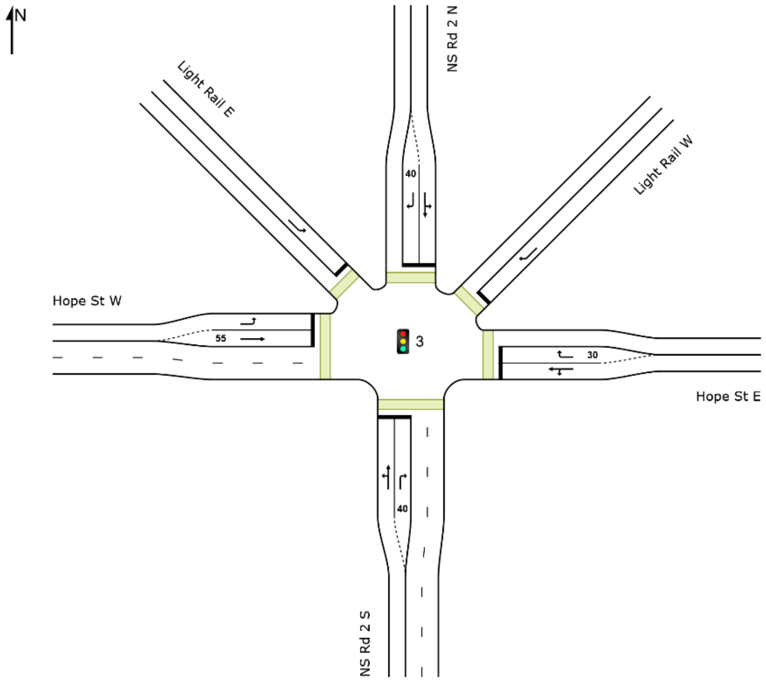
The SIDRA intersection configuration layouts for Melrose Park North are shown in Table 8 below for peak period conditions for 2036 (full build-out). The intersection configuration layouts derived from the SIDRA model have been developed in close coordination with Northrop preparing the concept design for the Melrose Park North internal street network. The preferred intersection configuration layouts have also been developed considering operational performance, utilities and services, physical constraints and constructability issues as defined by Northrop (refer to *Melrose Park Public Domain – Civil Engineering Report)*. The swept turning path diagrams of a 10.24m (garbage truck) and 12.5m long heavy rigid vehicle (large truck/bus) and 19.0m long articulated vehicle for the relevant streets and intersections are provided in **Appendix D**.

Table 8 – Proposed intersection layouts (2036) for Melrose Park North (SIDRA model)

Intersection #1: Hughes Avenue/Linden Grove		
	**Morning Peak**	
	LOS	**A**
	AVD (sec)	**11**
	DS	**0.34**
	Evening Peak	
	LOS	**A**
	AVD (sec)	**11**
	DS	**0.30**

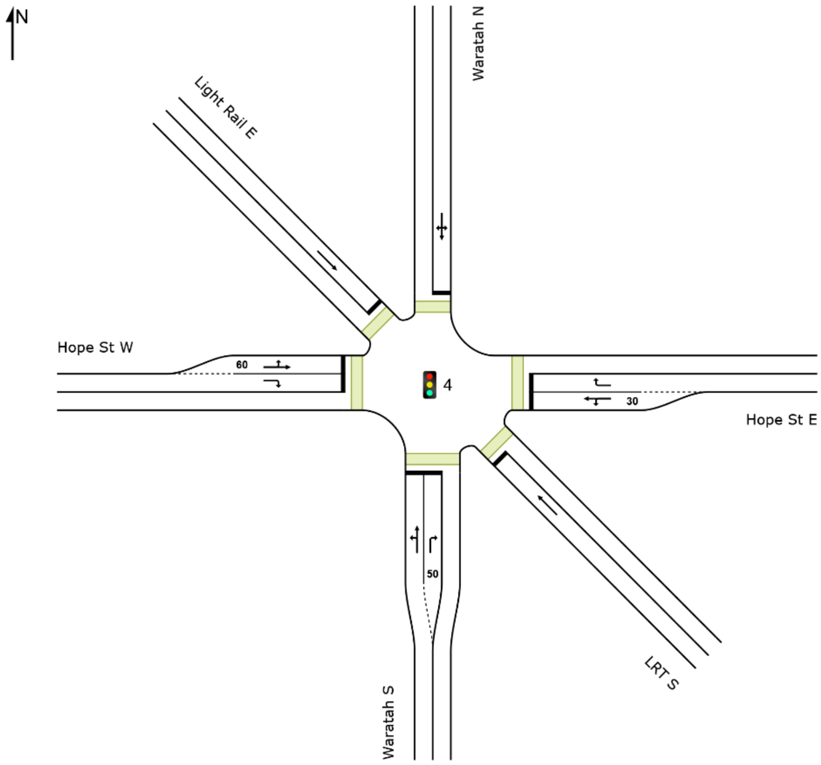
Intersection #2: Hughes Avenue/Hope Street		
	**Morning Peak**	
	LOS	**C**
	AVD (sec)	**36**
	DS	**0.85**
	Evening Peak	
	LOS	**C**
	AVD (sec)	**33**
	DS	**0.56**

Intersection #3: North-South Road 2/Hope Street

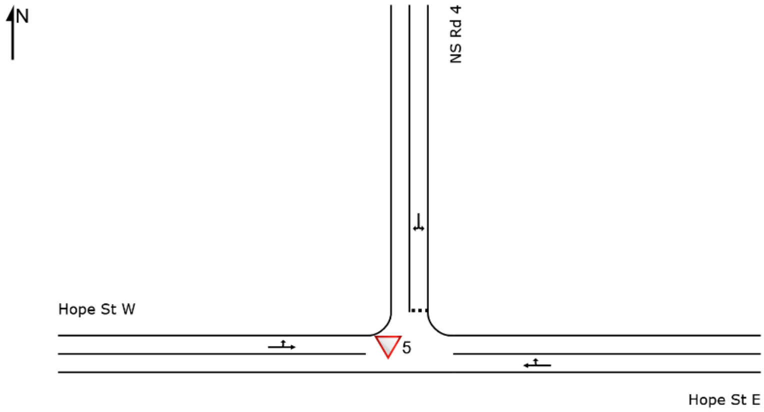


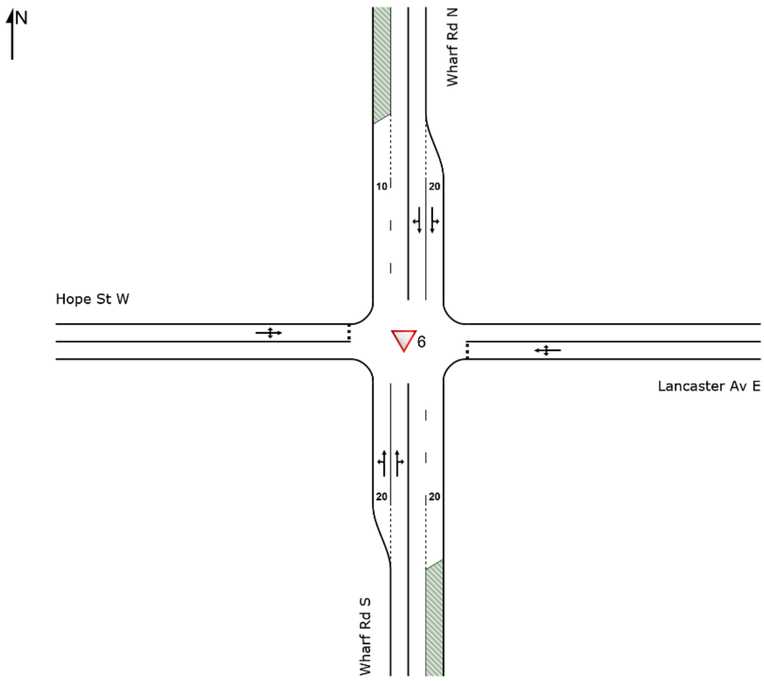
Morning Peak	
LOS	**C**
AVD (sec)	**30**
DS	**0.84**
Evening Peak	
LOS	**C**
AVD (sec)	**30**
DS	**0.69**

Intersection #4: North-South Road 3/Hope Street/Waratah Street

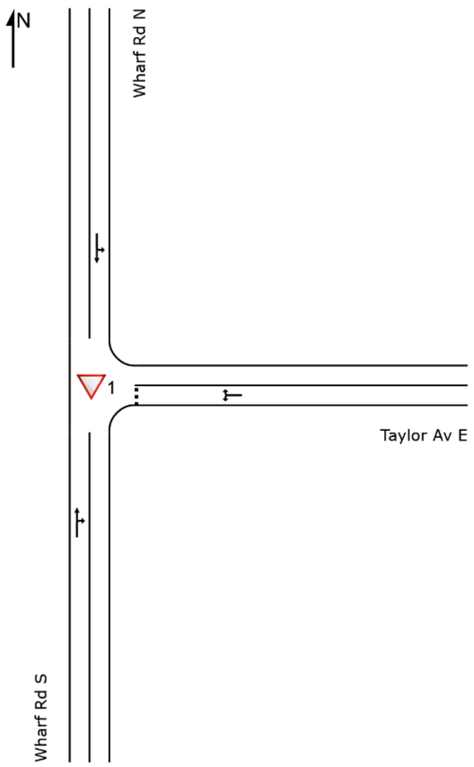


Morning Peak	
LOS	**C**
AVD (sec)	**35**
DS	**0.78**
Evening Peak	
LOS	**C**
AVD (sec)	**33**
DS	**0.71**

Intersection #5: North-South Road 4/Hope Street		
	**Morning Peak**	
	LOS	**A**
	AVD (sec)	**7**
	DS	**0.12**
	Evening Peak	
	LOS	**A**
	AVD (sec)	**11**
	DS	**0.39**

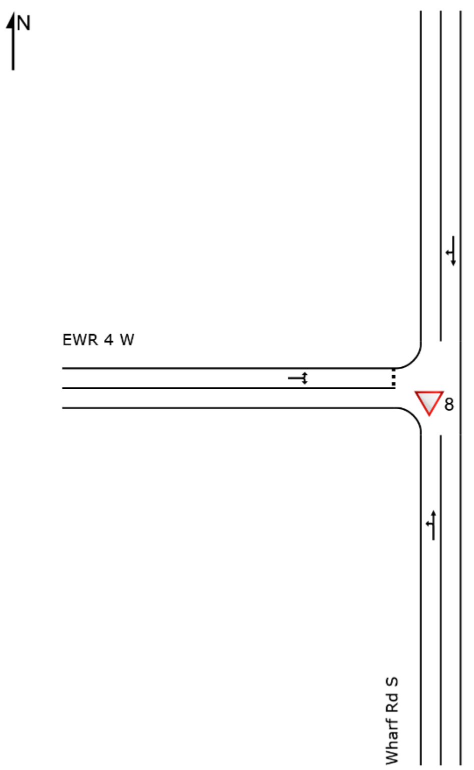
Intersection #6: Wharf Road/Hope Street		
	**Morning Peak**	
	LOS	**B**
	AVD (sec)	**19**
	DS	**0.51**
	Evening Peak	
	LOS	**C**
	AVD (sec)	**33**
	DS	**0.89**

Intersection #7: Wharf Road/Taylor Street



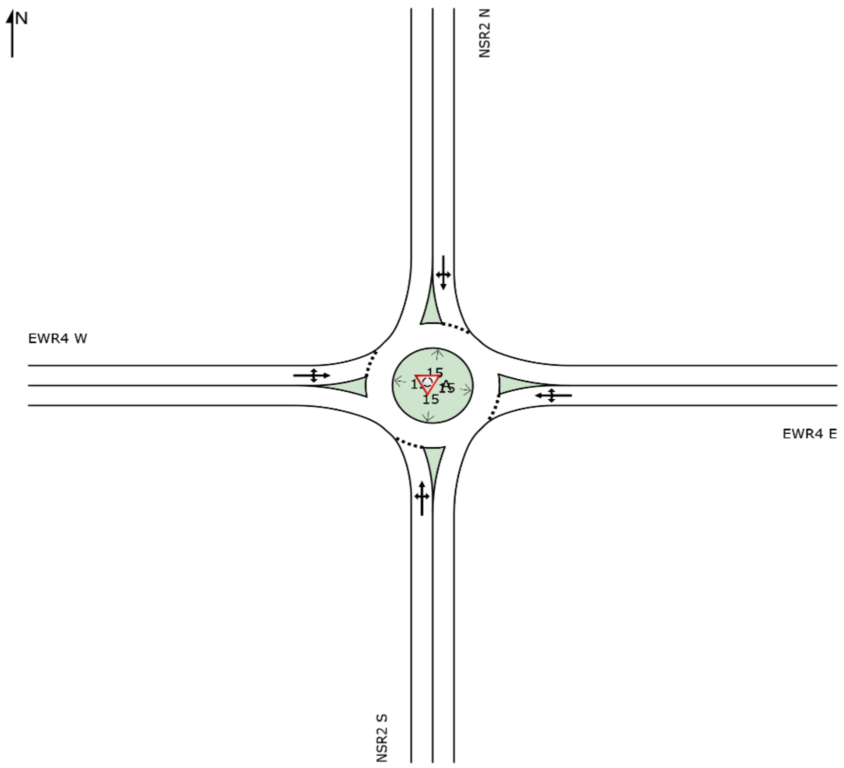
Morning Peak	
LOS	**A**
AVD (sec)	**8**
DS	**0.19**
Evening Peak	
LOS	**A**
AVD (sec)	**10**
DS	**0.32**

Intersection #8: Wharf Road/East-West Road 4



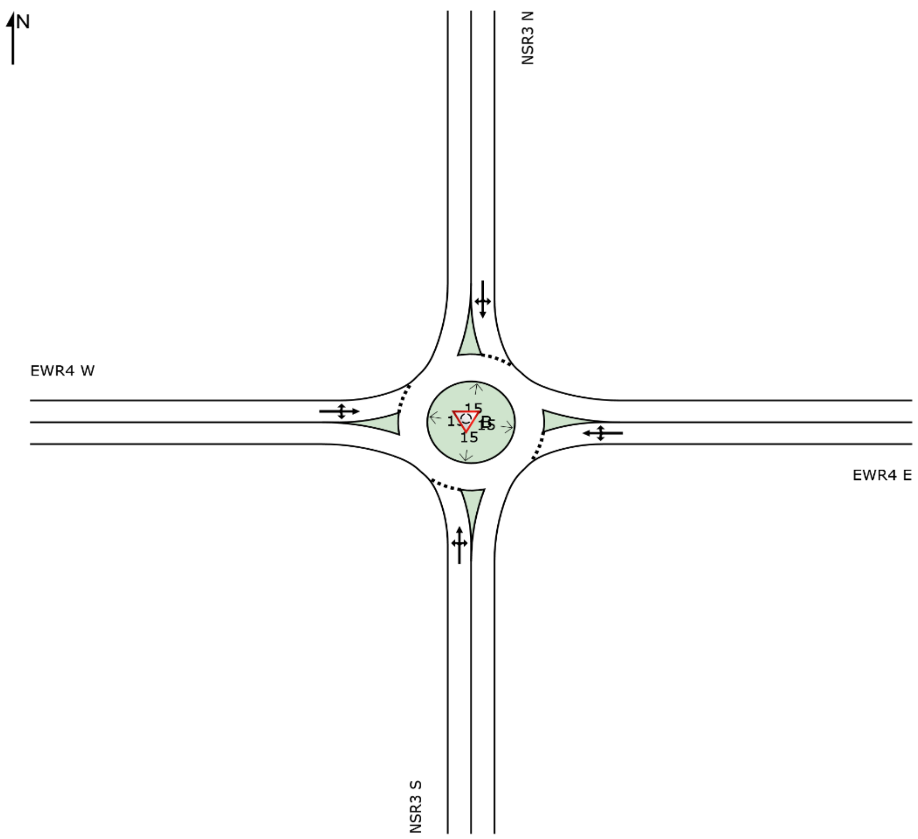
Morning Peak	
LOS	**A**
AVD (sec)	**10**
DS	**0.32**
Evening Peak	
LOS	**A**
AVD (sec)	**14**
DS	**0.40**

Intersection #9: North-South Road 2/East-West Road 4



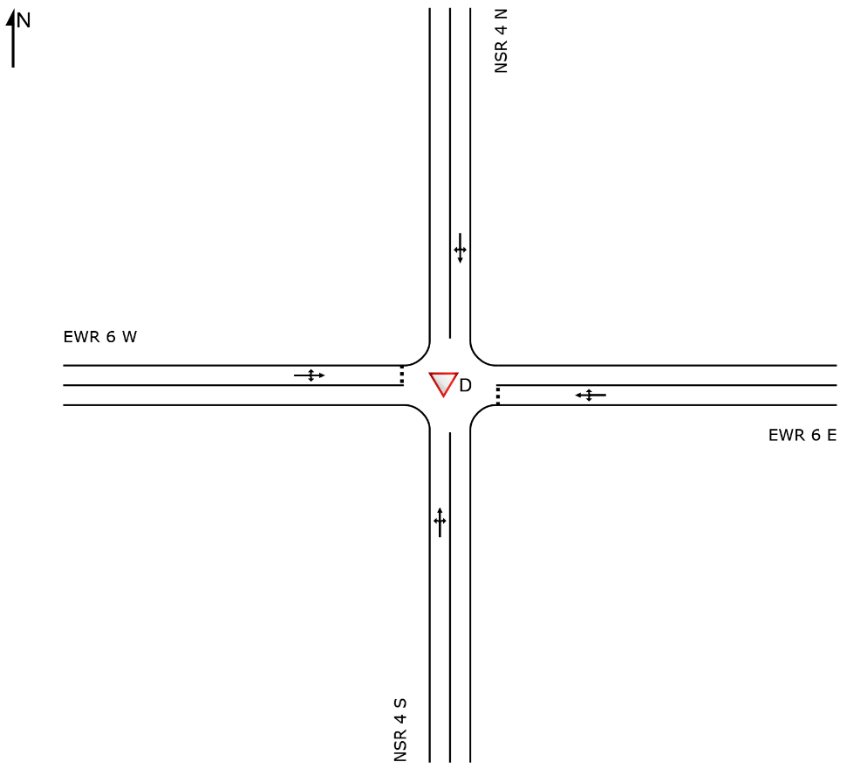
Morning Peak	
LOS	**A**
AVD (sec)	**11**
DS	**0.31**
Evening Peak	
LOS	**A**
AVD (sec)	**10**
DS	**0.22**

Intersection #10: North-South Road 3/East-West Road 4



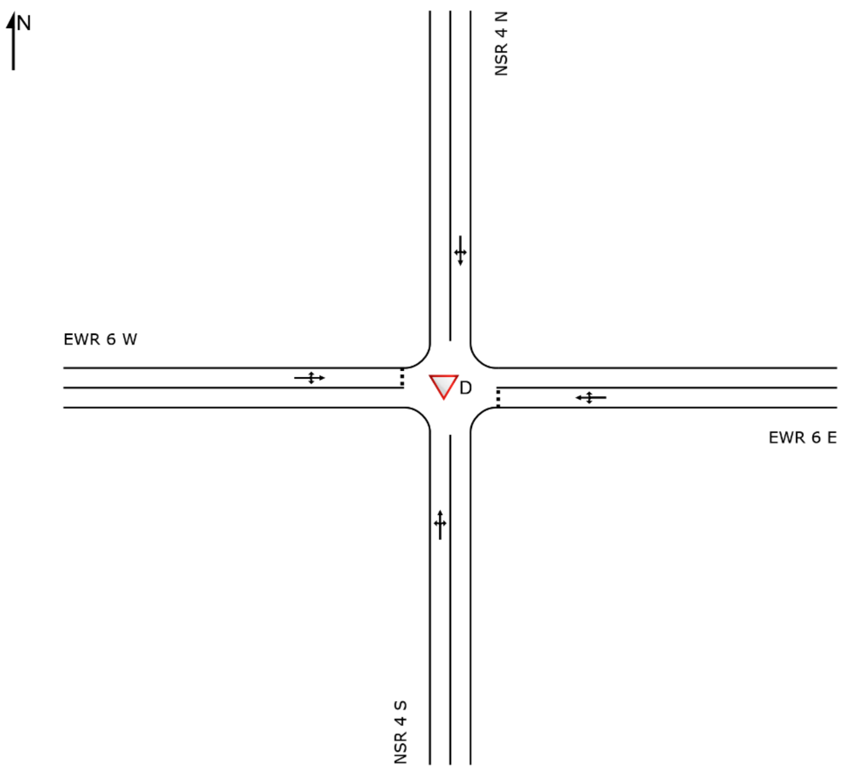
Morning Peak	
LOS	**A**
AVD (sec)	**9**
DS	**0.23**
Evening Peak	
LOS	**A**
AVD (sec)	**9**
DS	**0.25**

Intersection #11: North-South Road 4/East-West Road 4



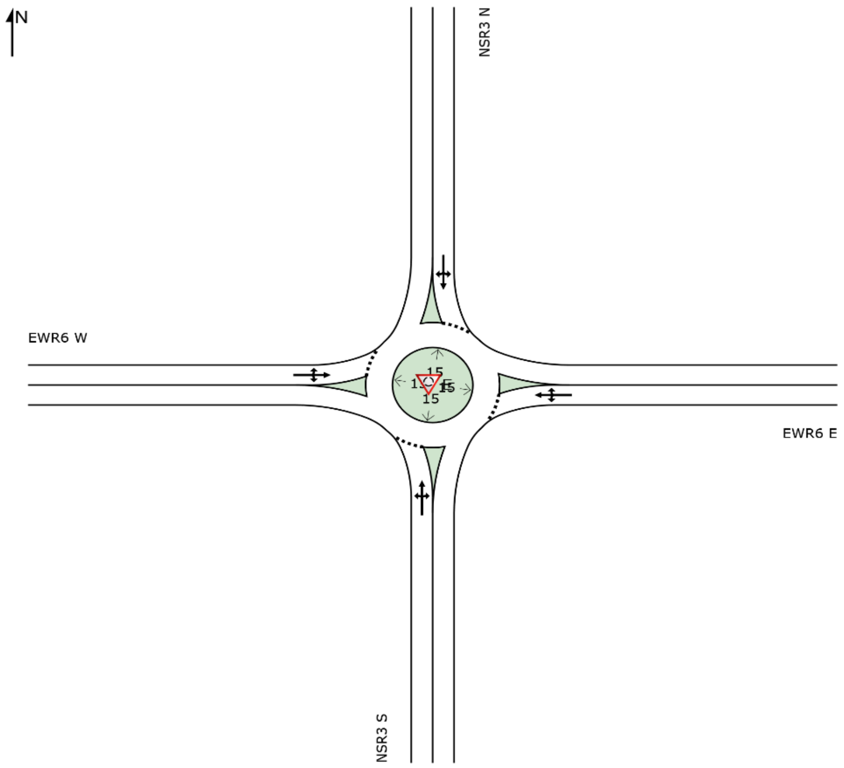
Morning Peak	
LOS	**A**
AVD (sec)	**9**
DS	**0.17**
Evening Peak	
LOS	**A**
AVD (sec)	**12**
DS	**0.40**

Intersection #12: North-South Road 4/East-West Road 6



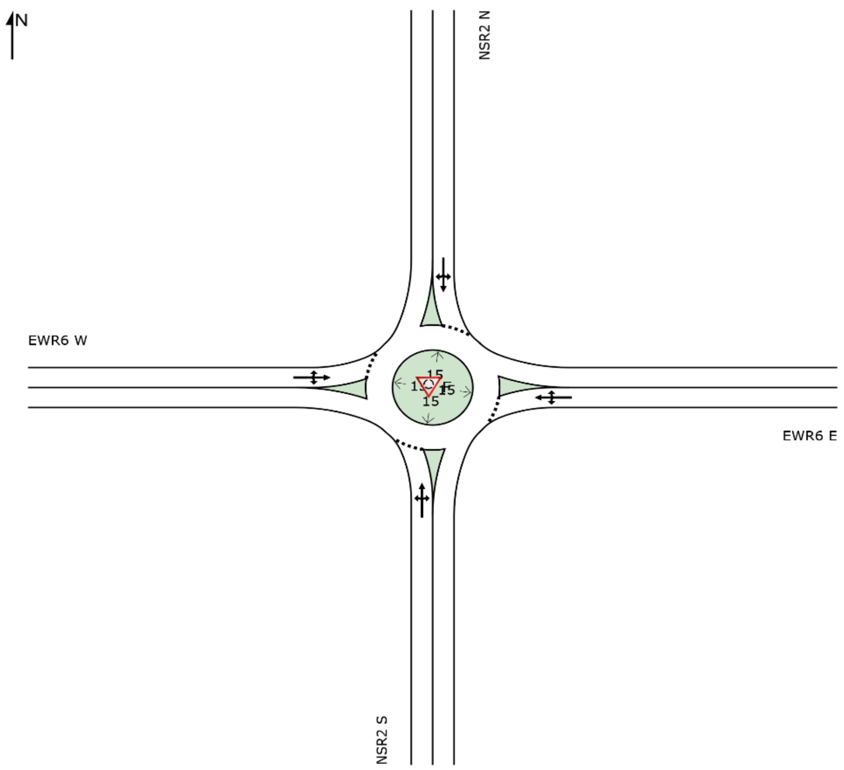
Morning Peak	
LOS	**A**
AVD (sec)	**7**
DS	**0.13**
Evening Peak	
LOS	**A**
AVD (sec)	**8**
DS	**0.20**

Intersection #13: North-South Road 3/East-West Road 6

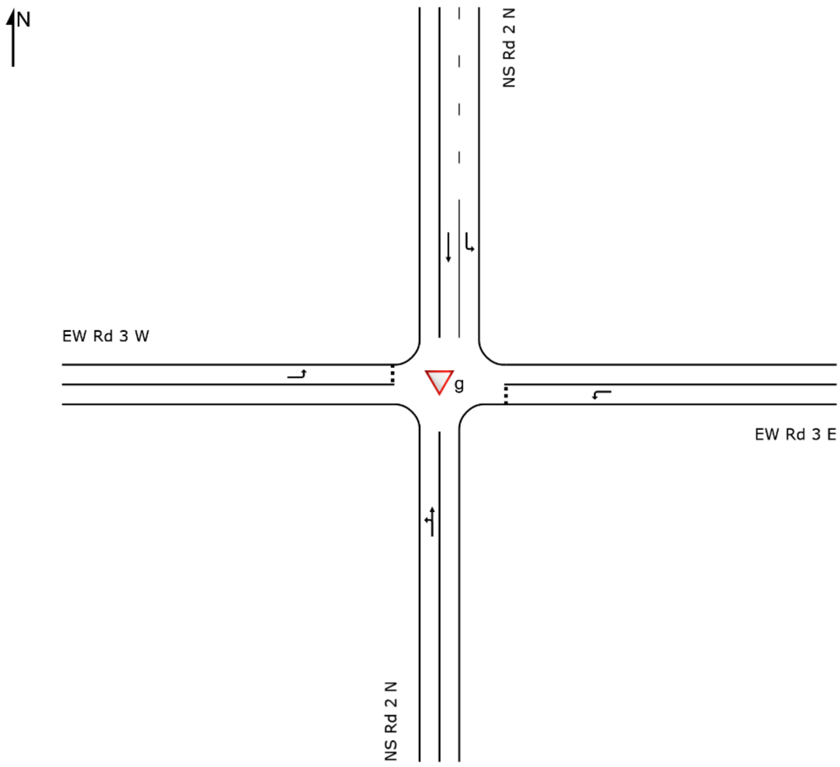


Morning Peak	
LOS	A
AVD (sec)	9
DS	0.18
Evening Peak	
LOS	A
AVD (sec)	9
DS	0.33

Intersection #14: North-South Road 2/East-West Road 6



Morning Peak	
LOS	A
AVD (sec)	10
DS	0.27
Evening Peak	
LOS	A
AVD (sec)	9
DS	0.25

Intersection #15: North-South Road 2/East-West Road 3		
	**Morning Peak**	
	LOS	**A**
	AVD (sec)	**7**
	DS	**0.34**
	Evening Peak	
	LOS	**A**
	AVD (sec)	**7**
	DS	**0.14**

5 SUMMARY & CONCLUSIONS

The summary and conclusions for the Melrose Park North site internal street network are described below.

5.1 Key findings

Modelling of the internal street network for the Melrose Park North site in both the AIMSUN mesoscopic model and SIDRA model under the 2036 ultimate build-out scenario revealed the following:

- All intersections within the site would operate with a satisfactory level of service in both AIMSUN and SIDRA models for the morning and evening peak hours.
- Minimal levels of traffic congestion on the internal local streets will be experienced during morning and evening peak periods, with moderate congestion during these periods limited to Victoria Road and its approaches on Wharf Road, Kissing Point Road and NSR-2.
- The proposed primary school within the Melrose Park North Precinct would result in an additional 213 vehicle trips in the morning peak and 49 trips in the evening peak period and can be easily accommodated within the site and surrounding street network.
- Modelled intersection performance in AIMSUN is generally better than SIDRA for the proposed signalised intersections along Hope Street incorporating Parramatta Light Rail (PLR) Stage 2. This is due to the difference in the treatment of on-demand phases for the PLR Stage 2, which are modelled as on-demand in AIMSUN (8 services per hour), but assumed to operate every cycle in SIDRA.
- Even accounting for conservative approach in SIDRA regarding light rail operations along Hope Street, the new signalised intersections along Hope Street at NSR-2 and NSR-3 would perform satisfactorily under the 2036 ultimate build-out scenario for both peak periods.

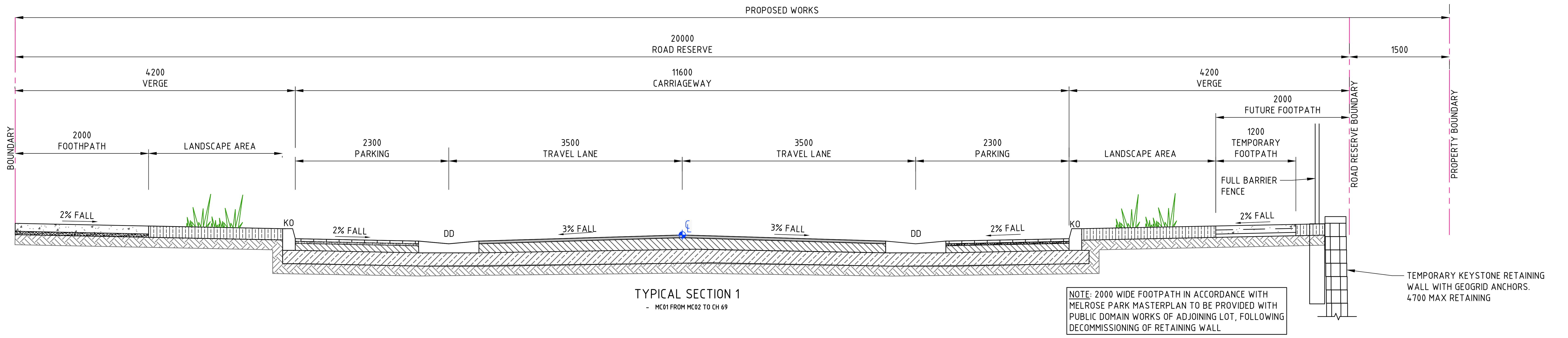
5.2 Key conclusions

The key conclusions drawn from the assessment of the traffic impacts of the proposed Melrose Park North site internal street network are as follows:

- The proposed internal street network within the Melrose Park North Precinct would have sufficient capacity to accommodate the forecast traffic demand of the development (including the proposed primary school) and the surrounding street network in 2036.
- The proposed internal street network and land use assumptions have no unacceptable traffic implications in terms of road network capacity within Melrose Park North site and surrounding streets, with projected peak hour traffic volumes within acceptable limits and internal intersections all performing acceptably.
- The modelled traffic flows indicate that internal streets within the Melrose Park North Precinct will operate satisfactorily with generally one traffic lane in each direction midblock plus generally two traffic lanes in each direction at approaches to intersections along Hope Street at NSR-2 and NSR-3 to accommodate PLR Stage 2.
- The street hierarchy within the Melrose Park Precinct North is compatible with the land use, place outcomes and the range of roles that each street serves. This incorporates a grid of collector roads (NSR-2, NSR-3, and EWR-4) to distribute traffic within the precinct and to promote local access rather than regional through traffic.
- The proposed internal street network and its interface with light rail along Hope Street at NSR-2 and NSR-3 will provide appropriate levels of performance in 2036 even under conservative PLR Stage 2 design and operation assumptions.

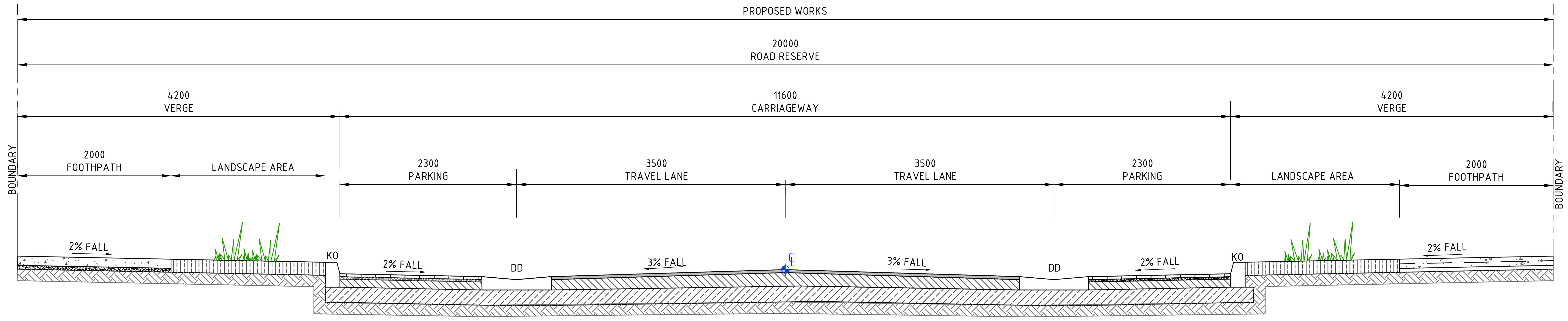
- The key signalised intersections along Hope Street at NSR-2 and NSR-3 all operate satisfactorily providing full access to the proposed new Town Centre without significant impacts to light rail operations along Hope Street.
- The internal street network ensures that bus services can be provided for buses running between Victoria Road and Hope Street (via NSR-2) connecting to future light rail stop at Hope Street. By providing an appropriately dimensioned street layout, reliable and rapid access can be provided for bus services within a useful and attractive urban design framework.
- Upgrade of the intersection of Hughes Street and Linden from the existing priority intersection to a roundabout (originally proposed as a priority-controlled intersection in the Melrose Park TMAP).
- The street sections have been developed on the basis that there will be a safe, amenable, and attractive pedestrian environment in all streets. Similarly, cycling will be promoted through a network comprising dedicated bicycle facilities and streets that are made safe for cycling through traffic planning, carriageway design and streetscape treatments.
- The swept turning path analysis for the internal street network and intersections for the Melrose Park North site have been designed to accommodate vehicle turning movements for both heavy rigid vehicles / buses (10.24m and 12.5 long) and articulated vehicles (19.0m long).

APPENDIX A TYPICAL STREET CROSS SECTIONS



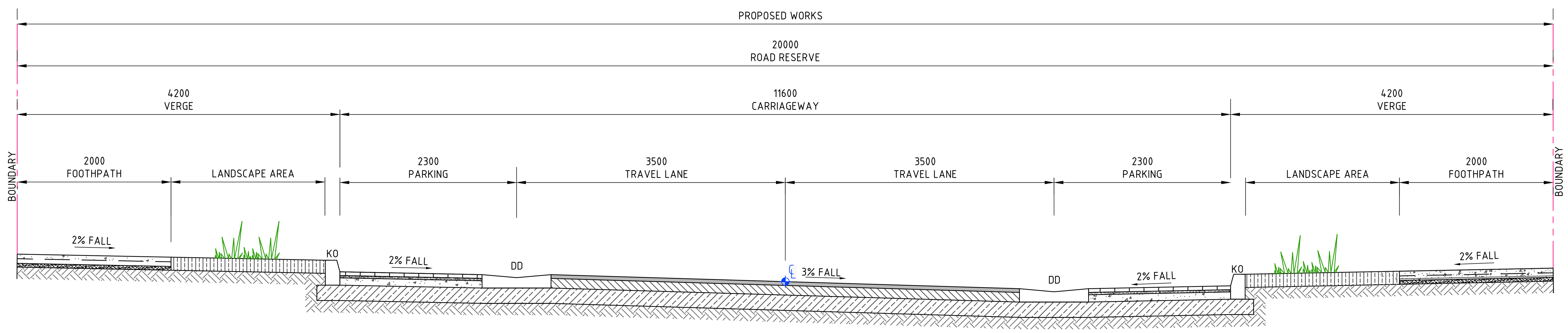
TYPICAL SECTION 1

- MC01 FROM MC02 TO CH 69



TYPICAL SECTION 2

- MC01 FROM CH 69 TO MC40
- MC30
- MC60 FROM MC03 TO MC04



TYPICAL SECTION 3

- MC01 FROM MC40 TO MC02
- MC50
- MC51
- MC60 FROM MC02 TO MC03

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TYPICAL ROAD SECTIONS SHEET 01

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DRAWING NUMBER **C04.31**
REVISION **03**
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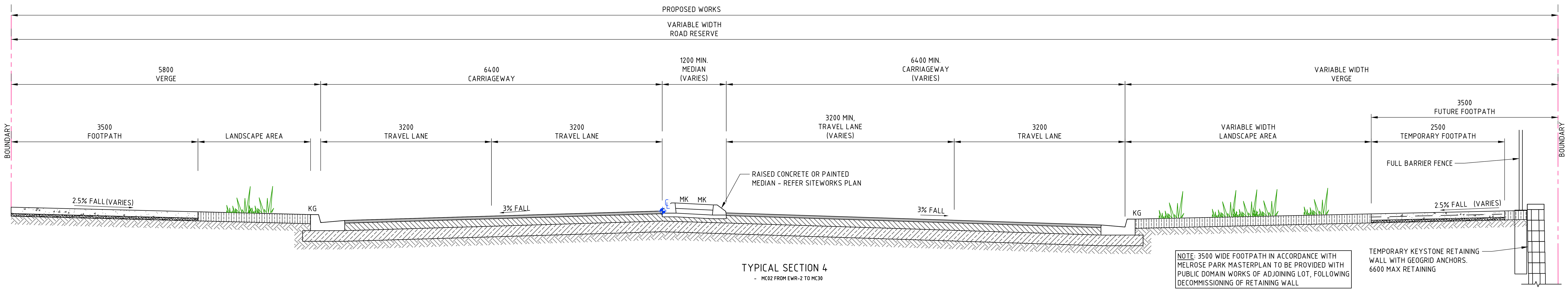
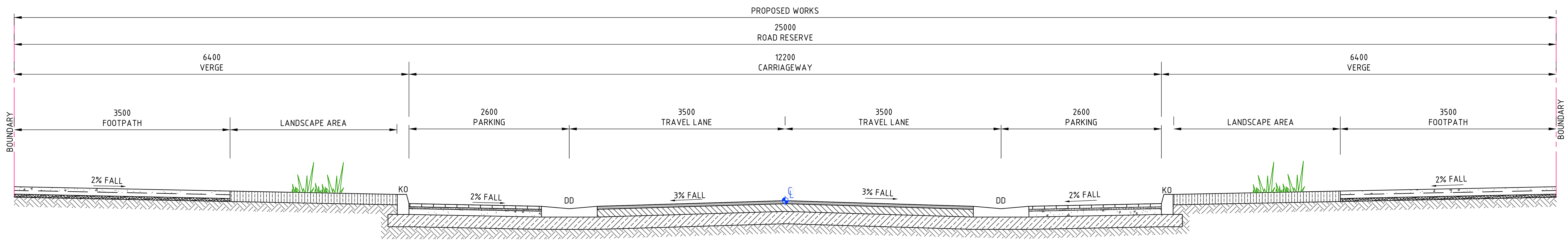


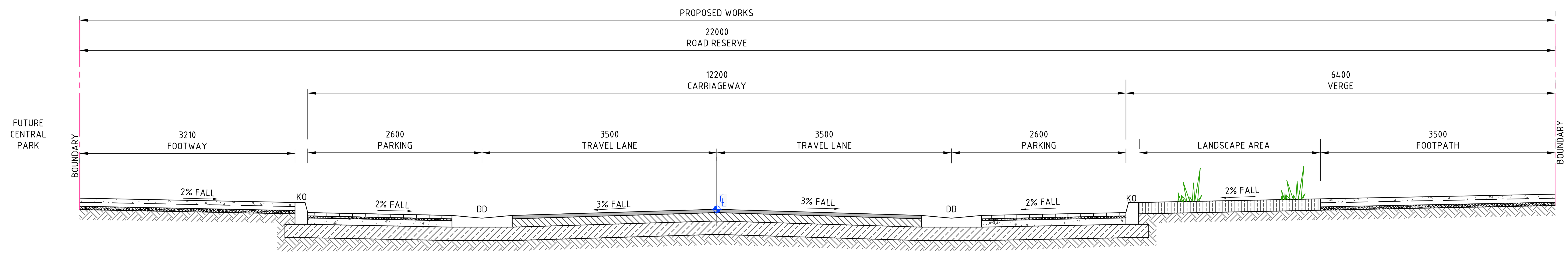
TYPICAL SECTION 4

- MC02 FROM EWR-2 TO MC30



TYPICAL SECTION 5

- MC02 FROM MC30 TO MC40



TYPICAL SECTION 6

- MC02 FROM MC40 TO MC60

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TYPICAL ROAD SECTIONS SHEET 02

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DRAWING NUMBER: C04.32

REVISION: 03

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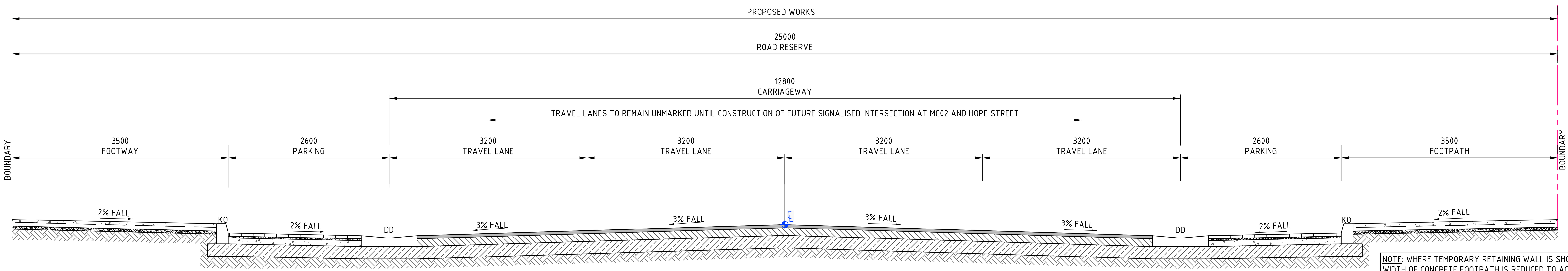
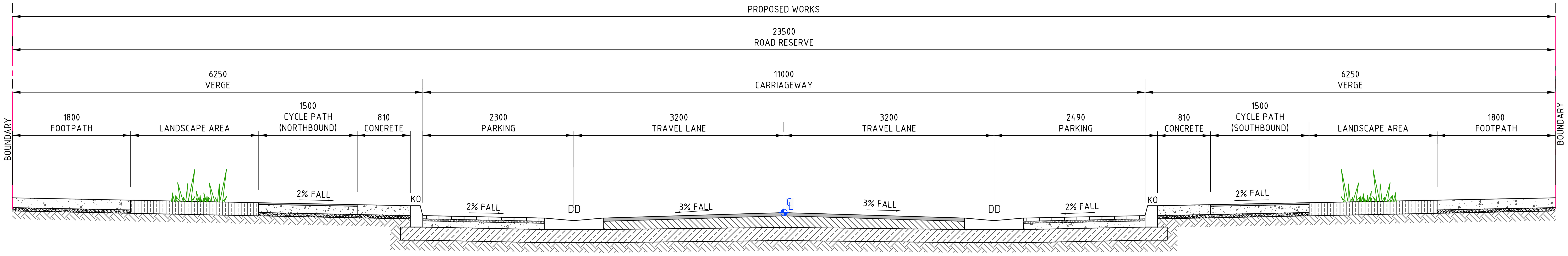
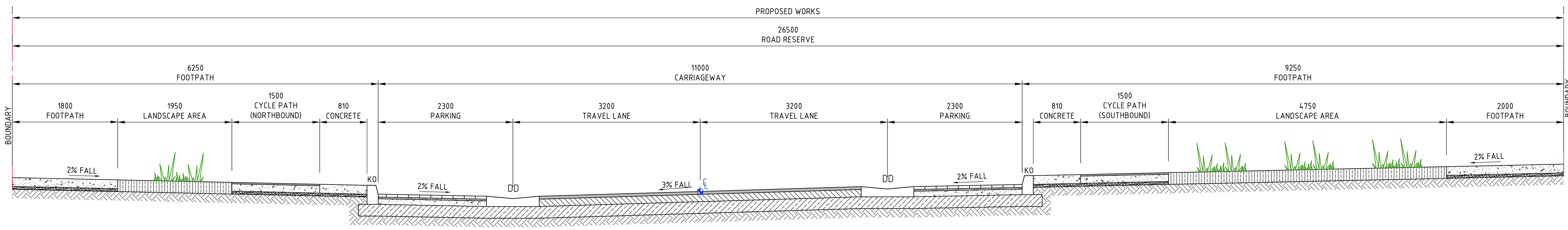


TYPICAL SECTION 7
- MC02 FROM MC60 TO HOPE ST

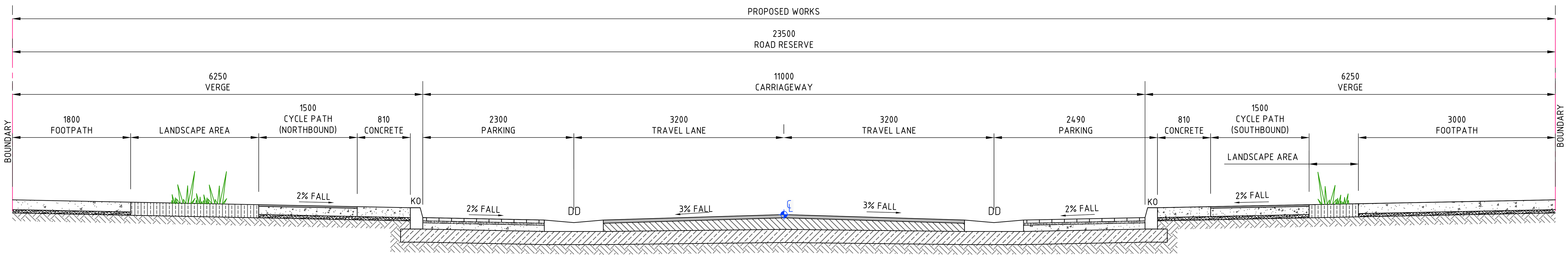
NOTE: WHERE TEMPORARY RETAINING WALL IS SHOWN ON PLAN THE WIDTH OF CONCRETE FOOTPATH IS REDUCED TO ACCOMMODATE THE WALL WITHIN THE ROAD RESERVE. FOOTPATH TO BE RECONSTRUCTED TO FULL 3500 WIDTH IN ACCORDANCE WITH MELROSE PARK MASTERPLAN WITH PUBLIC DOMAIN WORKS OF ADJOINING LOT, FOLLOWING DECOMMISSIONING OF RETAINING WALL



TYPICAL SECTION 8
- MC03 FROM EWR-2 TO MC40



TYPICAL SECTION 9
- MC03 FROM MC40 TO MC60



TYPICAL SECTION 10
- MC03 FROM MC60 TO HOPE ST

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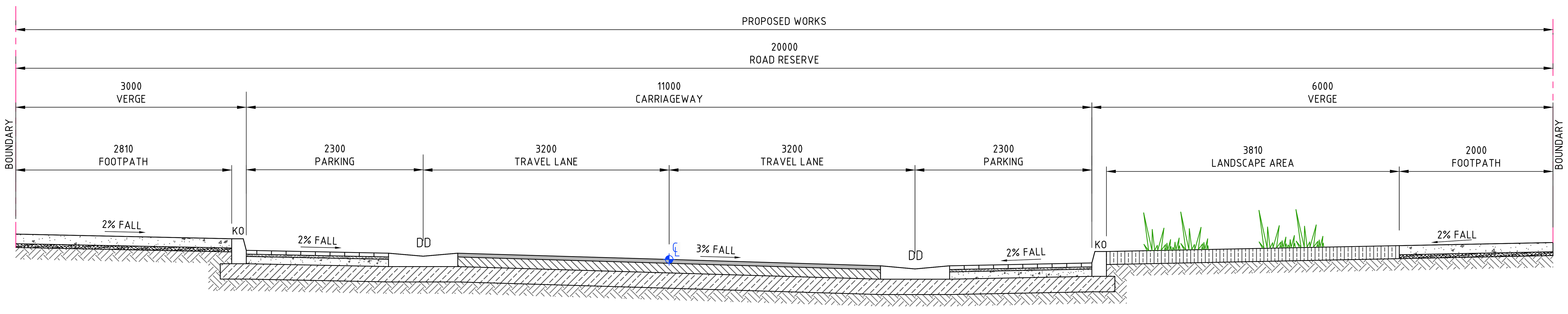
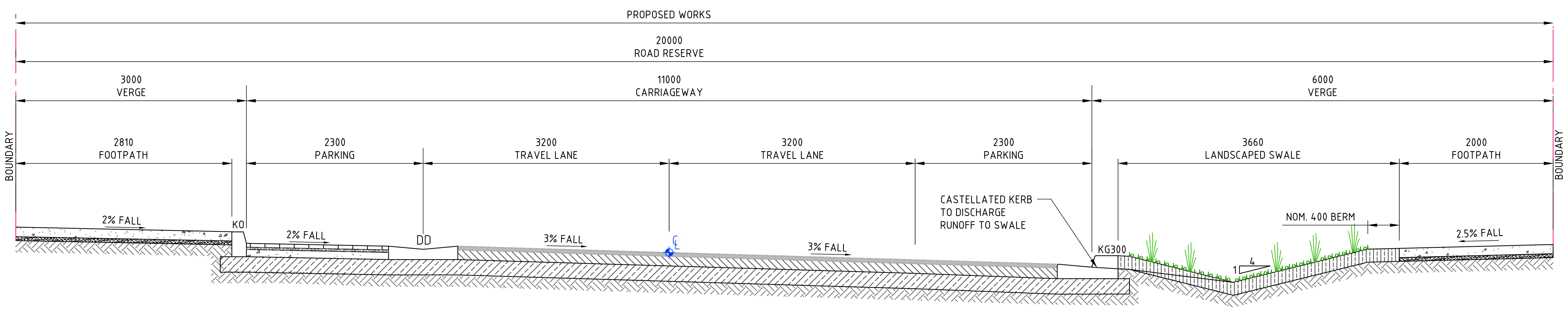


TYPICAL SECTION 11

- MC40 FROM HUGHES AVE TO MC01



TYPICAL SECTION 12

- MC40 FROM MC01 TO WHARF RD

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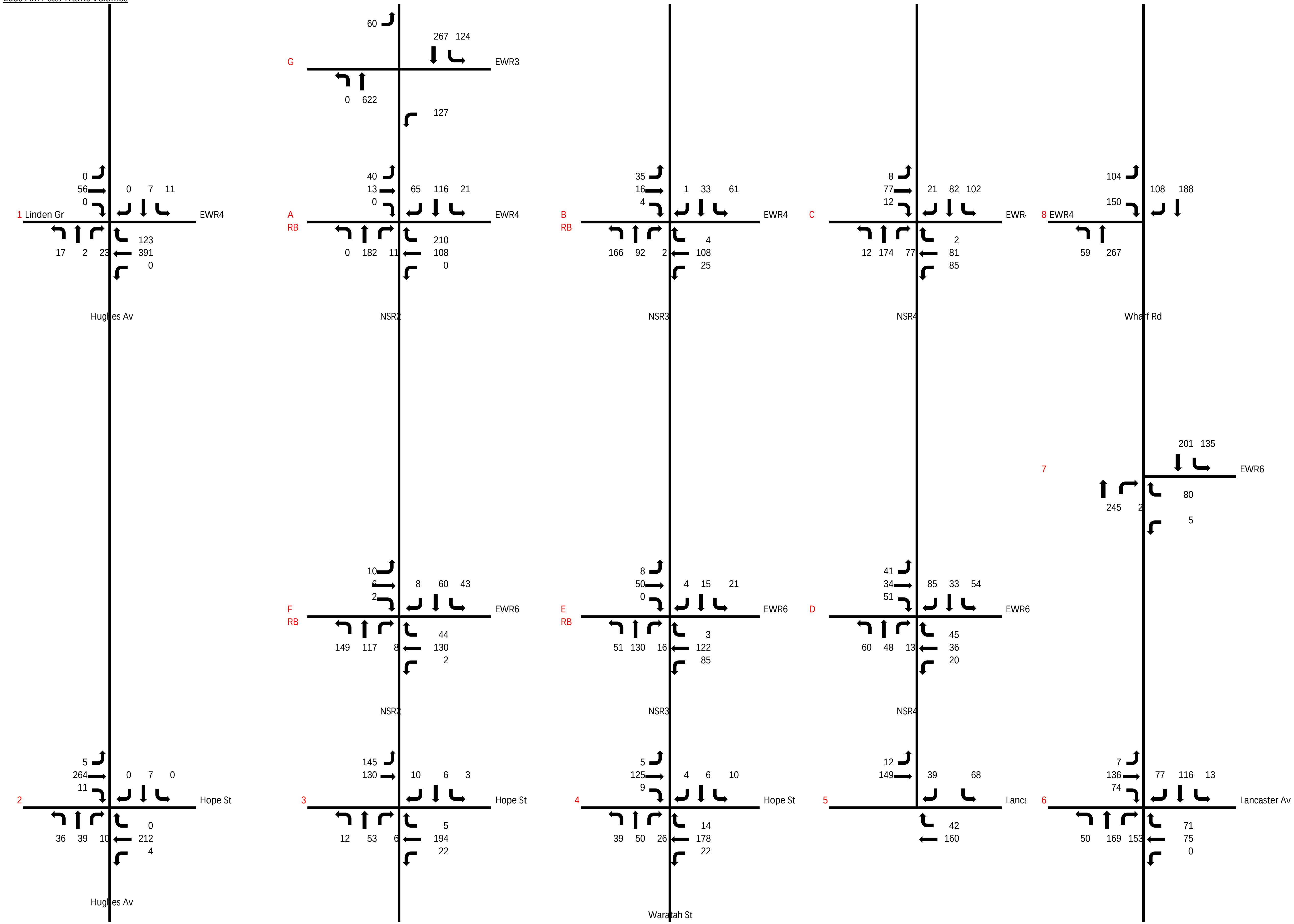
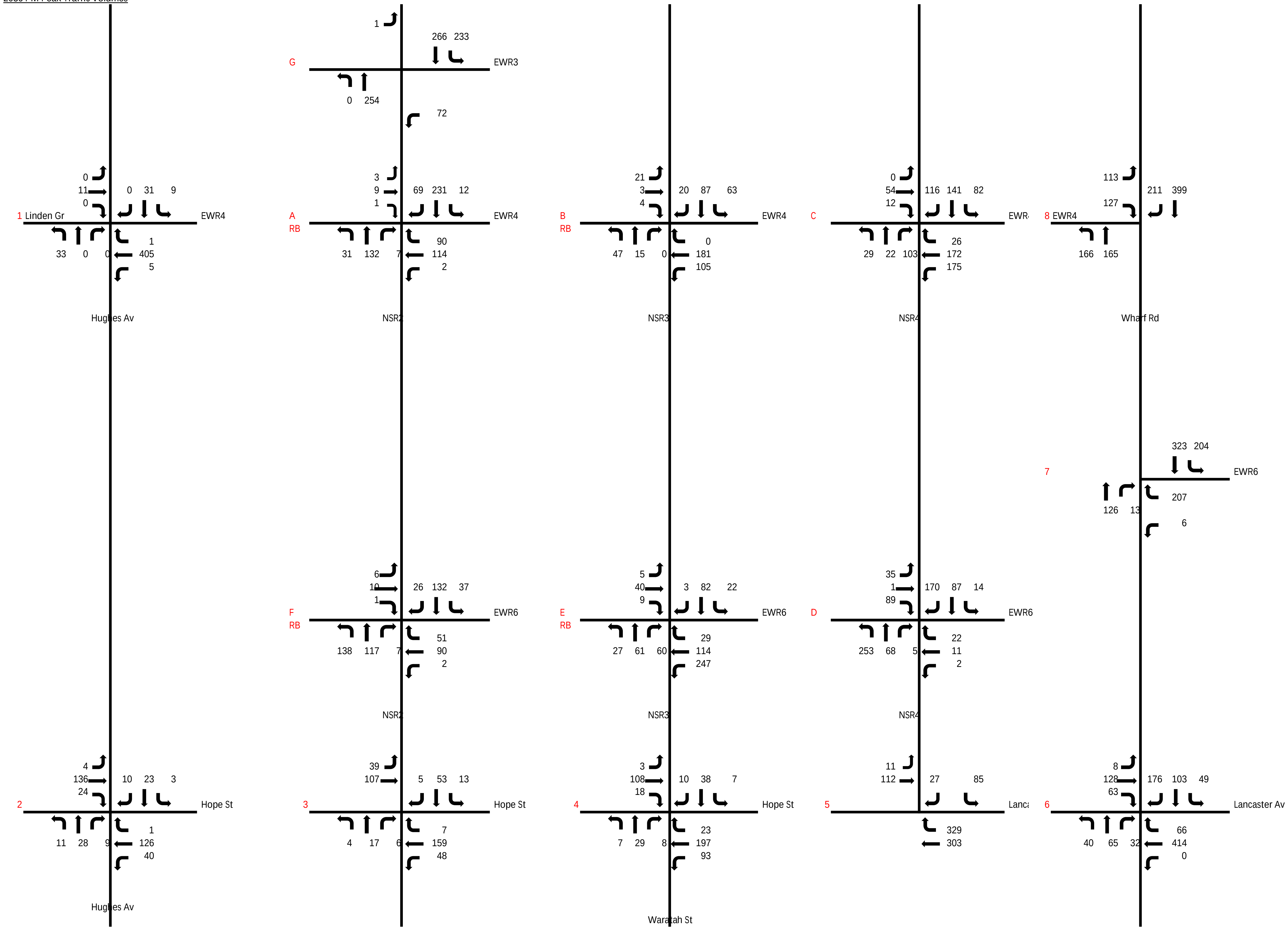
APPENDIX B 2036 INTERSECTION TURNING MOVEMENTS

2036 AM Peak Traffic Volumes



2036 PM Peak Traffic Volumes



APPENDIX C SIDRA OUTPUTS (2036)

MOVEMENT SUMMARY

Site: 1 [1 - Hughes Linden 2036 Dev AM (Site Folder: General)]

Hughes Linden 2036 Dev AM
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hughes Av S														
1	L2	17	3.0	18	3.0	0.054	7.4	LOS A	0.3	2.0	0.57	0.69	0.57	50.7
2	T1	2	3.0	2	3.0	0.054	7.4	LOS A	0.3	2.0	0.57	0.69	0.57	51.7
3	R2	23	3.0	24	3.0	0.054	11.4	LOS A	0.3	2.0	0.57	0.69	0.57	51.4
Approach		42	3.0	44	3.0	0.054	9.6	LOS A	0.3	2.0	0.57	0.69	0.57	51.1
East: EWR4 E														
4	L2	1	3.0	1	3.0	0.340	4.3	LOS A	2.3	16.4	0.08	0.50	0.08	53.7
5	T1	391	3.0	412	3.0	0.340	4.2	LOS A	2.3	16.4	0.08	0.50	0.08	54.8
6	R2	123	3.0	129	3.0	0.340	8.3	LOS A	2.3	16.4	0.08	0.50	0.08	54.5
Approach		515	3.0	542	3.0	0.340	5.2	LOS A	2.3	16.4	0.08	0.50	0.08	54.7
North: Hughes Av N														
7	L2	11	3.0	12	3.0	0.017	4.6	LOS A	0.1	0.6	0.23	0.48	0.23	53.8
8	T1	7	3.0	7	3.0	0.017	4.6	LOS A	0.1	0.6	0.23	0.48	0.23	54.9
9	R2	1	3.0	1	3.0	0.017	8.7	LOS A	0.1	0.6	0.23	0.48	0.23	54.6
Approach		19	3.0	20	3.0	0.017	4.8	LOS A	0.1	0.6	0.23	0.48	0.23	54.2
West: Linden Gr W														
10	L2	1	3.0	1	3.0	0.055	5.0	LOS A	0.3	1.9	0.32	0.48	0.32	53.5
11	T1	56	3.0	59	3.0	0.055	5.0	LOS A	0.3	1.9	0.32	0.48	0.32	54.5
12	R2	1	3.0	1	3.0	0.055	9.1	LOS A	0.3	1.9	0.32	0.48	0.32	54.2
Approach		58	3.0	61	3.0	0.055	5.1	LOS A	0.3	1.9	0.32	0.48	0.32	54.5
All Vehicles		634	3.0	667	3.0	0.340	5.5	LOS A	2.3	16.4	0.14	0.51	0.14	54.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [1 - Hughes Linden 2036 Dev PM (Site Folder: General)]

Hughes Linden 2036 Dev PM
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hughes Av S														
1	L2	33	3.0	35	3.0	0.042	6.6	LOS A	0.2	1.5	0.52	0.61	0.52	52.7
2	T1	1	3.0	1	3.0	0.042	6.5	LOS A	0.2	1.5	0.52	0.61	0.52	53.8
3	R2	1	3.0	1	3.0	0.042	10.6	LOS A	0.2	1.5	0.52	0.61	0.52	53.5
Approach		35	3.0	37	3.0	0.042	6.7	LOS A	0.2	1.5	0.52	0.61	0.52	52.8
East: EWR4 E														
4	L2	5	3.0	5	3.0	0.301	4.4	LOS A	1.8	13.1	0.16	0.44	0.16	54.1
5	T1	405	3.0	426	3.0	0.301	4.4	LOS A	1.8	13.1	0.16	0.44	0.16	55.2
6	R2	1	3.0	1	3.0	0.301	8.4	LOS A	1.8	13.1	0.16	0.44	0.16	54.9
Approach		411	3.0	433	3.0	0.301	4.4	LOS A	1.8	13.1	0.16	0.44	0.16	55.2
North: Hughes Av N														
7	L2	9	3.0	9	3.0	0.032	4.3	LOS A	0.1	1.0	0.08	0.46	0.08	54.4
8	T1	31	3.0	33	3.0	0.032	4.3	LOS A	0.1	1.0	0.08	0.46	0.08	55.5
9	R2	1	3.0	1	3.0	0.032	8.3	LOS A	0.1	1.0	0.08	0.46	0.08	55.2
Approach		41	3.0	43	3.0	0.032	4.4	LOS A	0.1	1.0	0.08	0.46	0.08	55.2
West: Linden Gr W														
10	L2	1	3.0	1	3.0	0.010	4.2	LOS A	0.0	0.3	0.03	0.47	0.03	54.4
11	T1	11	3.0	12	3.0	0.010	4.2	LOS A	0.0	0.3	0.03	0.47	0.03	55.5
12	R2	1	3.0	1	3.0	0.010	8.3	LOS A	0.0	0.3	0.03	0.47	0.03	55.2
Approach		13	3.0	14	3.0	0.010	4.5	LOS A	0.0	0.3	0.03	0.47	0.03	55.4
All Vehicles		500	3.0	526	3.0	0.301	4.6	LOS A	1.8	13.1	0.18	0.45	0.18	55.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: A [A - NSR 2 EWR 4 2036 Dev AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR2 S															
1	L2	1	3.0	1	3.0	0.230	6.9	LOS A	1.3	9.6	0.59	0.67	0.59	52.3
2	T1	182	3.0	192	3.0	0.230	6.8	LOS A	1.3	9.6	0.59	0.67	0.59	53.3
3	R2	11	3.0	12	3.0	0.230	10.9	LOS A	1.3	9.6	0.59	0.67	0.59	53.0
Approach		194	3.0	204	3.0	0.230	7.1	LOS A	1.3	9.6	0.59	0.67	0.59	53.3
East: EWR4 E															
4	L2	1	3.0	1	3.0	0.305	5.5	LOS A	1.8	13.0	0.43	0.64	0.43	51.5
5	T1	108	3.0	114	3.0	0.305	5.5	LOS A	1.8	13.0	0.43	0.64	0.43	52.5
6	R2	210	3.0	221	3.0	0.305	9.5	LOS A	1.8	13.0	0.43	0.64	0.43	52.2
Approach		319	3.0	336	3.0	0.305	8.2	LOS A	1.8	13.0	0.43	0.64	0.43	52.3
North: NSR2 N															
7	L2	21	3.0	22	3.0	0.151	4.3	LOS A	0.8	6.0	0.13	0.52	0.13	53.3
8	T1	116	3.0	122	3.0	0.151	4.3	LOS A	0.8	6.0	0.13	0.52	0.13	54.4
9	R2	65	3.0	68	3.0	0.151	8.4	LOS A	0.8	6.0	0.13	0.52	0.13	54.1
Approach		202	3.0	213	3.0	0.151	5.6	LOS A	0.8	6.0	0.13	0.52	0.13	54.2
West: EWR4 W															
10	L2	40	3.0	42	3.0	0.065	6.6	LOS A	0.3	2.4	0.54	0.62	0.54	52.7
11	T1	13	3.0	14	3.0	0.065	6.6	LOS A	0.3	2.4	0.54	0.62	0.54	53.7
12	R2	1	3.0	1	3.0	0.065	10.6	LOS A	0.3	2.4	0.54	0.62	0.54	53.4
Approach		54	3.0	57	3.0	0.065	6.7	LOS A	0.3	2.4	0.54	0.62	0.54	53.0
All Vehicles		769	3.0	809	3.0	0.305	7.1	LOS A	1.8	13.0	0.40	0.61	0.40	53.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: A [A - NSR 2 EWR 4 2036 Dev PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR2 S														
1	L2	31	3.0	33	3.0	0.183	6.0	LOS A	1.0	7.4	0.50	0.59	0.50	52.8
2	T1	132	3.0	139	3.0	0.183	6.0	LOS A	1.0	7.4	0.50	0.59	0.50	53.8
3	R2	7	3.0	7	3.0	0.183	10.0	LOS A	1.0	7.4	0.50	0.59	0.50	53.5
Approach		170	3.0	179	3.0	0.183	6.1	LOS A	1.0	7.4	0.50	0.59	0.50	53.6
East: EWR4 E														
4	L2	2	3.0	2	3.0	0.224	6.3	LOS A	1.2	8.8	0.51	0.66	0.51	51.7
5	T1	114	3.0	120	3.0	0.224	6.2	LOS A	1.2	8.8	0.51	0.66	0.51	52.6
6	R2	90	3.0	95	3.0	0.224	10.3	LOS A	1.2	8.8	0.51	0.66	0.51	52.4
Approach		206	3.0	217	3.0	0.224	8.0	LOS A	1.2	8.8	0.51	0.66	0.51	52.5
North: NSR2 N														
7	L2	12	3.0	13	3.0	0.220	4.3	LOS A	1.3	9.3	0.11	0.49	0.11	53.7
8	T1	231	3.0	243	3.0	0.220	4.3	LOS A	1.3	9.3	0.11	0.49	0.11	54.7
9	R2	69	3.0	73	3.0	0.220	8.3	LOS A	1.3	9.3	0.11	0.49	0.11	54.4
Approach		312	3.0	328	3.0	0.220	5.2	LOS A	1.3	9.3	0.11	0.49	0.11	54.6
West: EWR4 W														
10	L2	3	3.0	3	3.0	0.013	5.4	LOS A	0.1	0.5	0.40	0.50	0.40	53.1
11	T1	9	3.0	9	3.0	0.013	5.4	LOS A	0.1	0.5	0.40	0.50	0.40	54.1
12	R2	1	3.0	1	3.0	0.013	9.4	LOS A	0.1	0.5	0.40	0.50	0.40	53.8
Approach		13	3.0	14	3.0	0.013	5.7	LOS A	0.1	0.5	0.40	0.50	0.40	53.8
All Vehicles		701	3.0	738	3.0	0.224	6.2	LOS A	1.3	9.3	0.32	0.57	0.32	53.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: B [B - NSR 3 EWR 4 2036 Dev AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR3 S														
1	L2	166	3.0	175	3.0	0.229	4.9	LOS A	1.3	9.3	0.32	0.52	0.32	53.6
2	T1	92	3.0	97	3.0	0.229	4.9	LOS A	1.3	9.3	0.32	0.52	0.32	54.7
3	R2	2	3.0	2	3.0	0.229	9.0	LOS A	1.3	9.3	0.32	0.52	0.32	54.4
Approach		260	3.0	274	3.0	0.229	5.0	LOS A	1.3	9.3	0.32	0.52	0.32	54.0
East: EWR4 E														
4	L2	25	3.0	26	3.0	0.109	4.4	LOS A	0.5	3.9	0.15	0.45	0.15	54.1
5	T1	108	3.0	114	3.0	0.109	4.4	LOS A	0.5	3.9	0.15	0.45	0.15	55.2
6	R2	4	3.0	4	3.0	0.109	8.4	LOS A	0.5	3.9	0.15	0.45	0.15	54.8
Approach		137	3.0	144	3.0	0.109	4.5	LOS A	0.5	3.9	0.15	0.45	0.15	54.9
North: NSR3 N														
7	L2	61	3.0	64	3.0	0.074	4.3	LOS A	0.4	2.7	0.11	0.48	0.11	54.3
8	T1	33	3.0	35	3.0	0.074	4.3	LOS A	0.4	2.7	0.11	0.48	0.11	55.4
9	R2	1	3.0	1	3.0	0.074	8.3	LOS A	0.4	2.7	0.11	0.48	0.11	55.1
Approach		95	3.0	100	3.0	0.074	4.4	LOS A	0.4	2.7	0.11	0.48	0.11	54.7
West: EWR4 W														
10	L2	35	3.0	37	3.0	0.050	4.8	LOS A	0.2	1.8	0.27	0.50	0.27	53.6
11	T1	16	3.0	17	3.0	0.050	4.7	LOS A	0.2	1.8	0.27	0.50	0.27	54.7
12	R2	4	3.0	4	3.0	0.050	8.8	LOS A	0.2	1.8	0.27	0.50	0.27	54.4
Approach		55	3.0	58	3.0	0.050	5.0	LOS A	0.2	1.8	0.27	0.50	0.27	54.0
All Vehicles		547	3.0	576	3.0	0.229	4.8	LOS A	1.3	9.3	0.24	0.49	0.24	54.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: B [B - NSR 3 EWR 4 2036 Dev PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR3 S														
1	L2	47	3.0	49	3.0	0.063	5.4	LOS A	0.3	2.3	0.39	0.54	0.39	53.4
2	T1	15	3.0	16	3.0	0.063	5.3	LOS A	0.3	2.3	0.39	0.54	0.39	54.5
3	R2	1	3.0	1	3.0	0.063	9.4	LOS A	0.3	2.3	0.39	0.54	0.39	54.2
Approach		63	3.0	66	3.0	0.063	5.4	LOS A	0.3	2.3	0.39	0.54	0.39	53.7
East: EWR4 E														
4	L2	105	3.0	111	3.0	0.250	4.9	LOS A	1.4	10.1	0.31	0.50	0.31	53.6
5	T1	181	3.0	191	3.0	0.250	4.9	LOS A	1.4	10.1	0.31	0.50	0.31	54.6
6	R2	1	3.0	1	3.0	0.250	9.0	LOS A	1.4	10.1	0.31	0.50	0.31	54.3
Approach		287	3.0	302	3.0	0.250	4.9	LOS A	1.4	10.1	0.31	0.50	0.31	54.3
North: NSR3 N														
7	L2	63	3.0	66	3.0	0.118	4.3	LOS A	0.6	4.2	0.06	0.50	0.06	54.2
8	T1	87	3.0	92	3.0	0.118	4.2	LOS A	0.6	4.2	0.06	0.50	0.06	55.2
9	R2	20	3.0	21	3.0	0.118	8.3	LOS A	0.6	4.2	0.06	0.50	0.06	54.9
Approach		170	3.0	179	3.0	0.118	4.7	LOS A	0.6	4.2	0.06	0.50	0.06	54.8
West: EWR4 W														
10	L2	21	3.0	22	3.0	0.023	4.3	LOS A	0.1	0.8	0.10	0.52	0.10	54.0
11	T1	3	3.0	3	3.0	0.023	4.3	LOS A	0.1	0.8	0.10	0.52	0.10	55.0
12	R2	4	3.0	4	3.0	0.023	8.3	LOS A	0.1	0.8	0.10	0.52	0.10	54.7
Approach		28	3.0	29	3.0	0.023	4.9	LOS A	0.1	0.8	0.10	0.52	0.10	54.2
All Vehicles		548	3.0	577	3.0	0.250	4.9	LOS A	1.4	10.1	0.23	0.51	0.23	54.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: D [C - NSR 4 EWR 4 2036 Dev AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR 4 S														
1	L2	12	3.0	13	3.0	0.159	6.3	LOS A	0.6	4.3	0.22	0.20	0.22	55.8
2	T1	174	3.0	183	3.0	0.159	0.3	LOS A	0.6	4.3	0.22	0.20	0.22	57.4
3	R2	77	3.0	81	3.0	0.159	6.2	LOS A	0.6	4.3	0.22	0.20	0.22	55.2
Approach		263	3.0	277	3.0	0.159	2.3	NA	0.6	4.3	0.22	0.20	0.22	56.7
East: EWR 6 E														
4	L2	85	3.0	89	3.0	0.165	5.9	LOS A	0.7	4.8	0.23	0.58	0.23	53.0
5	T1	81	3.0	85	3.0	0.165	6.6	LOS A	0.7	4.8	0.23	0.58	0.23	53.1
6	R2	2	3.0	2	3.0	0.165	9.2	LOS A	0.7	4.8	0.23	0.58	0.23	52.4
Approach		168	3.0	177	3.0	0.165	6.2	LOS A	0.7	4.8	0.23	0.58	0.23	53.0
North: NSR 4 N														
7	L2	102	3.0	107	3.0	0.119	5.7	LOS A	0.2	1.6	0.10	0.32	0.10	54.9
8	T1	82	3.0	86	3.0	0.119	0.2	LOS A	0.2	1.6	0.10	0.32	0.10	56.5
9	R2	21	3.0	22	3.0	0.119	6.2	LOS A	0.2	1.6	0.10	0.32	0.10	54.4
Approach		205	3.0	216	3.0	0.119	3.6	NA	0.2	1.6	0.10	0.32	0.10	55.5
West: EWR 6 W														
10	L2	8	3.0	8	3.0	0.130	6.2	LOS A	0.5	3.4	0.46	0.69	0.46	52.4
11	T1	77	3.0	81	3.0	0.130	6.7	LOS A	0.5	3.4	0.46	0.69	0.46	52.5
12	R2	12	3.0	13	3.0	0.130	9.3	LOS A	0.5	3.4	0.46	0.69	0.46	51.8
Approach		97	3.0	102	3.0	0.130	7.0	LOS A	0.5	3.4	0.46	0.69	0.46	52.4
All Vehicles		733	3.0	772	3.0	0.165	4.2	NA	0.7	4.8	0.22	0.39	0.22	54.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: D [C - NSR 4 EWR 4 2036 Dev PM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR 4 S														
1	L2	29	3.0	31	3.0	0.106	6.4	LOS A	0.5	3.7	0.35	0.47	0.35	53.1
2	T1	22	3.0	23	3.0	0.106	0.8	LOS A	0.5	3.7	0.35	0.47	0.35	54.6
3	R2	103	3.0	108	3.0	0.106	6.3	LOS A	0.5	3.7	0.35	0.47	0.35	52.6
Approach		154	3.0	162	3.0	0.106	5.5	NA	0.5	3.7	0.35	0.47	0.35	53.0
East: EWR 6 E														
4	L2	175	3.0	184	3.0	0.401	6.6	LOS A	2.3	16.2	0.39	0.68	0.46	52.0
5	T1	172	3.0	181	3.0	0.401	7.9	LOS A	2.3	16.2	0.39	0.68	0.46	52.2
6	R2	26	3.0	27	3.0	0.401	10.4	LOS A	2.3	16.2	0.39	0.68	0.46	51.5
Approach		373	3.0	393	3.0	0.401	7.5	LOS A	2.3	16.2	0.39	0.68	0.46	52.1
North: NSR 4 N														
7	L2	82	3.0	86	3.0	0.199	5.7	LOS A	0.9	6.2	0.13	0.32	0.13	55.0
8	T1	141	3.0	148	3.0	0.199	0.1	LOS A	0.9	6.2	0.13	0.32	0.13	56.5
9	R2	116	3.0	122	3.0	0.199	5.7	LOS A	0.9	6.2	0.13	0.32	0.13	54.4
Approach		339	3.0	357	3.0	0.199	3.4	NA	0.9	6.2	0.13	0.32	0.13	55.4
West: EWR 6 W														
10	L2	1	3.0	1	3.0	0.103	5.6	LOS A	0.4	2.6	0.44	0.70	0.44	51.8
11	T1	54	3.0	57	3.0	0.103	6.8	LOS A	0.4	2.6	0.44	0.70	0.44	52.0
12	R2	12	3.0	13	3.0	0.103	11.8	LOS A	0.4	2.6	0.44	0.70	0.44	51.3
Approach		67	3.0	71	3.0	0.103	7.7	LOS A	0.4	2.6	0.44	0.70	0.44	51.9
All Vehicles		933	3.0	982	3.0	0.401	5.7	NA	2.3	16.2	0.29	0.52	0.32	53.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: D [D - NSR 4 EWR 6 2036 Dev AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR 4 S														
1	L2	60	3.0	63	3.0	0.070	5.6	LOS A	0.1	0.8	0.06	0.34	0.06	55.1
2	T1	48	3.0	51	3.0	0.070	0.1	LOS A	0.1	0.8	0.06	0.34	0.06	56.7
3	R2	13	3.0	14	3.0	0.070	5.8	LOS A	0.1	0.8	0.06	0.34	0.06	54.5
Approach		121	3.0	127	3.0	0.070	3.4	NA	0.1	0.8	0.06	0.34	0.06	55.6
East: EWR 6 E														
4	L2	20	3.0	21	3.0	0.110	5.7	LOS A	0.4	2.9	0.19	0.59	0.19	52.9
5	T1	36	3.0	38	3.0	0.110	5.4	LOS A	0.4	2.9	0.19	0.59	0.19	53.1
6	R2	45	3.0	47	3.0	0.110	7.2	LOS A	0.4	2.9	0.19	0.59	0.19	52.4
Approach		101	3.0	106	3.0	0.110	6.3	LOS A	0.4	2.9	0.19	0.59	0.19	52.8
North: NSR 4 N														
7	L2	54	3.0	57	3.0	0.106	5.9	LOS A	0.5	3.6	0.22	0.43	0.22	53.7
8	T1	33	3.0	35	3.0	0.106	0.3	LOS A	0.5	3.6	0.22	0.43	0.22	55.2
9	R2	85	3.0	89	3.0	0.106	5.9	LOS A	0.5	3.6	0.22	0.43	0.22	53.2
Approach		172	3.0	181	3.0	0.106	4.8	NA	0.5	3.6	0.22	0.43	0.22	53.7
West: EWR 6 W														
10	L2	41	3.0	43	3.0	0.128	5.7	LOS A	0.5	3.5	0.19	0.58	0.19	53.0
11	T1	34	3.0	36	3.0	0.128	5.5	LOS A	0.5	3.5	0.19	0.58	0.19	53.2
12	R2	51	3.0	54	3.0	0.128	7.1	LOS A	0.5	3.5	0.19	0.58	0.19	52.5
Approach		126	3.0	133	3.0	0.128	6.2	LOS A	0.5	3.5	0.19	0.58	0.19	52.8
All Vehicles		520	3.0	547	3.0	0.128	5.1	NA	0.5	3.6	0.17	0.47	0.17	53.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: D [D - NSR 4 EWR 6 2036 Dev PM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR 4 S														
1	L2	253	3.0	266	3.0	0.187	5.6	LOS A	0.1	0.4	0.01	0.46	0.01	54.4
2	T1	68	3.0	72	3.0	0.187	0.0	LOS A	0.1	0.4	0.01	0.46	0.01	55.9
3	R2	5	3.0	5	3.0	0.187	5.9	LOS A	0.1	0.4	0.01	0.46	0.01	53.8
Approach		326	3.0	343	3.0	0.187	4.4	NA	0.1	0.4	0.01	0.46	0.01	54.7
East: EWR 6 E														
4	L2	2	3.0	2	3.0	0.051	5.8	LOS A	0.2	1.2	0.40	0.67	0.40	51.9
5	T1	11	3.0	12	3.0	0.051	7.6	LOS A	0.2	1.2	0.40	0.67	0.40	52.1
6	R2	22	3.0	23	3.0	0.051	7.7	LOS A	0.2	1.2	0.40	0.67	0.40	51.4
Approach		35	3.0	37	3.0	0.051	7.6	LOS A	0.2	1.2	0.40	0.67	0.40	51.7
North: NSR 4 N														
7	L2	14	3.0	15	3.0	0.198	7.0	LOS A	1.1	7.5	0.45	0.44	0.45	53.6
8	T1	87	3.0	92	3.0	0.198	1.3	LOS A	1.1	7.5	0.45	0.44	0.45	55.1
9	R2	170	3.0	179	3.0	0.198	6.9	LOS A	1.1	7.5	0.45	0.44	0.45	53.0
Approach		271	3.0	285	3.0	0.198	5.1	NA	1.1	7.5	0.45	0.44	0.45	53.7
West: EWR 6 W														
10	L2	35	3.0	37	3.0	0.172	5.8	LOS A	0.6	4.5	0.28	0.65	0.28	51.6
11	T1	1	3.0	1	3.0	0.172	6.9	LOS A	0.6	4.5	0.28	0.65	0.28	51.8
12	R2	89	3.0	94	3.0	0.172	8.9	LOS A	0.6	4.5	0.28	0.65	0.28	51.1
Approach		125	3.0	132	3.0	0.172	8.0	LOS A	0.6	4.5	0.28	0.65	0.28	51.3
All Vehicles		757	3.0	797	3.0	0.198	5.4	NA	1.1	7.5	0.23	0.49	0.23	53.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: E [E - NSR 3 EWR 6 2036 Dev AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR3 S														
1	L2	51	3.0	54	3.0	0.181	5.0	LOS A	1.0	6.9	0.33	0.52	0.33	53.3
2	T1	130	3.0	137	3.0	0.181	5.0	LOS A	1.0	6.9	0.33	0.52	0.33	54.4
3	R2	16	3.0	17	3.0	0.181	9.0	LOS A	1.0	6.9	0.33	0.52	0.33	54.1
Approach		197	3.0	207	3.0	0.181	5.3	LOS A	1.0	6.9	0.33	0.52	0.33	54.1
East: EWR6 E														
4	L2	85	3.0	89	3.0	0.154	4.3	LOS A	0.8	5.9	0.11	0.46	0.11	54.3
5	T1	122	3.0	128	3.0	0.154	4.3	LOS A	0.8	5.9	0.11	0.46	0.11	55.4
6	R2	3	3.0	3	3.0	0.154	8.3	LOS A	0.8	5.9	0.11	0.46	0.11	55.1
Approach		210	3.0	221	3.0	0.154	4.4	LOS A	0.8	5.9	0.11	0.46	0.11	54.9
North: NSR3 N														
7	L2	21	3.0	22	3.0	0.035	4.6	LOS A	0.2	1.2	0.21	0.49	0.21	53.7
8	T1	15	3.0	16	3.0	0.035	4.5	LOS A	0.2	1.2	0.21	0.49	0.21	54.8
9	R2	4	3.0	4	3.0	0.035	8.6	LOS A	0.2	1.2	0.21	0.49	0.21	54.5
Approach		40	3.0	42	3.0	0.035	5.0	LOS A	0.2	1.2	0.21	0.49	0.21	54.2
West: EWR6 W														
10	L2	8	3.0	8	3.0	0.056	5.0	LOS A	0.3	2.0	0.33	0.49	0.33	53.4
11	T1	50	3.0	53	3.0	0.056	5.0	LOS A	0.3	2.0	0.33	0.49	0.33	54.5
12	R2	1	3.0	1	3.0	0.056	9.1	LOS A	0.3	2.0	0.33	0.49	0.33	54.2
Approach		59	3.0	62	3.0	0.056	5.1	LOS A	0.3	2.0	0.33	0.49	0.33	54.3
All Vehicles		506	3.0	533	3.0	0.181	4.9	LOS A	1.0	6.9	0.23	0.49	0.23	54.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: E [E - NSR 3 EWR 6 2036 Dev PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR3 S														
1	L2	27	3.0	28	3.0	0.141	5.1	LOS A	0.8	5.4	0.35	0.58	0.35	52.4
2	T1	61	3.0	64	3.0	0.141	5.1	LOS A	0.8	5.4	0.35	0.58	0.35	53.4
3	R2	60	3.0	63	3.0	0.141	9.1	LOS A	0.8	5.4	0.35	0.58	0.35	53.1
Approach		148	3.0	156	3.0	0.141	6.7	LOS A	0.8	5.4	0.35	0.58	0.35	53.1
East: EWR6 E														
4	L2	247	3.0	260	3.0	0.326	4.9	LOS A	2.1	15.1	0.32	0.52	0.32	53.5
5	T1	114	3.0	120	3.0	0.326	4.8	LOS A	2.1	15.1	0.32	0.52	0.32	54.5
6	R2	29	3.0	31	3.0	0.326	8.9	LOS A	2.1	15.1	0.32	0.52	0.32	54.2
Approach		390	3.0	411	3.0	0.326	5.2	LOS A	2.1	15.1	0.32	0.52	0.32	53.8
North: NSR3 N														
7	L2	22	3.0	23	3.0	0.098	4.9	LOS A	0.5	3.5	0.29	0.48	0.29	53.6
8	T1	82	3.0	86	3.0	0.098	4.8	LOS A	0.5	3.5	0.29	0.48	0.29	54.6
9	R2	3	3.0	3	3.0	0.098	8.9	LOS A	0.5	3.5	0.29	0.48	0.29	54.3
Approach		107	3.0	113	3.0	0.098	4.9	LOS A	0.5	3.5	0.29	0.48	0.29	54.4
West: EWR6 W														
10	L2	5	3.0	5	3.0	0.052	5.0	LOS A	0.3	1.8	0.33	0.51	0.33	53.1
11	T1	40	3.0	42	3.0	0.052	5.0	LOS A	0.3	1.8	0.33	0.51	0.33	54.1
12	R2	9	3.0	9	3.0	0.052	9.1	LOS A	0.3	1.8	0.33	0.51	0.33	53.8
Approach		54	3.0	57	3.0	0.052	5.7	LOS A	0.3	1.8	0.33	0.51	0.33	53.9
All Vehicles		699	3.0	736	3.0	0.326	5.5	LOS A	2.1	15.1	0.32	0.53	0.32	53.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: F [F - NSR 2 EWR 6 2036 Dev AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR2 S															
1	L2	149	3.0	157	3.0	0.265	5.5	LOS A	1.5	11.1	0.43	0.57	0.43	53.2
2	T1	117	3.0	123	3.0	0.265	5.5	LOS A	1.5	11.1	0.43	0.57	0.43	54.2
3	R2	8	3.0	8	3.0	0.265	9.5	LOS A	1.5	11.1	0.43	0.57	0.43	53.9
Approach		274	3.0	288	3.0	0.265	5.6	LOS A	1.5	11.1	0.43	0.57	0.43	53.7
East: EWR6 E															
4	L2	2	3.0	2	3.0	0.148	4.6	LOS A	0.8	5.5	0.22	0.51	0.22	53.2
5	T1	130	3.0	137	3.0	0.148	4.6	LOS A	0.8	5.5	0.22	0.51	0.22	54.2
6	R2	44	3.0	46	3.0	0.148	8.6	LOS A	0.8	5.5	0.22	0.51	0.22	53.9
Approach		176	3.0	185	3.0	0.148	5.6	LOS A	0.8	5.5	0.22	0.51	0.22	54.1
North: NSR2 N															
7	L2	43	3.0	45	3.0	0.083	4.3	LOS A	0.4	3.0	0.09	0.48	0.09	54.2
8	T1	60	3.0	63	3.0	0.083	4.3	LOS A	0.4	3.0	0.09	0.48	0.09	55.3
9	R2	8	3.0	8	3.0	0.083	8.3	LOS A	0.4	3.0	0.09	0.48	0.09	55.0
Approach		111	3.0	117	3.0	0.083	4.6	LOS A	0.4	3.0	0.09	0.48	0.09	54.8
West: EWR6 W															
10	L2	10	3.0	11	3.0	0.018	5.1	LOS A	0.1	0.6	0.34	0.51	0.34	53.3
11	T1	6	3.0	6	3.0	0.018	5.1	LOS A	0.1	0.6	0.34	0.51	0.34	54.3
12	R2	2	3.0	2	3.0	0.018	9.1	LOS A	0.1	0.6	0.34	0.51	0.34	54.0
Approach		18	3.0	19	3.0	0.018	5.5	LOS A	0.1	0.6	0.34	0.51	0.34	53.7
All Vehicles		579	3.0	609	3.0	0.265	5.4	LOS A	1.5	11.1	0.30	0.53	0.30	54.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: F [F - NSR 2 EWR 6 2036 Dev PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR2 S														
1	L2	138	3.0	145	3.0	0.250	5.4	LOS A	1.5	10.6	0.41	0.55	0.41	53.3
2	T1	117	3.0	123	3.0	0.250	5.3	LOS A	1.5	10.6	0.41	0.55	0.41	54.3
3	R2	7	3.0	7	3.0	0.250	9.4	LOS A	1.5	10.6	0.41	0.55	0.41	54.0
Approach		262	3.0	276	3.0	0.250	5.4	LOS A	1.5	10.6	0.41	0.55	0.41	53.7
East: EWR6 E														
4	L2	2	3.0	2	3.0	0.137	5.2	LOS A	0.7	5.0	0.35	0.57	0.35	52.5
5	T1	90	3.0	95	3.0	0.137	5.2	LOS A	0.7	5.0	0.35	0.57	0.35	53.5
6	R2	51	3.0	54	3.0	0.137	9.2	LOS A	0.7	5.0	0.35	0.57	0.35	53.2
Approach		143	3.0	151	3.0	0.137	6.6	LOS A	0.7	5.0	0.35	0.57	0.35	53.4
North: NSR2 N														
7	L2	37	3.0	39	3.0	0.142	4.3	LOS A	0.8	5.5	0.10	0.48	0.10	54.0
8	T1	132	3.0	139	3.0	0.142	4.3	LOS A	0.8	5.5	0.10	0.48	0.10	55.0
9	R2	26	3.0	27	3.0	0.142	8.3	LOS A	0.8	5.5	0.10	0.48	0.10	54.7
Approach		195	3.0	205	3.0	0.142	4.8	LOS A	0.8	5.5	0.10	0.48	0.10	54.8
West: EWR6 W														
10	L2	6	3.0	6	3.0	0.017	5.1	LOS A	0.1	0.6	0.35	0.50	0.35	53.3
11	T1	10	3.0	11	3.0	0.017	5.1	LOS A	0.1	0.6	0.35	0.50	0.35	54.4
12	R2	1	3.0	1	3.0	0.017	9.2	LOS A	0.1	0.6	0.35	0.50	0.35	54.1
Approach		17	3.0	18	3.0	0.017	5.4	LOS A	0.1	0.6	0.35	0.50	0.35	54.0
All Vehicles		617	3.0	649	3.0	0.250	5.5	LOS A	1.5	10.6	0.30	0.53	0.30	54.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: g [G - NSR 2 EWR 3 2036 Dev AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NS Rd 2 N														
1	L2	1	0.0	1	0.0	0.336	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	58.2
2	T1	622	0.0	655	0.0	0.336	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		623	0.0	656	0.0	0.336	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.8
East: EW Rd 3 E														
4	L2	127	0.0	134	0.0	0.105	6.5	LOS A	0.4	3.0	0.36	0.61	0.36	52.5
Approach		127	0.0	134	0.0	0.105	6.5	LOS A	0.4	3.0	0.36	0.61	0.36	52.5
North: NS Rd 2 N														
7	L2	124	0.0	131	0.0	0.070	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
8	T1	267	0.0	281	0.0	0.144	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		391	0.0	412	0.0	0.144	1.8	NA	0.0	0.0	0.00	0.18	0.00	57.8
West: EW Rd 3 W														
10	L2	60	0.0	63	0.0	0.078	8.5	LOS A	0.3	2.0	0.55	0.76	0.55	51.4
Approach		60	0.0	63	0.0	0.078	8.5	LOS A	0.3	2.0	0.55	0.76	0.55	51.4
All Vehicles		1201	0.0	1264	0.0	0.336	1.8	NA	0.4	3.0	0.07	0.16	0.07	57.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: g [G - NSR 2 EWR 3 2036 Dev PM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NS Rd 2 N														
1	L2	1	0.0	1	0.0	0.138	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	58.3
2	T1	254	0.0	267	0.0	0.138	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		255	0.0	268	0.0	0.138	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
East: EW Rd 3 E														
4	L2	72	0.0	76	0.0	0.060	6.5	LOS A	0.2	1.6	0.35	0.59	0.35	52.5
Approach		72	0.0	76	0.0	0.060	6.5	LOS A	0.2	1.6	0.35	0.59	0.35	52.5
North: NS Rd 2 N														
7	L2	233	0.0	245	0.0	0.132	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
8	T1	266	0.0	280	0.0	0.144	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		499	0.0	525	0.0	0.144	2.6	NA	0.0	0.0	0.00	0.27	0.00	56.8
West: EW Rd 3 W														
10	L2	1	0.0	1	0.0	0.001	6.3	LOS A	0.0	0.0	0.33	0.52	0.33	52.6
Approach		1	0.0	1	0.0	0.001	6.3	LOS A	0.0	0.0	0.33	0.52	0.33	52.6
All Vehicles		827	0.0	871	0.0	0.144	2.2	NA	0.2	1.6	0.03	0.22	0.03	57.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [2 - Hughes Hope 2036 Dev AM (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 80 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total	HV]	DEMAND FLOWS [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE [Veh.	Dist]	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Hughes Av S														
1	L2	36	3.0	38	3.0	0.246	37.1	LOS C	2.7	19.7	0.90	0.73	0.90	37.7
2	T1	39	3.0	41	3.0	* 0.246	31.6	LOS C	2.7	19.7	0.90	0.73	0.90	38.5
3	R2	10	3.0	11	3.0	0.051	40.8	LOS C	0.4	2.7	0.92	0.67	0.92	35.3
Approach		85	3.0	89	3.0	0.246	35.0	LOS C	2.7	19.7	0.90	0.72	0.90	37.7
East: Hope St E														
4	L2	4	3.0	4	3.0	0.009	18.4	LOS B	0.1	0.5	0.77	0.63	0.77	45.0
5	T1	212	3.0	223	3.0	* 0.849	44.0	LOS D	9.9	70.7	1.00	0.99	1.36	34.9
Approach		216	3.0	227	3.0	0.849	43.5	LOS D	9.9	70.7	1.00	0.99	1.34	35.1
NorthEast: Light Rail W														
26a	R1	10	100.0	11	100.0	* 0.189	48.5	LOS D	0.4	11.9	0.97	0.69	0.97	32.2
Approach		10	100.0	11	100.0	0.189	48.5	LOS D	0.4	11.9	0.97	0.69	0.97	32.2
North: Hughes Av N														
7	L2	1	3.0	1	3.0	0.002	26.3	LOS B	0.0	0.2	0.71	0.60	0.71	41.1
8	T1	7	3.0	7	3.0	0.026	31.6	LOS C	0.2	1.8	0.88	0.59	0.88	39.5
9	R2	1	3.0	1	3.0	0.005	39.9	LOS C	0.0	0.3	0.90	0.59	0.90	35.6
Approach		9	3.0	9	3.0	0.026	32.0	LOS C	0.2	1.8	0.86	0.59	0.86	39.2
West: Hope St W														
10	L2	5	3.0	5	3.0	* 0.515	34.6	LOS C	9.4	67.2	0.89	0.76	0.89	39.8
10a	L1	10	100.0	11	100.0	0.189	48.5	LOS D	0.4	11.9	0.97	0.69	0.97	32.0
11	T1	264	3.0	278	3.0	0.515	29.1	LOS C	9.4	67.2	0.89	0.76	0.89	40.6
12	R2	11	3.0	12	3.0	* 0.085	44.8	LOS D	0.4	3.2	0.96	0.67	0.96	34.0
Approach		290	6.3	305	6.3	0.515	30.4	LOS C	9.4	67.2	0.89	0.76	0.89	40.0
All Vehicles		610	6.2	642	6.2	0.849	36.0	LOS C	9.9	70.7	0.93	0.83	1.05	37.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		ped	m			sec	m	m/sec
South: Hughes Av S												
P1	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	201.4	217.2	1.08
East: Hope St E												

P2	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	198.8	213.9	1.08
NorthEast: Light Rail W												
P6	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	194.8	208.6	1.07
North: Hughes Av N												
P3	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	201.4	217.2	1.08
West: Hope St W												
P4	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	203.9	220.5	1.08
All Pedestrians		250	263	34.3	LOS D	0.1	0.1	0.93	0.93	200.1	215.5	1.08

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 2 [2 - Hughes Hope 2036 Dev PM (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 80 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Hughes Av S														
1	L2	11	3.0	12	3.0	0.137	37.3	LOS C	1.4	10.1	0.89	0.68	0.89	38.1
2	T1	28	3.0	29	3.0	* 0.137	31.7	LOS C	1.4	10.1	0.89	0.68	0.89	38.8
3	R2	9	3.0	9	3.0	0.042	39.6	LOS C	0.3	2.4	0.90	0.67	0.90	35.7
Approach		48	3.0	51	3.0	0.137	34.5	LOS C	1.4	10.1	0.89	0.68	0.89	38.0
East: Hope St E														
4	L2	40	3.0	42	3.0	0.093	19.0	LOS B	0.8	5.7	0.80	0.71	0.80	44.7
5	T1	126	3.0	133	3.0	* 0.555	37.3	LOS C	5.1	36.8	0.99	0.78	0.99	37.3
Approach		166	3.0	175	3.0	0.555	32.9	LOS C	5.1	36.8	0.94	0.76	0.94	38.8
NorthEast: Light Rail W														
26a	R1	10	100.0	11	100.0	* 0.189	48.5	LOS D	0.4	11.9	0.97	0.69	0.97	32.2
Approach		10	100.0	11	100.0	0.189	48.5	LOS D	0.4	11.9	0.97	0.69	0.97	32.2
North: Hughes Av N														
7	L2	3	3.0	3	3.0	0.006	26.4	LOS B	0.1	0.6	0.72	0.63	0.72	41.0
8	T1	23	3.0	24	3.0	0.084	32.3	LOS C	0.8	6.0	0.89	0.64	0.89	39.3
9	R2	10	3.0	11	3.0	0.046	39.7	LOS C	0.4	2.7	0.91	0.67	0.91	35.7
Approach		36	3.0	38	3.0	0.084	33.8	LOS C	0.8	6.0	0.88	0.65	0.88	38.4
West: Hope St W														
10	L2	4	3.0	4	3.0	* 0.280	33.2	LOS C	4.5	32.5	0.83	0.69	0.83	40.4
10a	L1	10	100.0	11	100.0	0.189	48.5	LOS D	0.4	11.9	0.97	0.69	0.97	32.0
11	T1	136	3.0	143	3.0	0.280	27.6	LOS B	4.5	32.5	0.83	0.69	0.83	41.3
12	R2	24	3.0	25	3.0	* 0.185	45.5	LOS D	1.0	7.1	0.97	0.71	0.97	33.8
Approach		174	8.6	183	8.6	0.280	31.4	LOS C	4.5	32.5	0.85	0.69	0.85	39.4
All Vehicles		434	7.5	457	7.5	0.555	32.9	LOS C	5.1	36.8	0.90	0.71	0.90	38.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Hughes Av S												
P1	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	201.4	217.2	1.08
East: Hope St E												

P2	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	198.8	213.9	1.08
NorthEast: Light Rail W												
P6	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	194.8	208.6	1.07
North: Hughes Av N												
P3	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	201.4	217.2	1.08
West: Hope St W												
P4	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	203.9	220.5	1.08
All Pedestrians		250	263	34.3	LOS D	0.1	0.1	0.93	0.93	200.1	215.5	1.08

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3 [3 - NSR2 Hope 2036 Dev AM Turn Bay (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 70 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NS Rd 2 S														
1	L2	12	3.0	13	3.0	0.316	38.0	LOS C	2.3	16.3	0.96	0.73	0.96	38.0
2	T1	53	3.0	56	3.0	* 0.316	32.5	LOS C	2.3	16.3	0.96	0.73	0.96	38.8
3	R2	6	3.0	6	3.0	0.030	36.2	LOS C	0.2	1.4	0.91	0.65	0.91	36.9
Approach		71	3.0	75	3.0	0.316	33.7	LOS C	2.3	16.3	0.95	0.72	0.95	38.5
East: Hope St E														
4	L2	22	3.0	23	3.0	* 0.459	32.1	LOS C	6.5	46.6	0.89	0.77	0.89	40.7
5	T1	194	3.0	204	3.0	0.459	26.5	LOS B	6.5	46.6	0.89	0.77	0.89	41.6
6	R2	5	0.0	5	0.0	* 0.033	38.6	LOS C	0.2	1.2	0.94	0.64	0.94	36.0
Approach		221	2.9	233	2.9	0.459	27.4	LOS B	6.5	46.6	0.89	0.77	0.89	41.4
NorthEast: Light Rail W														
26a	R1	10	100.0	11	100.0	* 0.165	42.1	LOS C	0.4	10.3	0.96	0.69	0.96	34.4
Approach		10	100.0	11	100.0	0.165	42.1	LOS C	0.4	10.3	0.96	0.69	0.96	34.4
North: NS Rd 2 N														
7	L2	10	3.0	11	3.0	0.058	32.4	LOS C	0.5	3.6	0.86	0.66	0.86	39.3
8	T1	6	3.0	6	3.0	0.058	26.8	LOS B	0.5	3.6	0.86	0.66	0.86	40.1
9	R2	3	3.0	3	3.0	0.015	35.9	LOS C	0.1	0.7	0.91	0.63	0.91	36.9
Approach		19	3.0	20	3.0	0.058	31.2	LOS C	0.5	3.6	0.87	0.66	0.87	39.1
NorthWest: Light Rail E														
27a	L1	10	100.0	11	100.0	0.165	42.3	LOS C	0.4	10.3	0.96	0.69	0.96	33.9
Approach		10	100.0	11	100.0	0.165	42.3	LOS C	0.4	10.3	0.96	0.69	0.96	33.9
West: Hope St W														
10	L2	145	3.0	153	3.0	0.420	20.2	LOS B	2.9	20.5	0.92	0.78	0.92	44.1
11	T1	130	3.0	137	3.0	* 0.835	40.9	LOS C	5.4	38.5	1.00	0.96	1.45	36.0
Approach		275	3.0	289	3.0	0.835	30.0	LOS C	5.4	38.5	0.96	0.86	1.17	39.8
All Vehicles		606	6.2	638	6.2	0.835	29.9	LOS C	6.5	46.6	0.93	0.80	1.03	40.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed

		ped/h	ped/h	sec		ped	m			sec	m	m/sec
South: NS Rd 2 S												
P1	Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	194.9	215.2	1.10
East: Hope St E												
P2	Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	192.3	211.9	1.10
NorthEast: Light Rail W												
P6	Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	189.8	208.6	1.10
North: NS Rd 2 N												
P3	Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	192.3	211.9	1.10
NorthWest: Light Rail E												
P7	Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	189.8	208.6	1.10
West: Hope St W												
P4	Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	194.9	215.2	1.10
All Pedestrians		300	316	29.3	LOS C	0.1	0.1	0.92	0.92	192.3	211.9	1.10

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 3 [3 - NSR2 Hope 2036 Dev PM Turn Bay (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 70 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NS Rd 2 S														
1	L2	4	3.0	4	3.0	0.102	36.8	LOS C	0.7	5.1	0.93	0.67	0.93	38.5
2	T1	17	3.0	18	3.0	0.102	31.3	LOS C	0.7	5.1	0.93	0.67	0.93	39.3
3	R2	6	3.0	6	3.0	0.030	36.2	LOS C	0.2	1.4	0.91	0.65	0.91	36.9
Approach		27	3.0	28	3.0	0.102	33.2	LOS C	0.7	5.1	0.92	0.66	0.92	38.6
East: Hope St E														
4	L2	48	3.0	51	3.0	* 0.434	29.3	LOS C	5.8	41.6	0.88	0.78	0.88	41.7
5	T1	159	3.0	167	3.0	0.434	23.7	LOS B	5.8	41.6	0.88	0.78	0.88	42.6
6	R2	7	0.0	7	0.0	* 0.046	38.7	LOS C	0.2	1.7	0.94	0.66	0.94	35.9
Approach		214	2.9	225	2.9	0.434	25.5	LOS B	5.8	41.6	0.88	0.77	0.88	42.1
NorthEast: Light Rail W														
26a	R1	10	100.0	11	100.0	* 0.165	42.1	LOS C	0.4	10.3	0.96	0.69	0.96	34.4
Approach		10	100.0	11	100.0	0.165	42.1	LOS C	0.4	10.3	0.96	0.69	0.96	34.4
North: NS Rd 2 N														
7	L2	13	3.0	14	3.0	0.303	37.0	LOS C	2.3	16.3	0.95	0.73	0.95	38.4
8	T1	53	3.0	56	3.0	* 0.303	31.4	LOS C	2.3	16.3	0.95	0.73	0.95	39.2
9	R2	5	3.0	5	3.0	0.025	36.1	LOS C	0.2	1.2	0.91	0.65	0.91	36.8
Approach		71	3.0	75	3.0	0.303	32.8	LOS C	2.3	16.3	0.94	0.72	0.94	38.9
NorthWest: Light Rail E														
27a	L1	10	100.0	11	100.0	0.165	42.3	LOS C	0.4	10.3	0.96	0.69	0.96	33.9
Approach		10	100.0	11	100.0	0.165	42.3	LOS C	0.4	10.3	0.96	0.69	0.96	33.9
West: Hope St W														
10	L2	39	3.0	41	3.0	0.113	19.0	LOS B	0.7	5.1	0.85	0.71	0.85	44.7
11	T1	107	3.0	113	3.0	* 0.687	37.3	LOS C	4.1	29.8	1.00	0.84	1.18	37.3
Approach		146	3.0	154	3.0	0.687	32.4	LOS C	4.1	29.8	0.96	0.81	1.09	39.0
All Vehicles		478	7.0	503	7.0	0.687	29.8	LOS C	5.8	41.6	0.92	0.77	0.96	40.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed

	ped/h	ped/h	sec		ped	m			sec	m	m/sec
South: NS Rd 2 S											
P1 Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	194.9	215.2	1.10
East: Hope St E											
P2 Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	192.3	211.9	1.10
NorthEast: Light Rail W											
P6 Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	189.8	208.6	1.10
North: NS Rd 2 N											
P3 Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	192.3	211.9	1.10
NorthWest: Light Rail E											
P7 Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	189.8	208.6	1.10
West: Hope St W											
P4 Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	194.9	215.2	1.10
All Pedestrians	300	316	29.3	LOS C	0.1	0.1	0.92	0.92	192.3	211.9	1.10

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4 [4 - Waratah Hope 2036 Dev AM (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 70 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Waratah S														
1	L2	39	3.0	41	3.0	0.468	39.0	LOS C	3.2	23.0	0.98	0.76	0.98	37.1
2	T1	50	3.0	53	3.0	* 0.468	33.4	LOS C	3.2	23.0	0.98	0.76	0.98	37.8
3	R2	26	3.0	27	3.0	0.161	39.5	LOS C	0.9	6.6	0.96	0.71	0.96	35.6
Approach		115	3.0	121	3.0	0.468	36.7	LOS C	3.2	23.0	0.97	0.75	0.97	37.0
SouthEast: LRT S														
22	T1	10	100.0	11	100.0	* 0.157	36.4	LOS C	0.4	10.3	0.95	0.67	0.95	37.6
Approach		10	100.0	11	100.0	0.157	36.4	LOS C	0.4	10.3	0.95	0.67	0.95	37.6
East: Hope St E														
4	L2	22	3.0	23	3.0	0.775	41.2	LOS C	7.8	55.7	1.00	0.92	1.23	36.9
5	T1	178	3.0	187	3.0	* 0.775	35.6	LOS C	7.8	55.7	1.00	0.92	1.23	37.6
6	R2	14	0.0	15	0.0	* 0.047	28.0	LOS B	0.4	2.8	0.86	0.68	0.86	40.0
Approach		214	2.8	225	2.8	0.775	35.7	LOS C	7.8	55.7	0.99	0.91	1.21	37.7
North: Waratah N														
7	L2	4	3.0	4	3.0	0.060	27.5	LOS B	0.6	4.1	0.82	0.65	0.82	41.2
8	T1	6	3.0	6	3.0	0.060	21.9	LOS B	0.6	4.1	0.82	0.65	0.82	42.1
9	R2	10	3.0	11	3.0	* 0.060	27.4	LOS B	0.6	4.1	0.82	0.65	0.82	41.1
Approach		20	3.0	21	3.0	0.060	25.8	LOS B	0.6	4.1	0.82	0.65	0.82	41.4
NorthWest: Light Rail E														
28	T1	10	100.0	11	100.0	0.157	36.4	LOS C	0.4	10.3	0.95	0.67	0.95	37.6
Approach		10	100.0	11	100.0	0.157	36.4	LOS C	0.4	10.3	0.95	0.67	0.95	37.6
West: Hope St W														
10	L2	5	3.0	5	3.0	0.502	37.0	LOS C	4.5	32.6	0.97	0.77	0.97	38.8
11	T1	125	3.0	132	3.0	0.502	31.4	LOS C	4.5	32.6	0.97	0.77	0.97	39.5
12	R2	9	3.0	9	3.0	0.061	38.9	LOS C	0.3	2.3	0.94	0.67	0.94	35.8
Approach		139	3.0	146	3.0	0.502	32.1	LOS C	4.5	32.6	0.97	0.76	0.97	39.2
All Vehicles		508	6.7	535	6.7	0.775	34.6	LOS C	7.8	55.7	0.97	0.81	1.06	38.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed

		ped/h	ped/h	sec		ped	m			sec	m	m/sec
South: Waratah S												
P1	Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	192.3	211.9	1.10
SouthEast: LRT S												
P5	Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	189.8	208.6	1.10
East: Hope St E												
P2	Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	192.3	211.9	1.10
North: Waratah N												
P3	Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	189.8	208.6	1.10
NorthWest: Light Rail E												
P7	Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	189.8	208.6	1.10
West: Hope St W												
P4	Full	50	53	29.3	LOS C	0.1	0.1	0.92	0.92	192.3	211.9	1.10
All Pedestrians		300	316	29.3	LOS C	0.1	0.1	0.92	0.92	191.1	210.3	1.10

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4 [4 - Waratah Hope 2036 Dev PM (Site Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 80 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Waratah S														
1	L2	7	3.0	7	3.0	0.215	43.2	LOS D	1.4	10.3	0.95	0.71	0.95	36.0
2	T1	29	3.0	31	3.0	* 0.215	37.7	LOS C	1.4	10.3	0.95	0.71	0.95	36.7
3	R2	8	3.0	8	3.0	0.055	43.3	LOS D	0.3	2.3	0.94	0.67	0.94	34.3
Approach		44	3.0	46	3.0	0.215	39.6	LOS C	1.4	10.3	0.95	0.70	0.95	36.1
SouthEast: LRT S														
22	T1	10	100.0	11	100.0	* 0.180	42.6	LOS D	0.4	11.9	0.97	0.68	0.97	35.3
Approach		10	100.0	11	100.0	0.180	42.6	LOS D	0.4	11.9	0.97	0.68	0.97	35.3
East: Hope St E														
4	L2	93	3.0	98	3.0	0.708	37.4	LOS C	11.5	82.2	0.97	0.86	1.03	37.9
5	T1	197	3.0	207	3.0	* 0.708	31.8	LOS C	11.5	82.2	0.97	0.86	1.03	38.7
6	R2	23	0.0	24	0.0	* 0.057	24.7	LOS B	0.6	4.5	0.76	0.70	0.76	41.5
Approach		313	2.8	329	2.8	0.708	33.0	LOS C	11.5	82.2	0.95	0.85	1.01	38.6
North: Waratah N														
7	L2	7	3.0	7	3.0	0.151	32.5	LOS C	1.9	13.5	0.84	0.65	0.84	39.9
8	T1	38	3.0	40	3.0	0.151	27.0	LOS B	1.9	13.5	0.84	0.65	0.84	40.8
9	R2	10	3.0	11	3.0	* 0.151	32.5	LOS C	1.9	13.5	0.84	0.65	0.84	39.8
Approach		55	3.0	58	3.0	0.151	28.7	LOS C	1.9	13.5	0.84	0.65	0.84	40.5
NorthWest: Light Rail E														
28	T1	10	100.0	11	100.0	0.180	42.6	LOS D	0.4	11.9	0.97	0.68	0.97	35.3
Approach		10	100.0	11	100.0	0.180	42.6	LOS D	0.4	11.9	0.97	0.68	0.97	35.3
West: Hope St W														
10	L2	3	3.0	3	3.0	0.258	32.7	LOS C	3.8	27.1	0.85	0.68	0.85	40.6
11	T1	108	3.0	114	3.0	0.258	27.1	LOS B	3.8	27.1	0.85	0.68	0.85	41.5
12	R2	18	3.0	19	3.0	0.139	45.2	LOS D	0.7	5.3	0.96	0.70	0.96	33.7
Approach		129	3.0	136	3.0	0.258	29.8	LOS C	3.8	27.1	0.87	0.68	0.87	40.2
All Vehicles		561	6.3	591	6.3	0.708	32.7	LOS C	11.5	82.2	0.92	0.77	0.95	38.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed

		ped/h	ped/h	sec		ped	m			sec	m	m/sec
South: Waratah S												
P1	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	197.3	211.9	1.07
SouthEast: LRT S												
P5	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	194.8	208.6	1.07
East: Hope St E												
P2	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	197.3	211.9	1.07
North: Waratah N												
P3	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	194.8	208.6	1.07
NorthWest: Light Rail E												
P7	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	194.8	208.6	1.07
West: Hope St W												
P4	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	197.3	211.9	1.07
All Pedestrians		300	316	34.3	LOS D	0.1	0.1	0.93	0.93	196.0	210.3	1.07

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

▽ Site: 5 [5 - NSR 4 Hope 2036 Dev AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Hope St E														
5	T1	160	3.0	168	3.0	0.118	0.2	LOS A	0.3	2.2	0.14	0.13	0.14	58.3
6	R2	42	3.0	44	3.0	0.118	6.1	LOS A	0.3	2.2	0.14	0.13	0.14	56.0
Approach		202	3.0	213	3.0	0.118	1.4	NA	0.3	2.2	0.14	0.13	0.14	57.9
North: NS Rd 4														
7	L2	68	3.0	72	3.0	0.097	6.1	LOS A	0.4	2.6	0.28	0.59	0.28	52.7
9	R2	39	3.0	41	3.0	0.097	7.1	LOS A	0.4	2.6	0.28	0.59	0.28	52.2
Approach		107	3.0	113	3.0	0.097	6.5	LOS A	0.4	2.6	0.28	0.59	0.28	52.5
West: Hope St W														
10	L2	12	3.0	13	3.0	0.089	5.6	LOS A	0.0	0.0	0.00	0.04	0.00	57.8
11	T1	149	3.0	157	3.0	0.089	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.6
Approach		161	3.0	169	3.0	0.089	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.4
All Vehicles		470	3.0	495	3.0	0.118	2.2	NA	0.4	2.6	0.12	0.20	0.12	57.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 5 [5 - NSR 4 Hope 2036 Dev PM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Hope St E														
5	T1	303	3.0	319	3.0	0.391	0.5	LOS A	2.4	17.2	0.30	0.31	0.30	56.3
6	R2	329	3.0	346	3.0	0.391	6.1	LOS A	2.4	17.2	0.30	0.31	0.30	54.1
Approach		632	3.0	665	3.0	0.391	3.4	NA	2.4	17.2	0.30	0.31	0.30	55.1
North: NS Rd 4														
7	L2	85	3.0	89	3.0	0.116	6.0	LOS A	0.4	3.1	0.23	0.59	0.23	52.3
9	R2	27	3.0	28	3.0	0.116	10.8	LOS A	0.4	3.1	0.23	0.59	0.23	51.8
Approach		112	3.0	118	3.0	0.116	7.1	LOS A	0.4	3.1	0.23	0.59	0.23	52.2
West: Hope St W														
10	L2	11	3.0	12	3.0	0.068	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	57.7
11	T1	112	3.0	118	3.0	0.068	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	59.5
Approach		123	3.0	129	3.0	0.068	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.3
All Vehicles		867	3.0	913	3.0	0.391	3.5	NA	2.4	17.2	0.25	0.31	0.25	55.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 6 [6 - Wharf Hope 2036 Dev AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wharf Rd S														
1	L2	50	3.0	53	3.0	0.042	5.6	LOS A	0.0	0.0	0.00	0.40	0.00	54.9
2	T1	169	3.0	178	3.0	0.211	0.5	LOS A	1.0	7.5	0.22	0.31	0.22	56.4
3	R2	153	3.0	161	3.0	0.211	6.2	LOS A	1.0	7.5	0.25	0.30	0.25	54.6
Approach		372	3.0	392	3.0	0.211	3.5	NA	1.0	7.5	0.20	0.32	0.20	55.5
East: Lancaster Av E														
4	L2	1	3.0	1	3.0	0.394	7.7	LOS A	1.9	13.6	0.69	0.93	0.93	46.6
5	T1	75	3.0	79	3.0	0.394	12.6	LOS A	1.9	13.6	0.69	0.93	0.93	47.0
6	R2	71	3.0	75	3.0	0.394	19.0	LOS B	1.9	13.6	0.69	0.93	0.93	46.4
Approach		147	3.0	155	3.0	0.394	15.6	LOS B	1.9	13.6	0.69	0.93	0.93	46.7
North: Wharf Rd N														
7	L2	13	3.0	14	3.0	0.024	5.6	LOS A	0.0	0.0	0.00	0.18	0.00	56.7
8	T1	116	3.0	122	3.0	0.120	0.7	LOS A	0.6	4.0	0.23	0.26	0.23	56.9
9	R2	77	3.0	81	3.0	0.120	6.6	LOS A	0.6	4.0	0.30	0.29	0.30	54.6
Approach		206	3.0	217	3.0	0.120	3.2	NA	0.6	4.0	0.24	0.27	0.24	56.0
West: Hope St W														
10	L2	7	3.0	7	3.0	0.510	8.7	LOS A	3.0	21.5	0.57	0.89	0.90	46.6
11	T1	136	3.0	143	3.0	0.510	13.8	LOS A	3.0	21.5	0.57	0.89	0.90	47.0
12	R2	74	3.0	78	3.0	0.510	19.7	LOS B	3.0	21.5	0.57	0.89	0.90	46.4
Approach		217	3.0	228	3.0	0.510	15.6	LOS B	3.0	21.5	0.57	0.89	0.90	46.8
All Vehicles		942	3.0	992	3.0	0.510	8.1	NA	3.0	21.5	0.37	0.54	0.49	51.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 6 [6 - Wharf Hope 2036 Dev PM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wharf Rd S														
1	L2	40	3.0	42	3.0	0.023	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.5
2	T1	65	3.0	68	3.0	0.064	0.3	LOS A	0.2	1.7	0.19	0.19	0.19	57.5
3	R2	32	3.0	34	3.0	0.064	6.2	LOS A	0.2	1.7	0.19	0.19	0.19	55.6
Approach		137	3.0	144	3.0	0.064	3.2	NA	0.2	1.7	0.13	0.31	0.13	55.9
East: Lancaster Av E														
4	L2	1	3.0	1	3.0	0.885	19.2	LOS B	14.7	105.5	0.87	1.63	2.89	41.2
5	T1	414	3.0	436	3.0	0.885	25.0	LOS B	14.7	105.5	0.87	1.63	2.89	41.5
6	R2	66	3.0	69	3.0	0.885	32.5	LOS C	14.7	105.5	0.87	1.63	2.89	41.1
Approach		481	3.0	506	3.0	0.885	26.0	LOS B	14.7	105.5	0.87	1.63	2.89	41.4
North: Wharf Rd N														
7	L2	49	3.0	52	3.0	0.038	5.6	LOS A	0.0	0.0	0.00	0.43	0.00	54.7
8	T1	103	3.0	108	3.0	0.192	0.4	LOS A	1.0	6.9	0.20	0.39	0.20	55.8
9	R2	176	3.0	185	3.0	0.192	6.1	LOS A	1.0	6.9	0.24	0.39	0.24	53.9
Approach		328	3.0	345	3.0	0.192	4.2	NA	1.0	6.9	0.19	0.40	0.19	54.6
West: Hope St W														
10	L2	8	3.0	8	3.0	0.516	9.2	LOS A	3.0	21.3	0.01	0.54	0.01	45.7
11	T1	128	3.0	135	3.0	0.516	12.6	LOS A	3.0	21.3	0.01	0.54	0.01	46.0
12	R2	63	3.0	66	3.0	0.516	27.9	LOS B	3.0	21.3	0.01	0.54	0.01	45.5
Approach		199	3.0	209	3.0	0.516	17.3	LOS B	3.0	21.3	0.01	0.54	0.01	45.8
All Vehicles		1145	3.0	1205	3.0	0.885	15.5	NA	14.7	105.5	0.44	0.93	1.29	46.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [7 - Wharf Taylor 2036 Dev AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wharf Rd S														
2	T1	245	3.0	258	3.0	0.137	0.0	LOS A	0.0	0.1	0.01	0.00	0.01	59.9
3	R2	2	3.0	2	3.0	0.137	7.0	LOS A	0.0	0.1	0.01	0.00	0.01	57.5
Approach		247	3.0	260	3.0	0.137	0.1	NA	0.0	0.1	0.01	0.00	0.01	59.9
East: Taylor Av E														
4	L2	5	3.0	5	3.0	0.117	6.3	LOS A	0.4	2.8	0.46	0.74	0.46	51.6
6	R2	80	3.0	84	3.0	0.117	8.1	LOS A	0.4	2.8	0.46	0.74	0.46	51.1
Approach		85	3.0	89	3.0	0.117	8.0	LOS A	0.4	2.8	0.46	0.74	0.46	51.1
North: Wharf Rd N														
7	L2	135	3.0	142	3.0	0.189	5.6	LOS A	0.0	0.0	0.00	0.24	0.00	56.1
8	T1	201	3.0	212	3.0	0.189	0.1	LOS A	0.0	0.0	0.00	0.24	0.00	57.8
Approach		336	3.0	354	3.0	0.189	2.3	NA	0.0	0.0	0.00	0.24	0.00	57.1
All Vehicles		668	3.0	703	3.0	0.189	2.2	NA	0.4	2.8	0.06	0.22	0.06	57.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 1 [7 - Wharf Taylor 2036 Dev PM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wharf Rd S														
2	T1	126	3.0	133	3.0	0.084	0.4	LOS A	0.2	1.1	0.14	0.06	0.14	58.9
3	R2	13	3.0	14	3.0	0.084	8.1	LOS A	0.2	1.1	0.14	0.06	0.14	56.5
Approach		139	3.0	146	3.0	0.084	1.2	NA	0.2	1.1	0.14	0.06	0.14	58.7
East: Taylor Av E														
4	L2	6	3.0	6	3.0	0.321	7.5	LOS A	1.3	9.6	0.56	0.85	0.66	50.6
6	R2	207	3.0	218	3.0	0.321	9.5	LOS A	1.3	9.6	0.56	0.85	0.66	50.1
Approach		213	3.0	224	3.0	0.321	9.5	LOS A	1.3	9.6	0.56	0.85	0.66	50.1
North: Wharf Rd N														
7	L2	204	3.0	215	3.0	0.296	5.7	LOS A	0.0	0.0	0.00	0.23	0.00	56.2
8	T1	323	3.0	340	3.0	0.296	0.1	LOS A	0.0	0.0	0.00	0.23	0.00	57.8
Approach		527	3.0	555	3.0	0.296	2.2	NA	0.0	0.0	0.00	0.23	0.00	57.1
All Vehicles		879	3.0	925	3.0	0.321	3.8	NA	1.3	9.6	0.16	0.35	0.18	55.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 8 [8 - Wharf EWR 4 2036 Dev AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wharf Rd S														
1	L2	59	3.0	62	3.0	0.181	5.6	LOS A	0.0	0.0	0.00	0.11	0.00	57.2
2	T1	267	3.0	281	3.0	0.181	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	58.9
Approach		326	3.0	343	3.0	0.181	1.1	NA	0.0	0.0	0.00	0.11	0.00	58.6
North: Wharf Rd N														
8	T1	188	3.0	198	3.0	0.195	0.9	LOS A	0.9	6.4	0.35	0.24	0.35	56.8
9	R2	108	3.0	114	3.0	0.195	7.0	LOS A	0.9	6.4	0.35	0.24	0.35	54.6
Approach		296	3.0	312	3.0	0.195	3.1	NA	0.9	6.4	0.35	0.24	0.35	56.0
West: EWR 4 W														
10	L2	104	3.0	109	3.0	0.319	7.0	LOS A	1.4	10.1	0.49	0.76	0.55	51.2
12	R2	150	3.0	158	3.0	0.319	9.6	LOS A	1.4	10.1	0.49	0.76	0.55	50.8
Approach		254	3.0	267	3.0	0.319	8.6	LOS A	1.4	10.1	0.49	0.76	0.55	51.0
All Vehicles		876	3.0	922	3.0	0.319	3.9	NA	1.4	10.1	0.26	0.34	0.28	55.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 8 [8 - Wharf EWR 4 2036 Dev PM (Site Folder: General)]

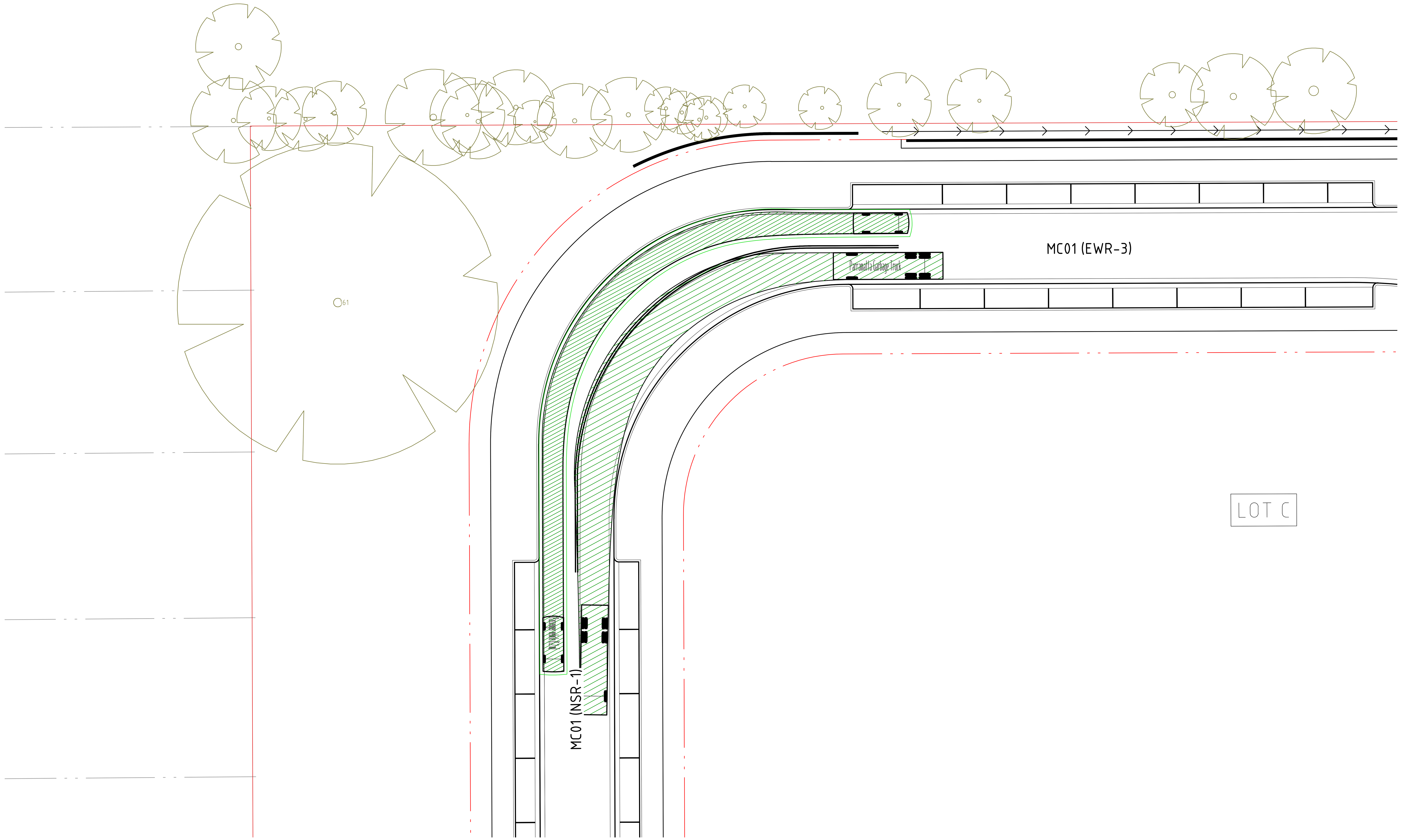
New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	INPUT VOLUMES HV] %	DEMAND FLOWS [Total veh/h	DEMAND FLOWS HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	95% BACK OF QUEUE Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Wharf Rd S														
1	L2	166	3.0	175	3.0	0.187	5.6	LOS A	0.0	0.0	0.00	0.30	0.00	55.7
2	T1	165	3.0	174	3.0	0.187	0.0	LOS A	0.0	0.0	0.00	0.30	0.00	57.3
Approach		331	3.0	348	3.0	0.187	2.8	NA	0.0	0.0	0.00	0.30	0.00	56.5
North: Wharf Rd N														
8	T1	399	3.0	420	3.0	0.400	1.3	LOS A	2.5	18.2	0.41	0.25	0.46	56.6
9	R2	211	3.0	222	3.0	0.400	7.7	LOS A	2.5	18.2	0.41	0.25	0.46	54.4
Approach		610	3.0	642	3.0	0.400	3.5	NA	2.5	18.2	0.41	0.25	0.46	55.8
West: EWR 4 W														
10	L2	113	3.0	119	3.0	0.383	7.1	LOS A	1.8	12.9	0.43	0.73	0.56	49.7
12	R2	127	3.0	134	3.0	0.383	13.9	LOS A	1.8	12.9	0.43	0.73	0.56	49.3
Approach		240	3.0	253	3.0	0.383	10.7	LOS A	1.8	12.9	0.43	0.73	0.56	49.5
All Vehicles		1181	3.0	1243	3.0	0.400	4.8	NA	2.5	18.2	0.30	0.36	0.35	54.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX D SWEPT TURNING PATH DIAGRAMS

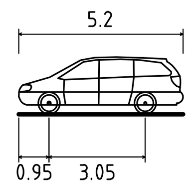


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

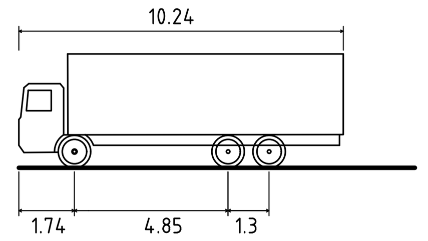
VEHICLE PROFILE



PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE



PARRAMATTA GARBAGE TRUCK (10.24 m)

OVERALL LENGTH	10.240m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.490m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR CLIENT REVIEW	BM		AR	26.11.21
02	ISSUED FOR DA	BM		AR	29.11.21
03	REISSUED FOR DA	BM		AR	24.01.22
04	DRAFT FOR INFORMATION	AS		AR	02.12.22

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PROJECT: MELROSE PARK INFRASTRUCTURE

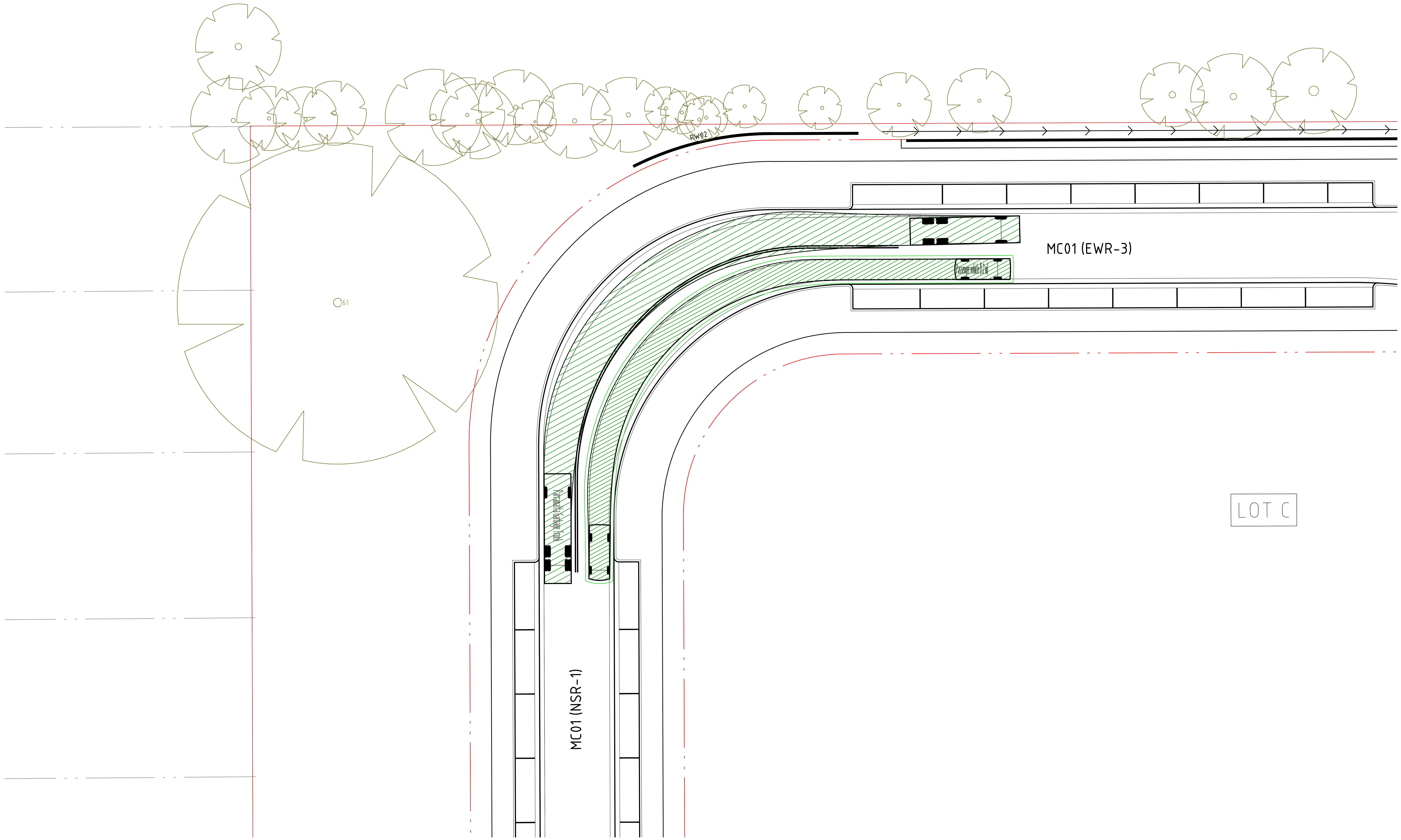
DRAWING TITLE: CIVIL ENGINEERING PACKAGE — SWEPT PATHS PLAN - SHEET 01

JOB NUMBER: 150077-60

DRAWING NUMBER: C10.01

REVISION: 04

DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

FORWARD MOVEMENT

VEHICLE BODY

VEHICLE WHEELS

VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE

5.2
0.95 3.05

PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE

10.24
1.74 4.85 1.3

PARRAMATTA GARBAGE TRUCK (10.24 m)

OVERALL LENGTH	10.240m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.490m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR CLIENT REVIEW	BM		AR	26.11.21
02	ISSUED FOR DA	BM		AR	29.11.21
03	REISSUED FOR DA	BM		AR	24.01.22
04	DRAFT FOR INFORMATION	AS		AR	02.12.22

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SCALE 1:200@ A1 0 2 4 6 8 10m

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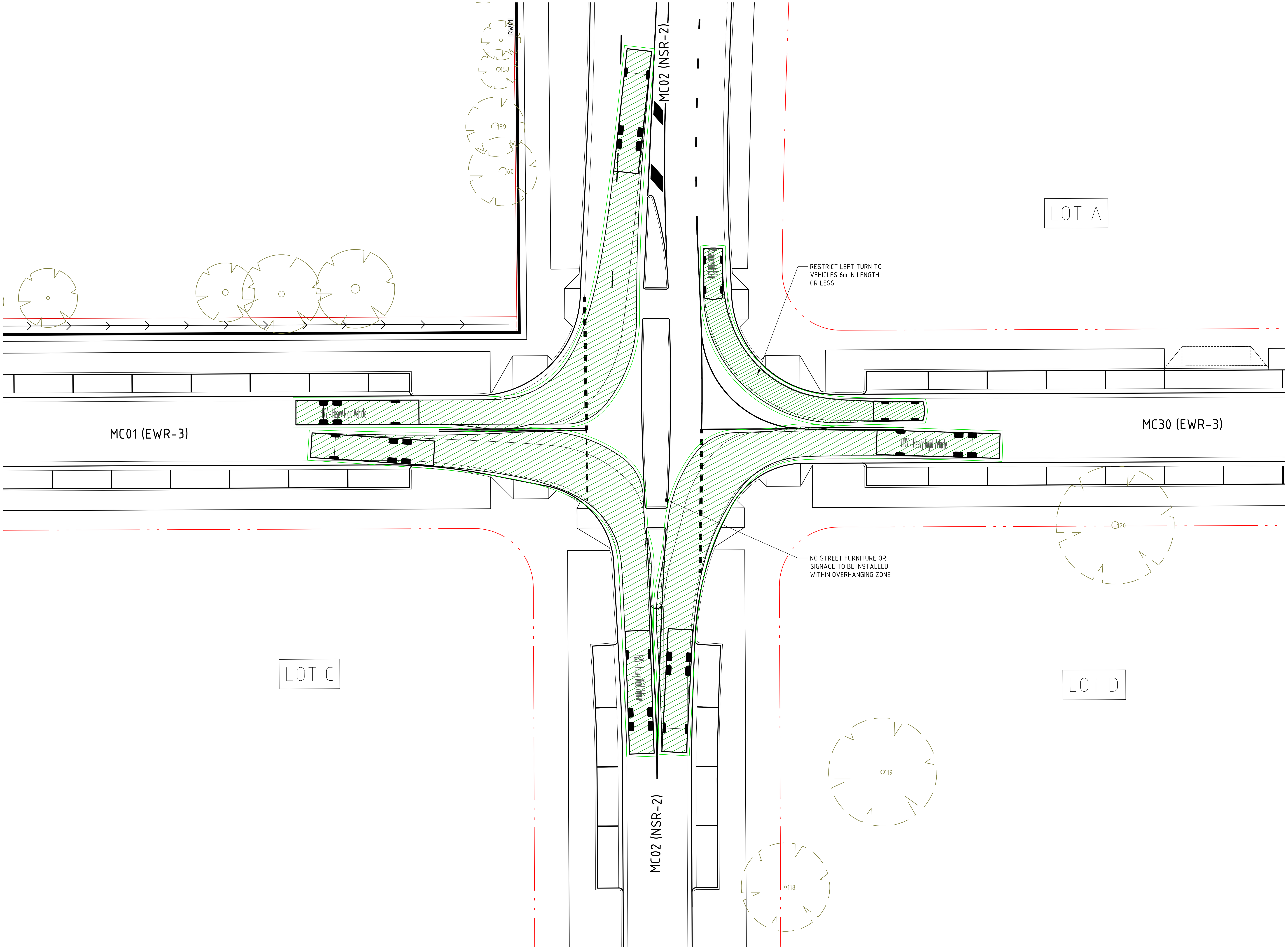
PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 02

JOB NUMBER 150077-60
DRAWING NUMBER C10.02
REVISION 04
DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

FORWARD MOVEMENT

VEHICLE BODY

VEHICLE WHEELS

VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE

5.2

0.95 3.05

PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE

12.5

2.4 5.9 1.4

6.6

HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR CLIENT REVIEW	BM		AR	26.11.21
02	ISSUED FOR DA	BM		AR	29.11.21
03	REISSUED FOR DA	BM		AR	24.01.22
04	DRAFT FOR INFORMATION	AS		AR	02.12.22

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PROJECTS

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ARCHITECT

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SCALE 1:200@ A1 0 2 4 6 8 10m

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Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
MELROSE PARK INFRASTRUCTURE

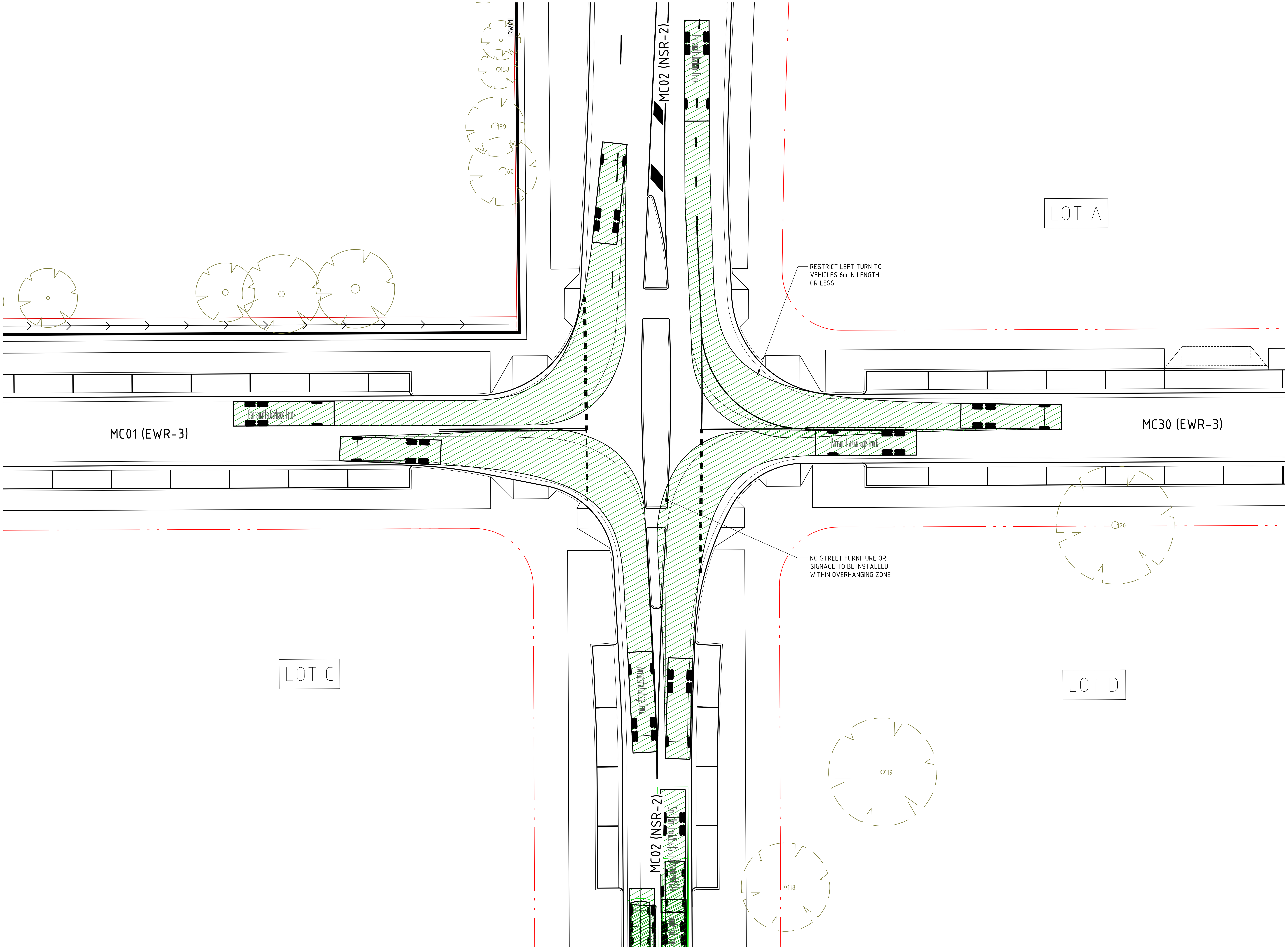
DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 03

JOB NUMBER 150077-60

DRAWING NUMBER C10.03

REVISION 04

DRAWING SHEET SIZE = A1

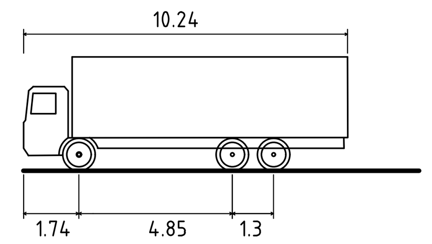


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



PARRAMATTA GARBAGE TRUCK (10.24 m)

OVERALL LENGTH	10.240m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.490m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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03	REISSUED FOR DA	BM		AR	24.01.22
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Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
MELROSE PARK INFRASTRUCTURE

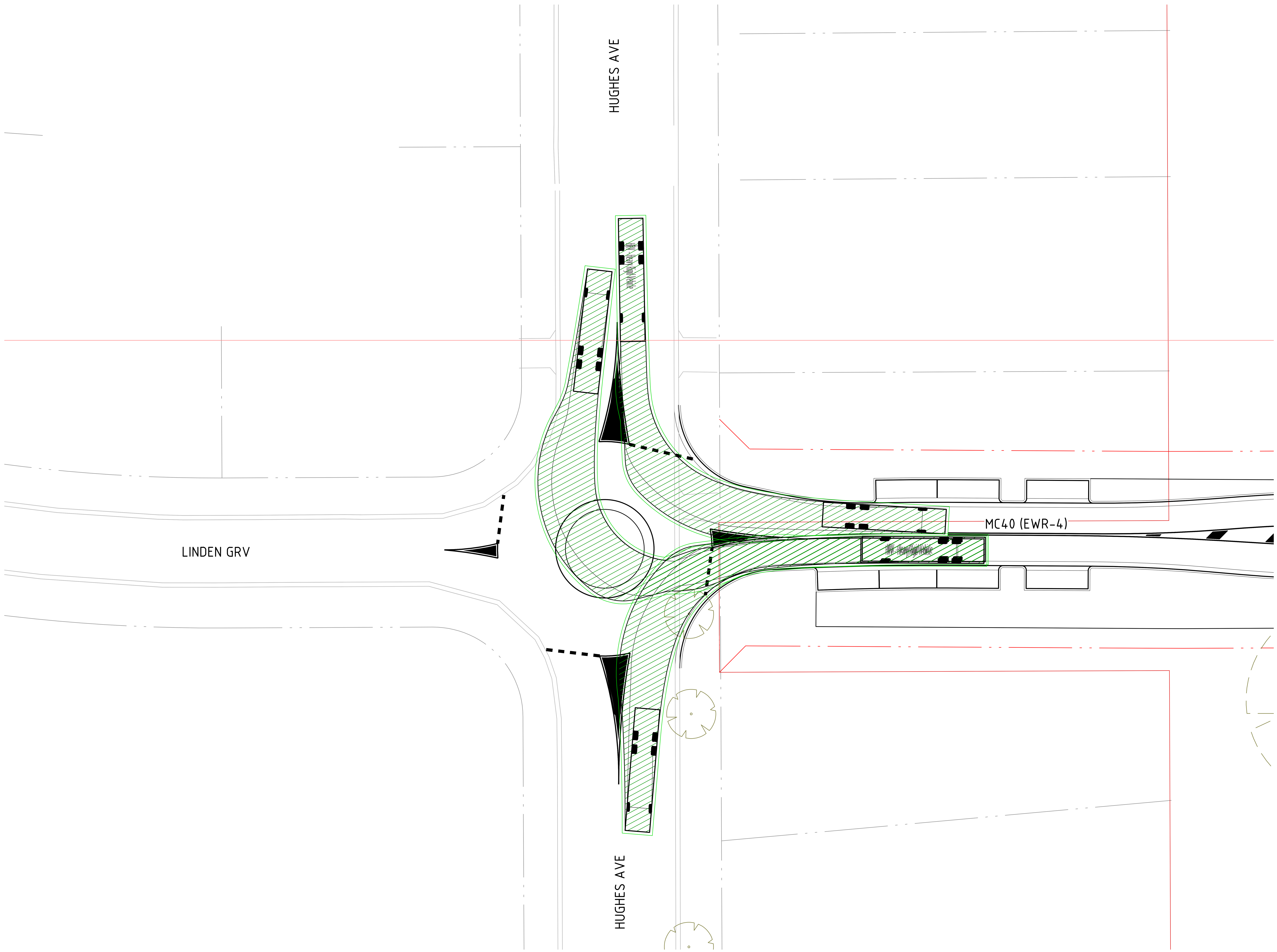
DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 04

JOB NUMBER 150077-60

DRAWING NUMBER C10.04

REVISION 04

DRAWING SHEET SIZE = A1

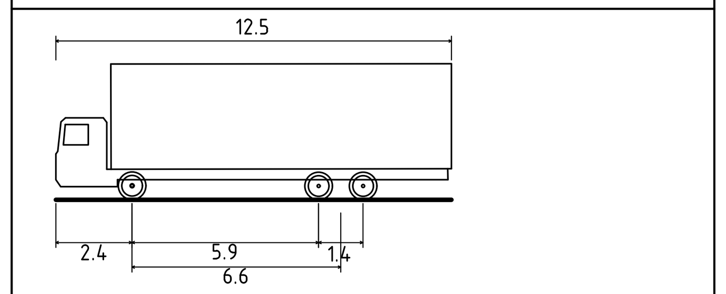


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT: MELROSE PARK INFRASTRUCTURE

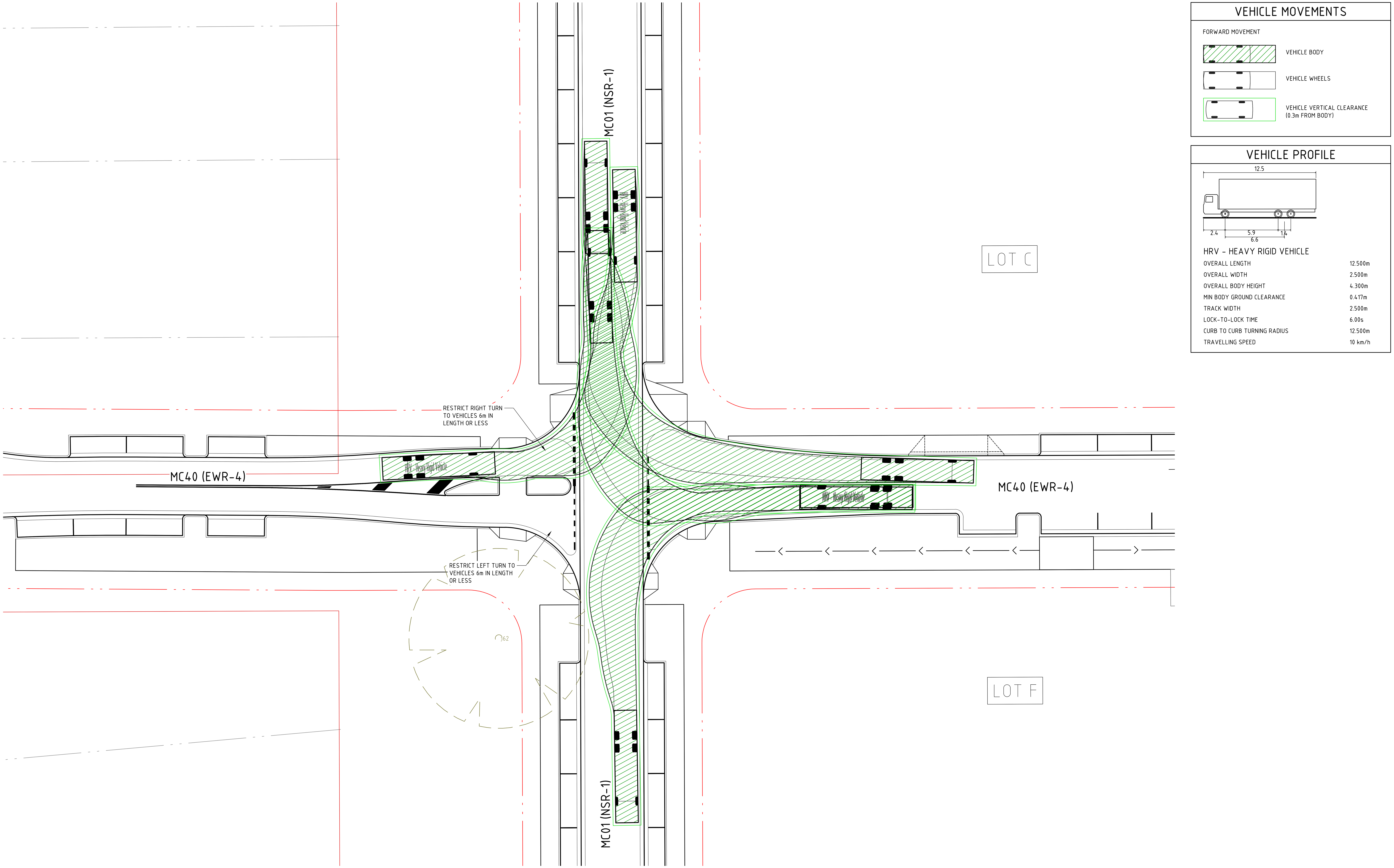
DRAWING TITLE: CIVIL ENGINEERING PACKAGE — SWEPT PATHS PLAN - SHEET 05

JOB NUMBER: 150077-60

DRAWING NUMBER: C10.05

REVISION: 04

DRAWING SHEET SIZE = A1



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DESIGNED: A.RIVETT
JOB MANAGER: P.SUTTON
VERIFIER: -

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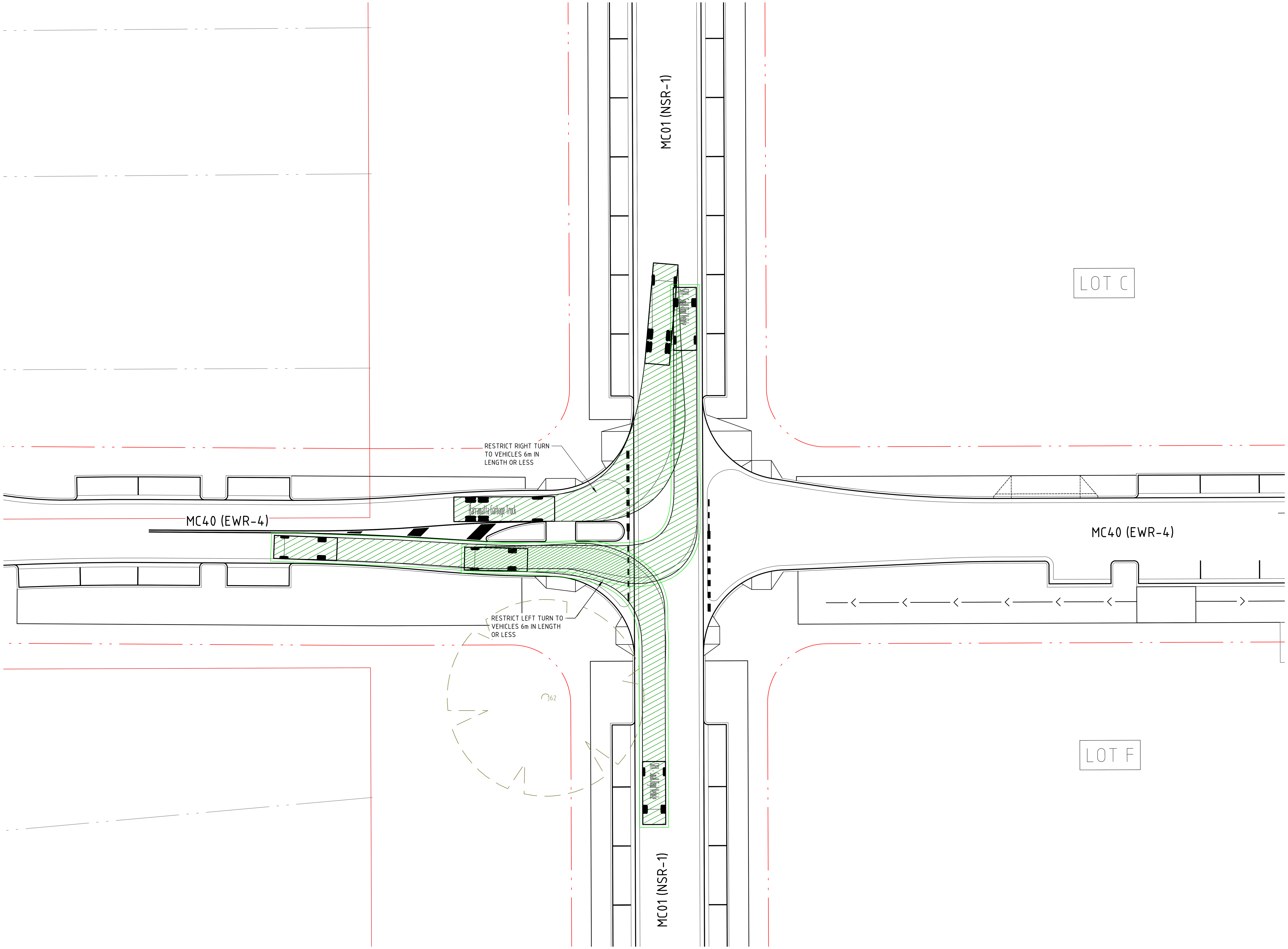
PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 06

JOB NUMBER **150077-60**
DRAWING NUMBER **C10.06**
REVISION **04**
DRAWING SHEET SIZE = A1

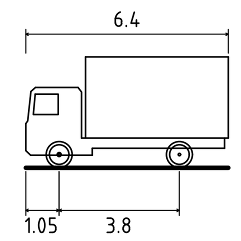


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

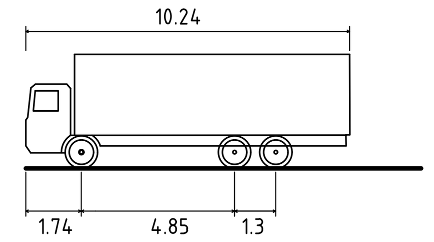
VEHICLE PROFILE



SRV - SMALL RIGID VEHICLE

OVERALL LENGTH	6.400m
OVERALL WIDTH	2.330m
OVERALL BODY HEIGHT	3.500m
MIN BODY GROUND CLEARANCE	0.398m
TRACK WIDTH	2.330m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	7.100m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE



PARRAMATTA GARBAGE TRUCK (10.24 m)

OVERALL LENGTH	10.240m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.490m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

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PROJECT

MELROSE PARK INFRASTRUCTURE

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

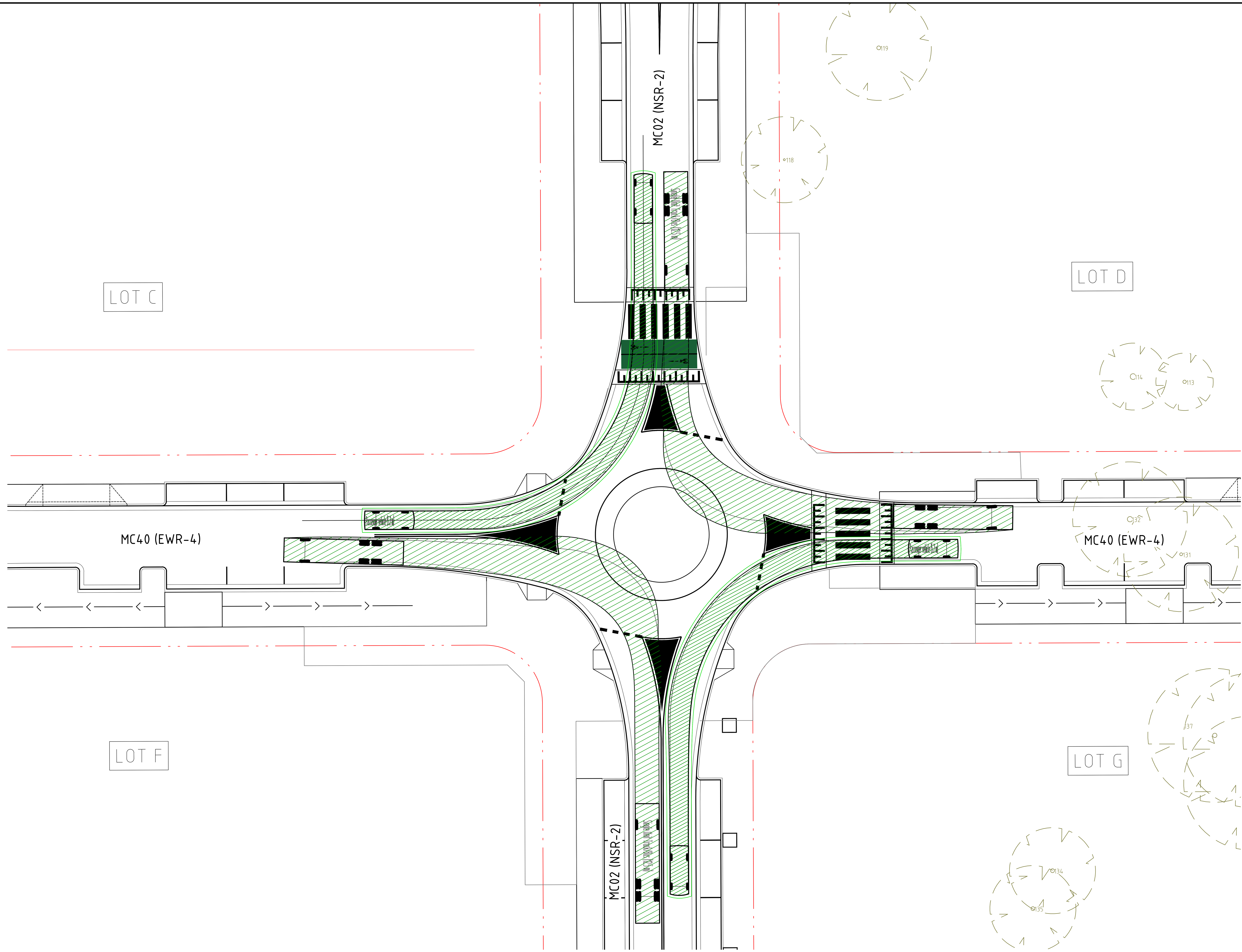
SWEPT PATHS PLAN - SHEET 07

JOB NUMBER 150077-60

DRAWING NUMBER C10.07

REVISION 04

DRAWING SHEET SIZE = A1

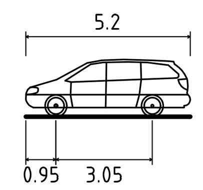


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

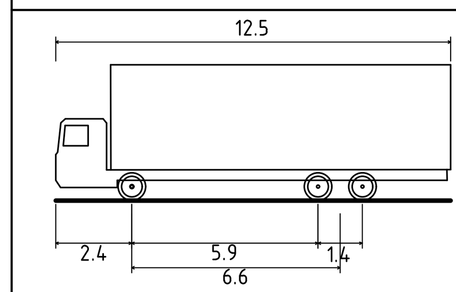
VEHICLE PROFILE



PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA
DESIGNED: A.RIVETT
JOB MANAGER: P.SUTTON
VERIFIER: -

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0 2 4 6 8 10m

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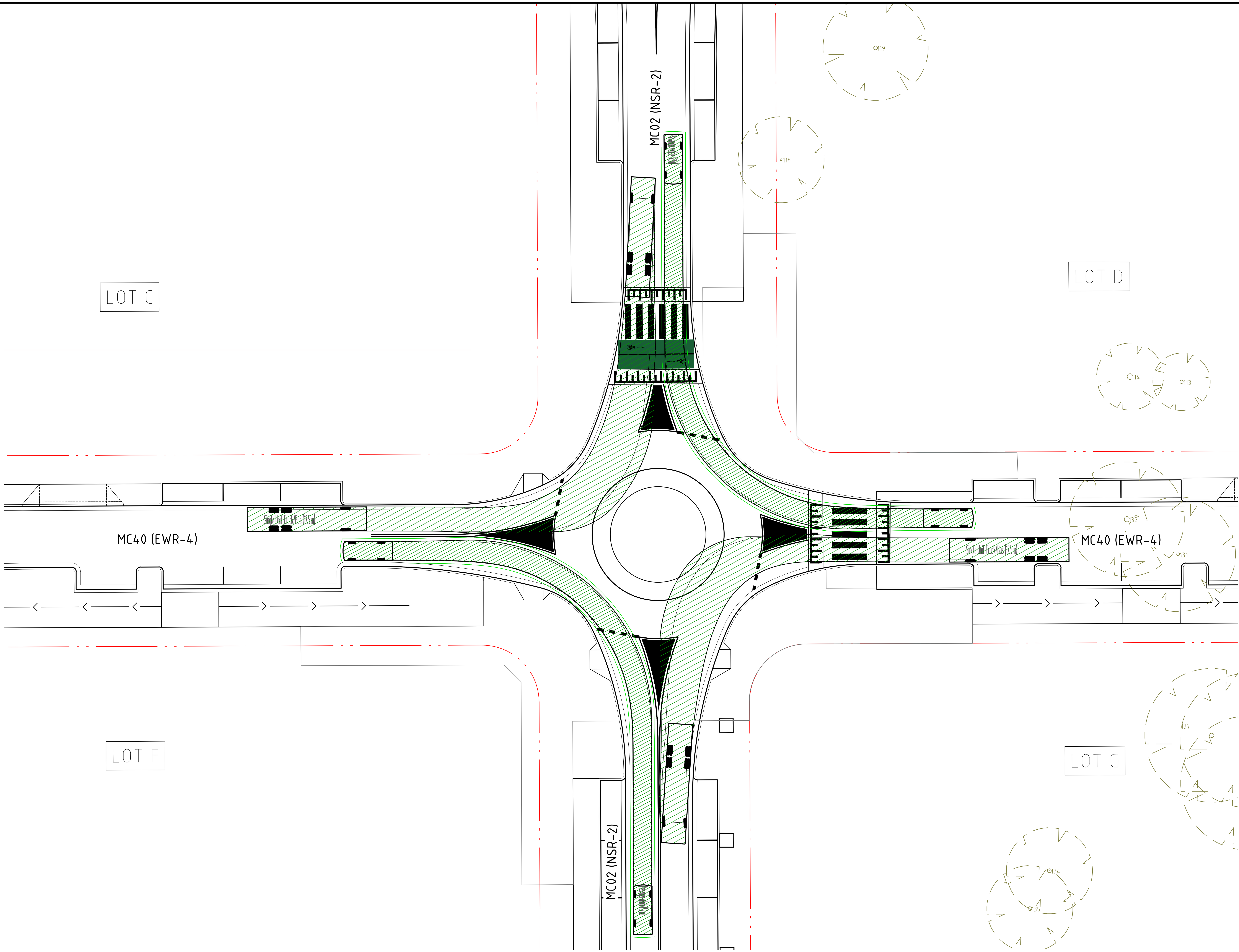
PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 08

JOB NUMBER 150077-60
DRAWING NUMBER C10.08
REVISION 04
DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

FORWARD MOVEMENT

VEHICLE BODY

VEHICLE WHEELS

VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE

5.2

0.95 3.05

PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE

12.5

2.4 5.9 1.4

6.6

HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

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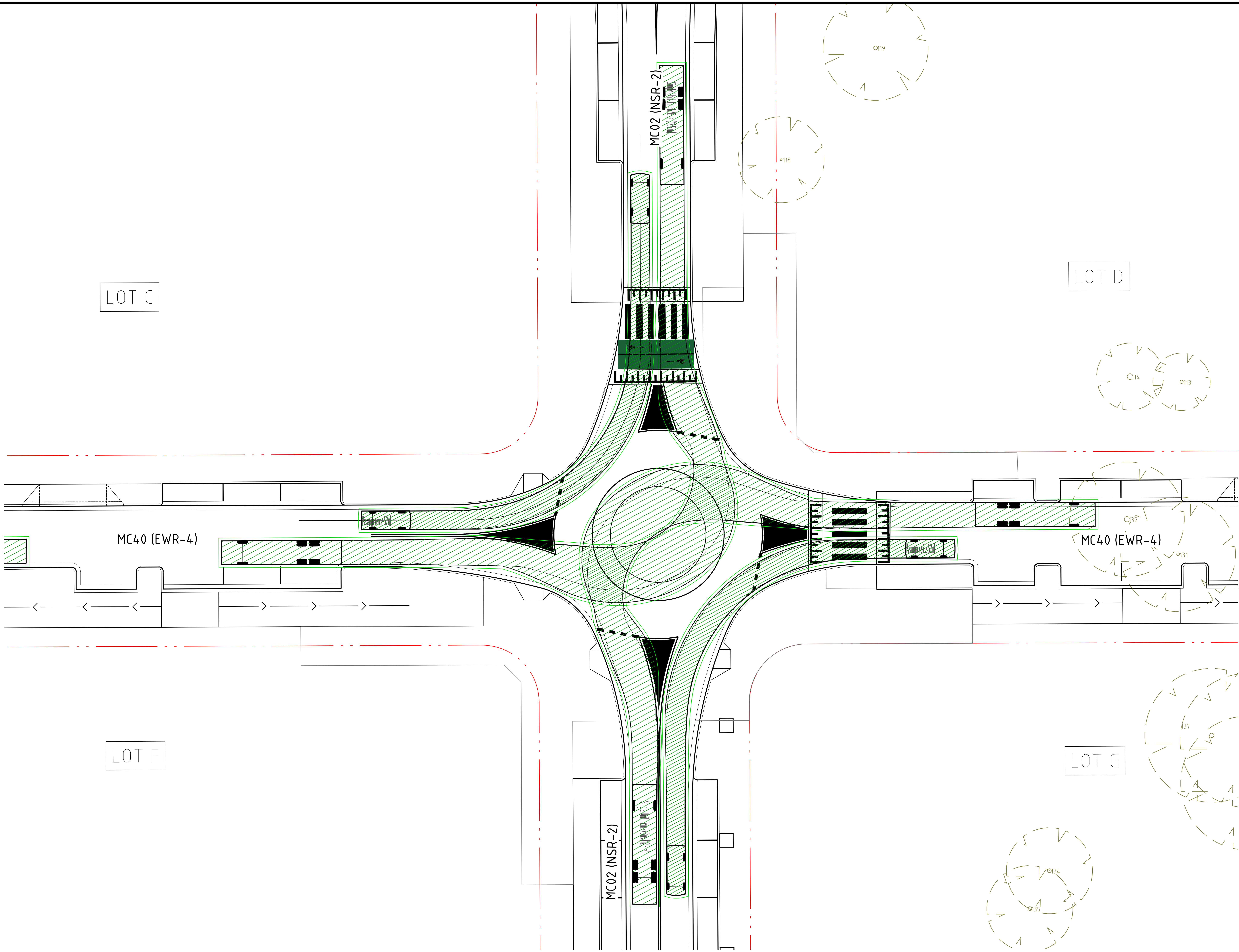
PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 09

JOB NUMBER
150077-60

DRAWING NUMBER **C10.09** REVISION **04**

DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

FORWARD MOVEMENT

VEHICLE BODY

VEHICLE WHEELS

VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE

5.2
0.95 3.05

PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE

12.5
2.4 5.9 1.4
6.6

HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

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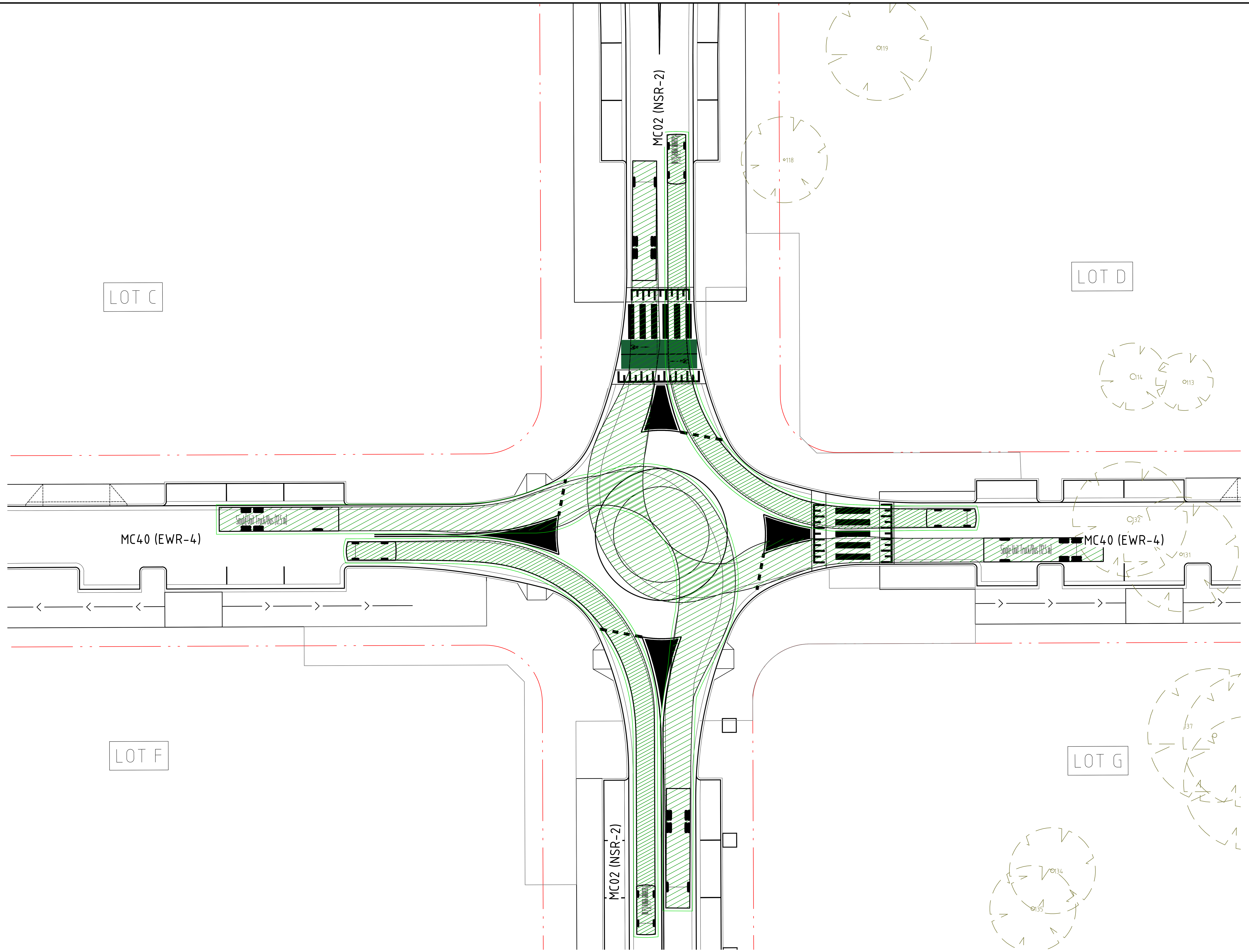
PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 10

JOB NUMBER **150077-60**

DRAWING NUMBER **C10.10** REVISION **04**

DRAWING SHEET SIZE = A1

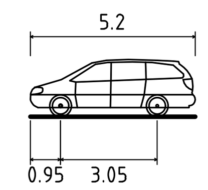


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

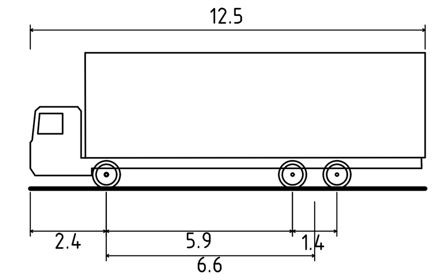
VEHICLE PROFILE



PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

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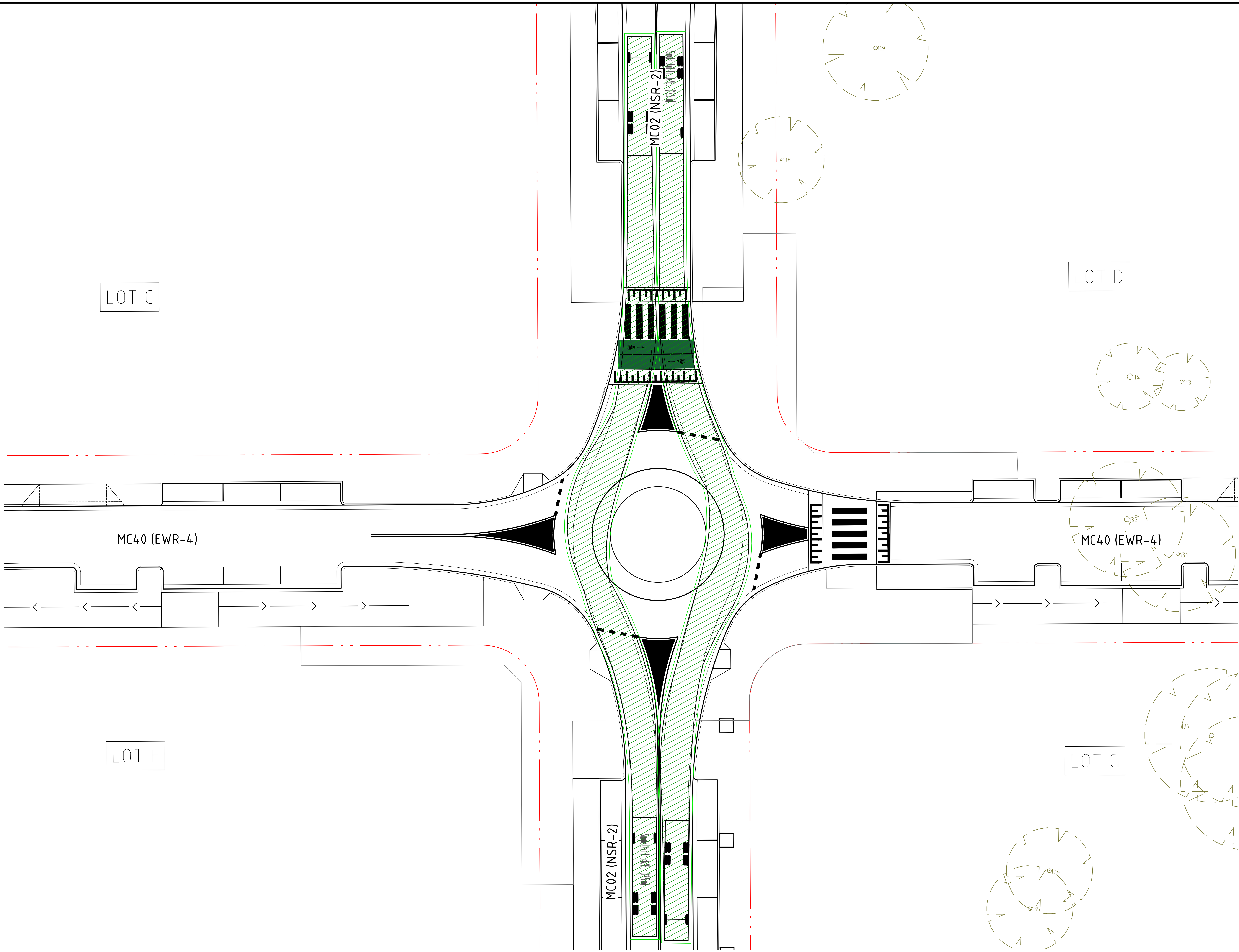
PROJECT
MELROSE PARK INFRASTRUCTURE

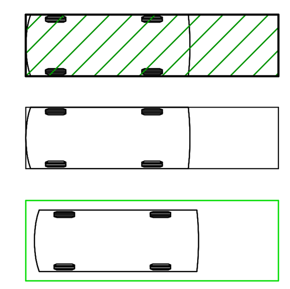
DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 11

JOB NUMBER **150077-60**
DRAWING NUMBER **C10.11**
REVISION **04**
DRAWING SHEET SIZE = A1

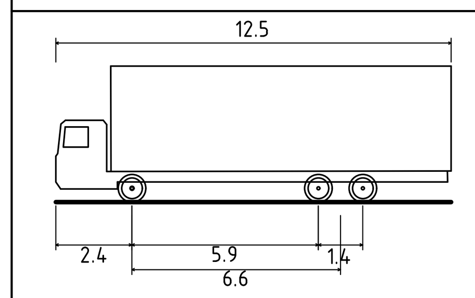


VEHICLE MOVEMENTS

FORWARD MOVEMENT



VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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03	REISSUED FOR DA	BM		AR	24.01.22
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PROJECT
MELROSE PARK INFRASTRUCTURE

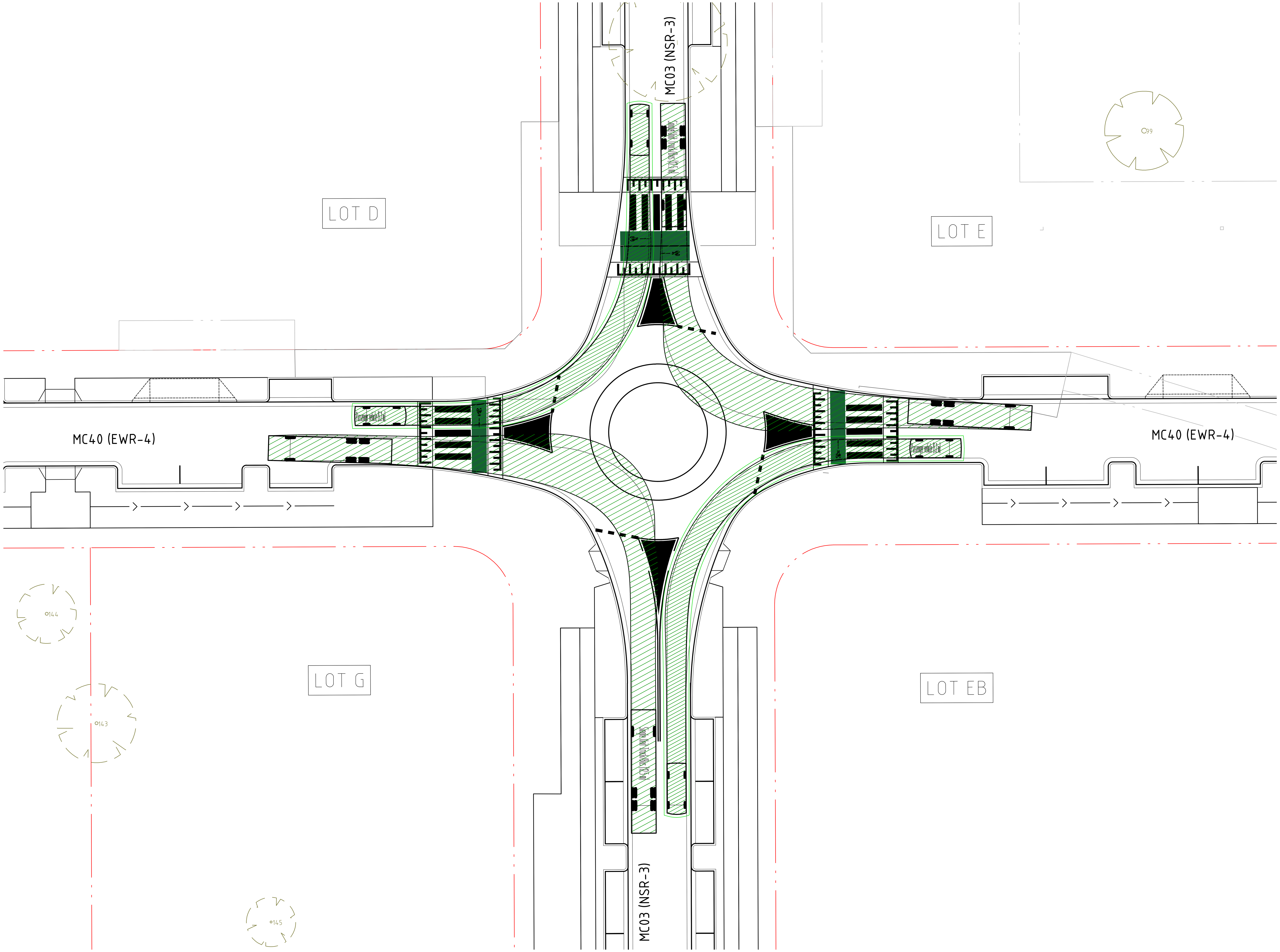
DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 12

JOB NUMBER 150077-60

DRAWING NUMBER C10.12

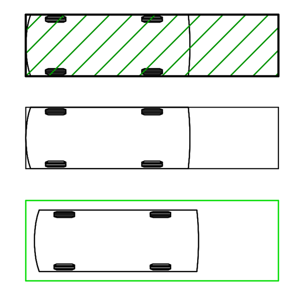
REVISION 04

DRAWING SHEET SIZE = A1

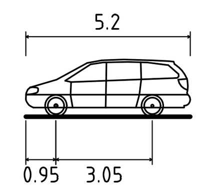


VEHICLE MOVEMENTS

FORWARD MOVEMENT



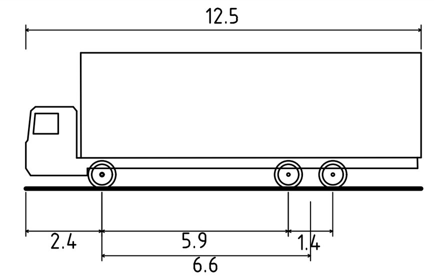
VEHICLE PROFILE



PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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Email sydney@northrop.com.au ABN 81 094 433 100

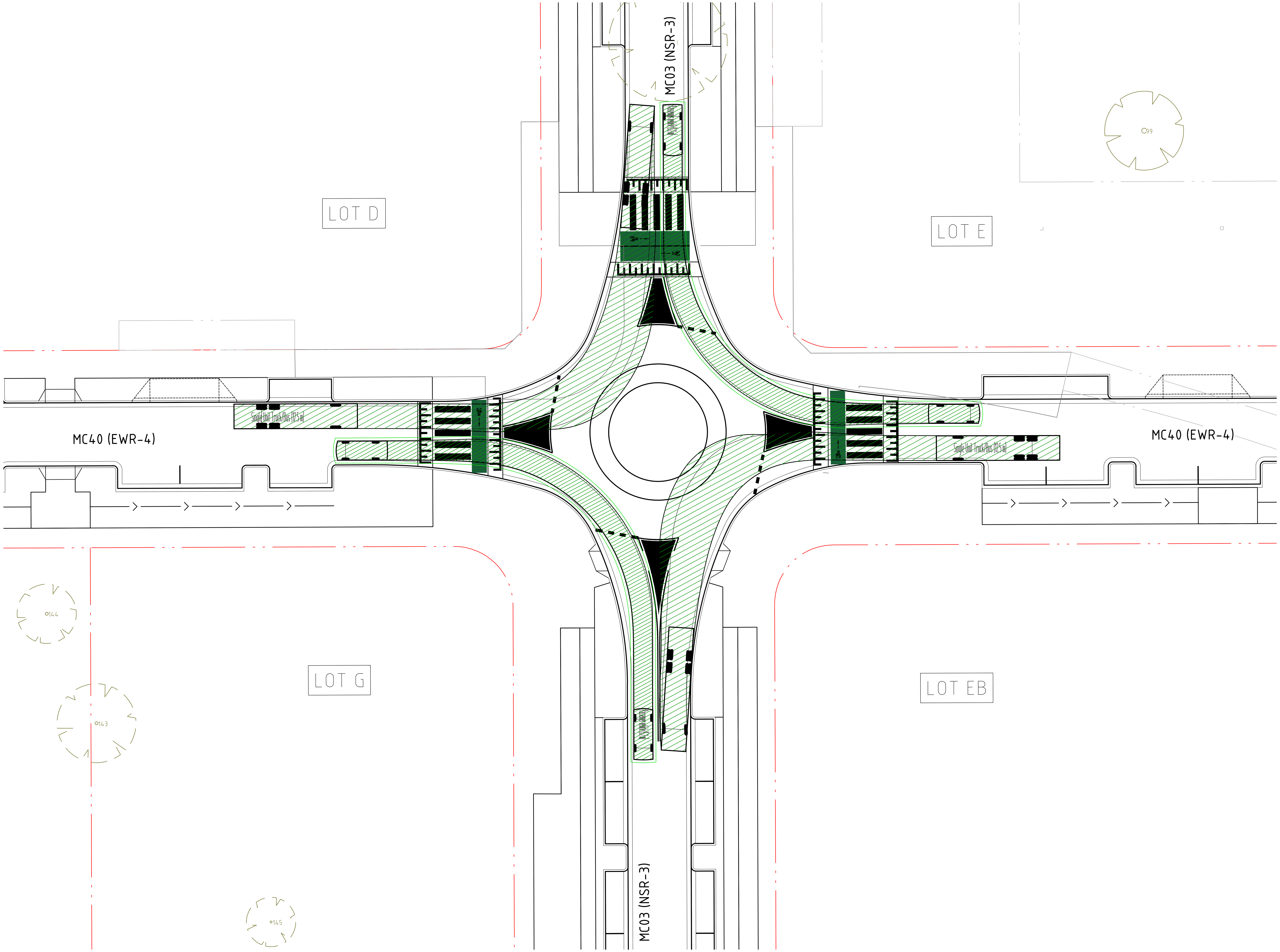
PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 13

JOB NUMBER **150077-60**

DRAWING NUMBER **C10.13** REVISION **04**

DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

FORWARD MOVEMENT

VEHICLE BODY

VEHICLE WHEELS

VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE

5.2

0.95 3.05

PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE

12.5

2.4 5.9 1.4 6.6

HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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PROJECT
MELROSE PARK INFRASTRUCTURE

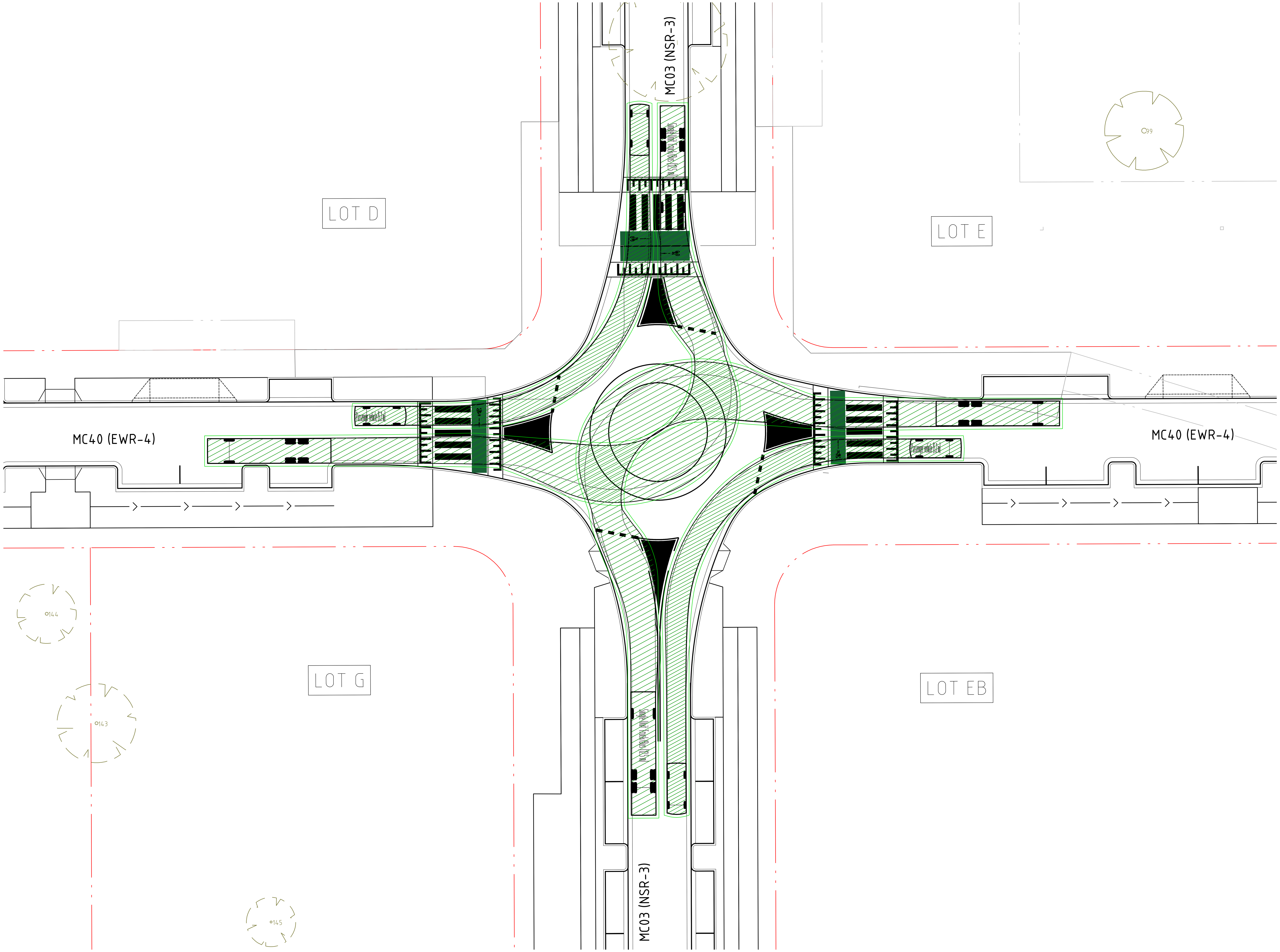
DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 14

JOB NUMBER 150077-60

DRAWING NUMBER C10.14

REVISION 04

DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE

5.2

0.95 3.05

PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE

12.5

2.4 5.9 1.4

6.6

HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
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OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

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PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE

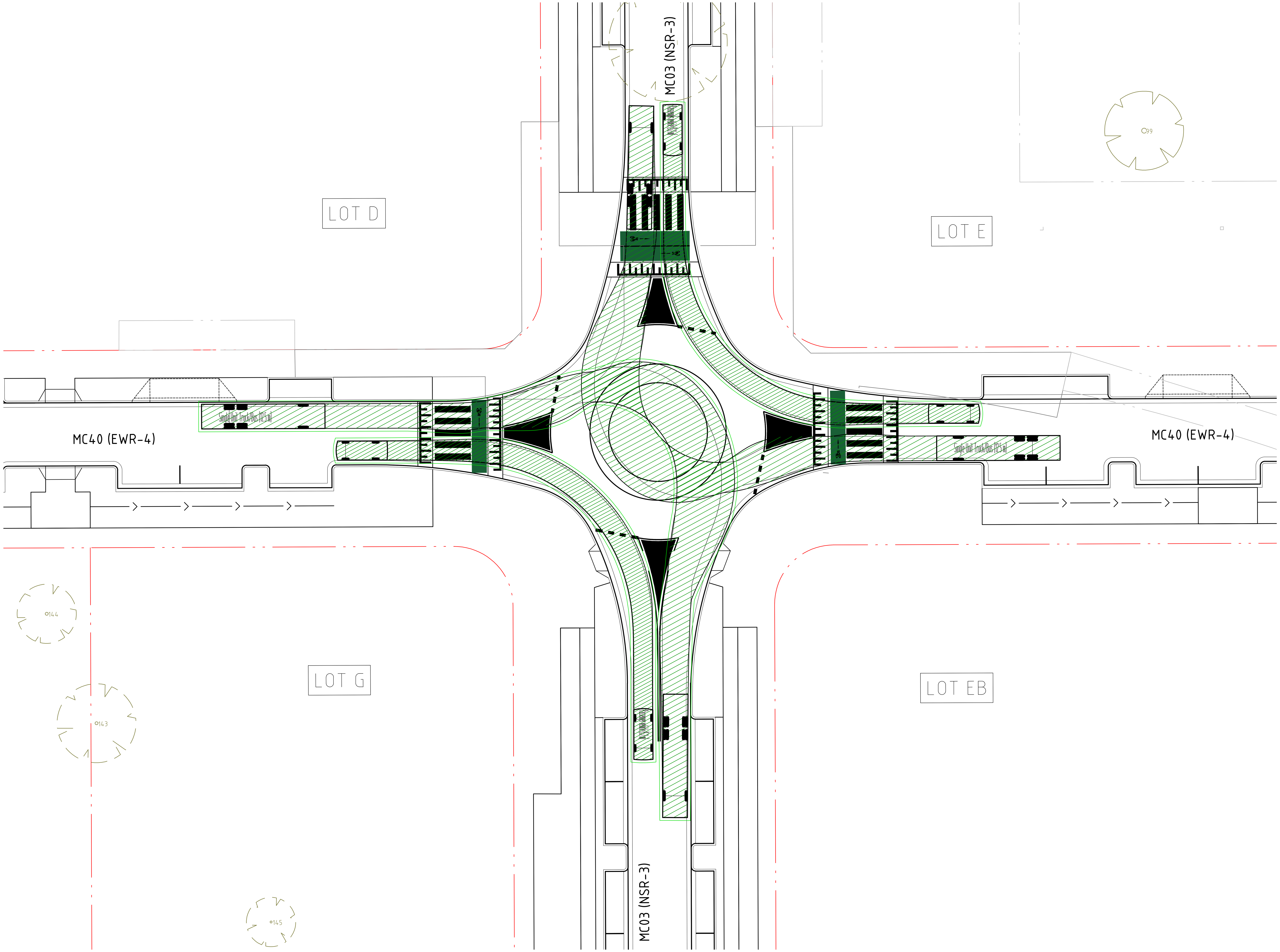
SWEPT PATHS PLAN - SHEET 15

JOB NUMBER 150077-60

DRAWING NUMBER C10.15

REVISION 04

DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

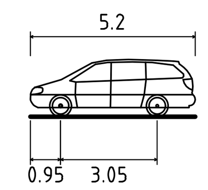
FORWARD MOVEMENT

VEHICLE BODY

VEHICLE WHEELS

VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

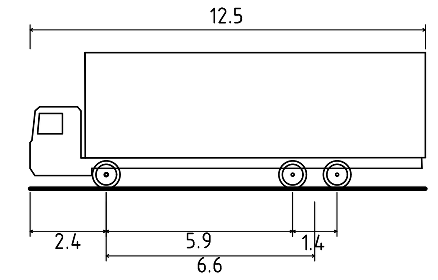
VEHICLE PROFILE



PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

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PROJECT
MELROSE PARK INFRASTRUCTURE

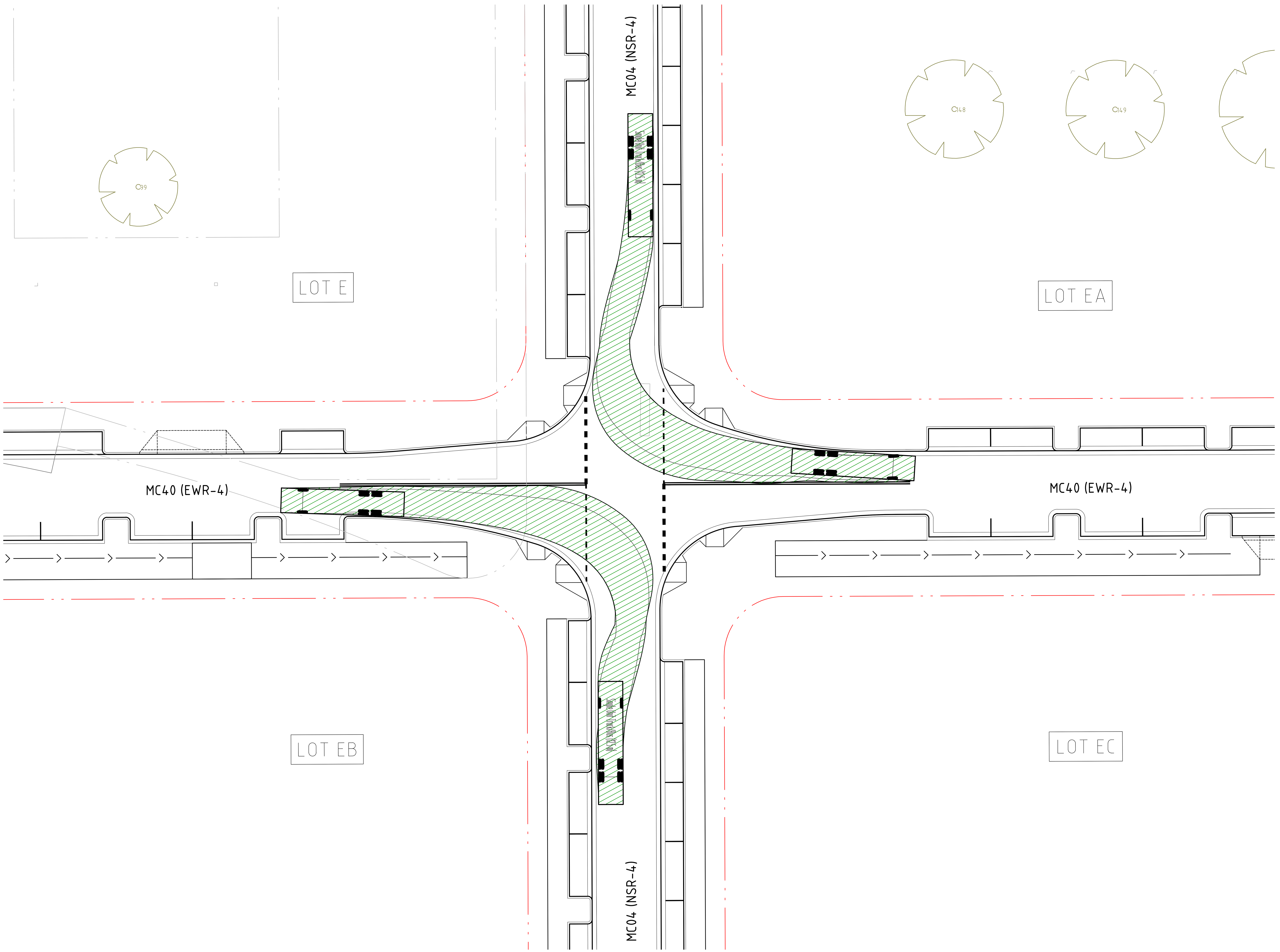
DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 16

JOB NUMBER 150077-60

DRAWING NUMBER C10.16

REVISION 04

DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

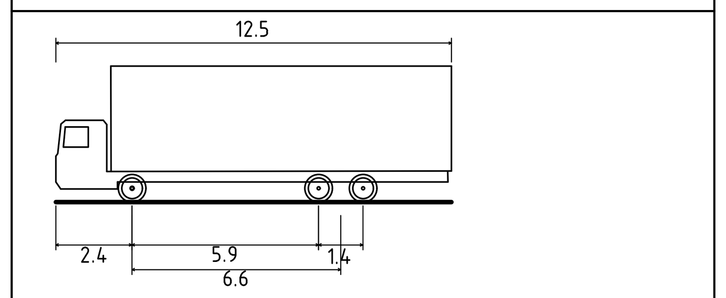
FORWARD MOVEMENT

VEHICLE BODY

VEHICLE WHEELS

VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

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PROJECT: MELROSE PARK INFRASTRUCTURE

DRAWING TITLE: CIVIL ENGINEERING PACKAGE

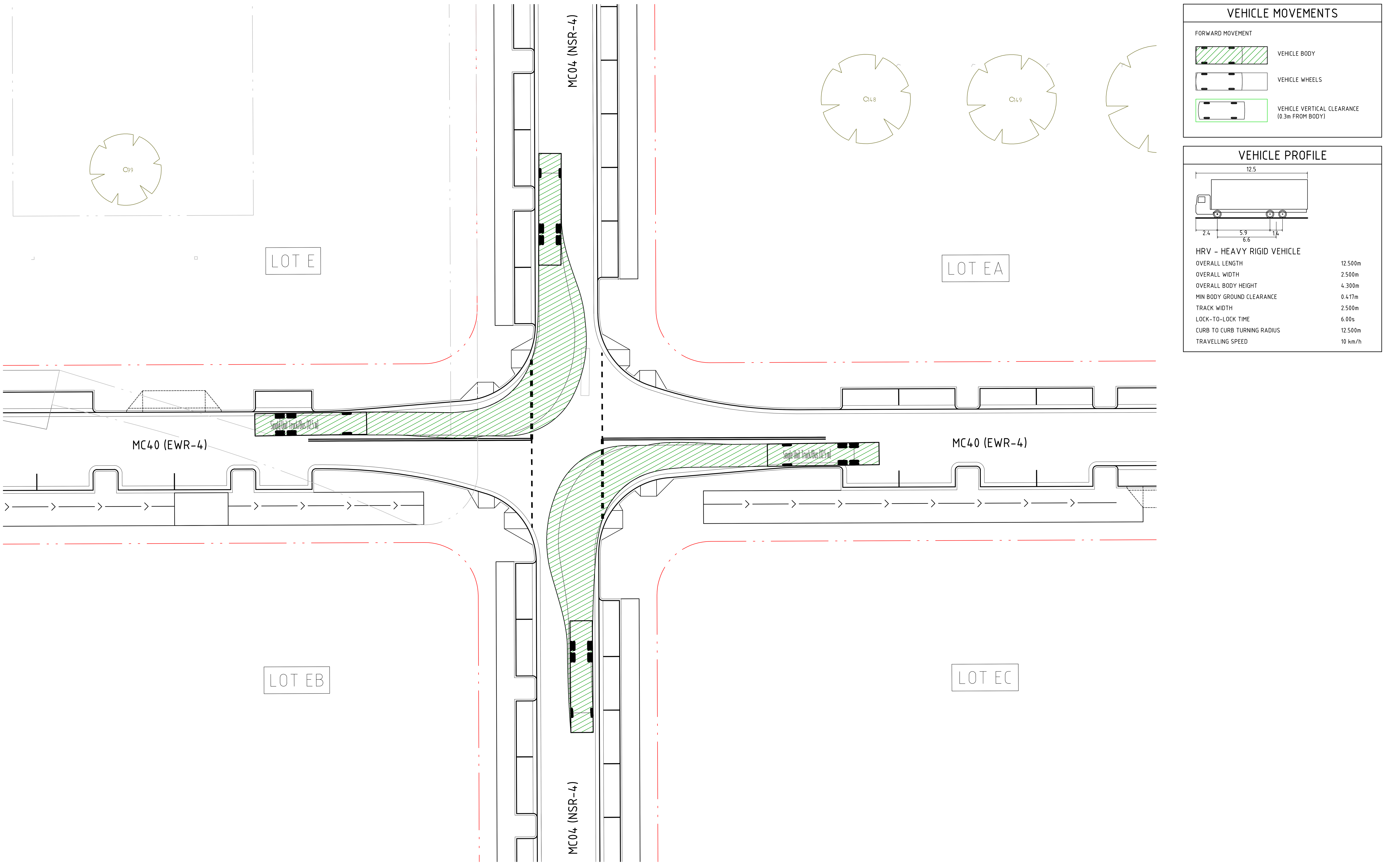
SWEPT PATHS PLAN - SHEET 17

JOB NUMBER: 150077-60

DRAWING NUMBER: C10.17

REVISION: 04

DRAWING SHEET SIZE = A1



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PROJECT
MELROSE PARK INFRASTRUCTURE

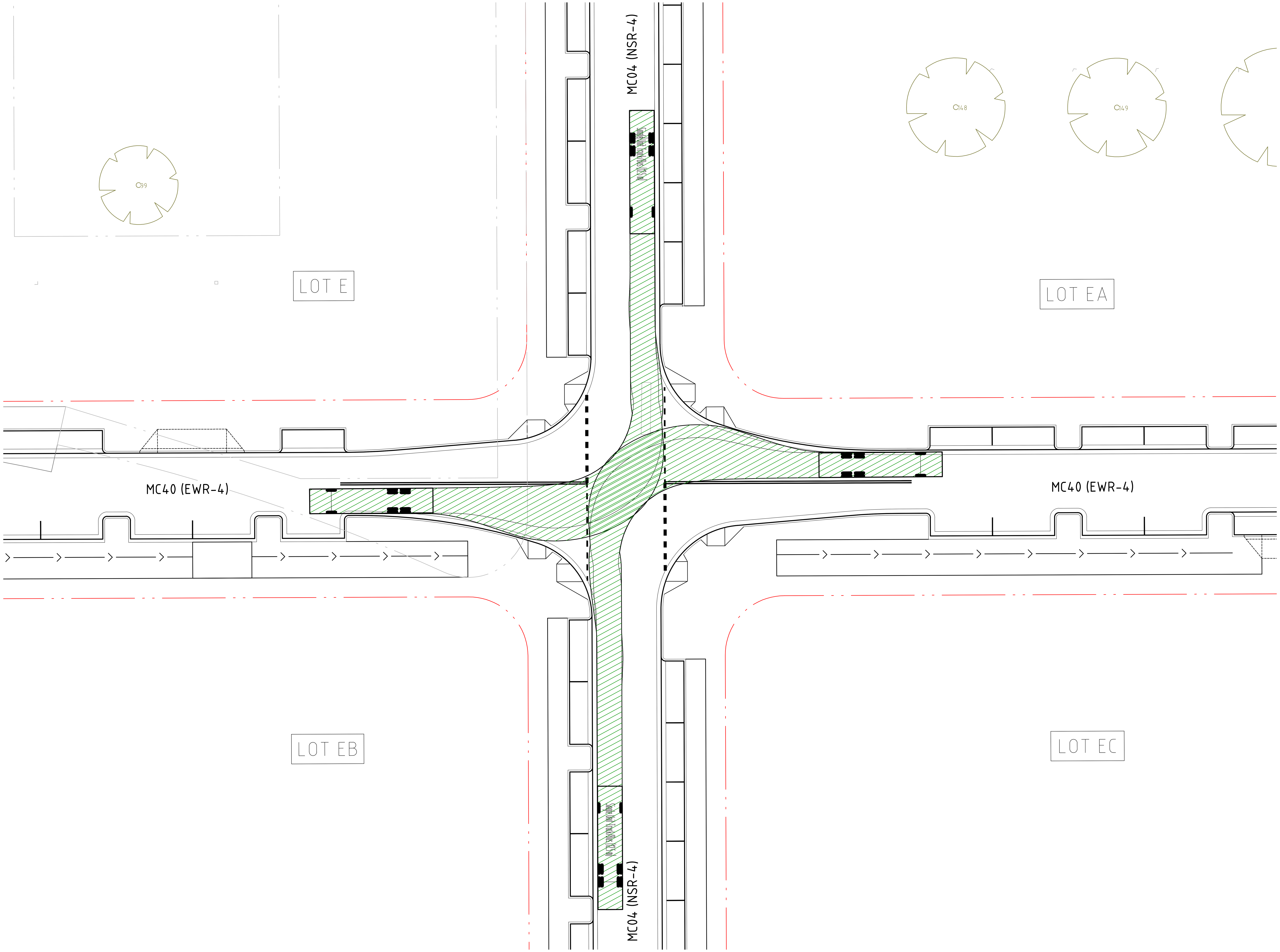
DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 18

JOB NUMBER 150077-60

DRAWING NUMBER C10.18

REVISION 04

DRAWING SHEET SIZE = A1

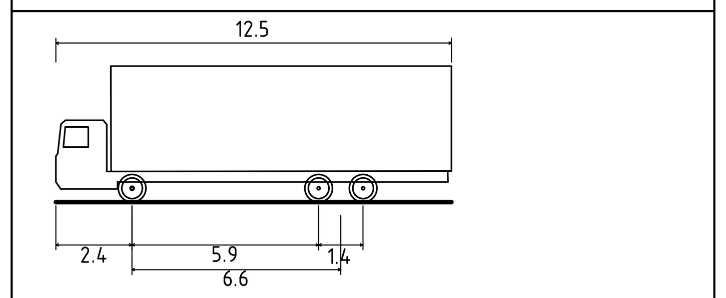


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

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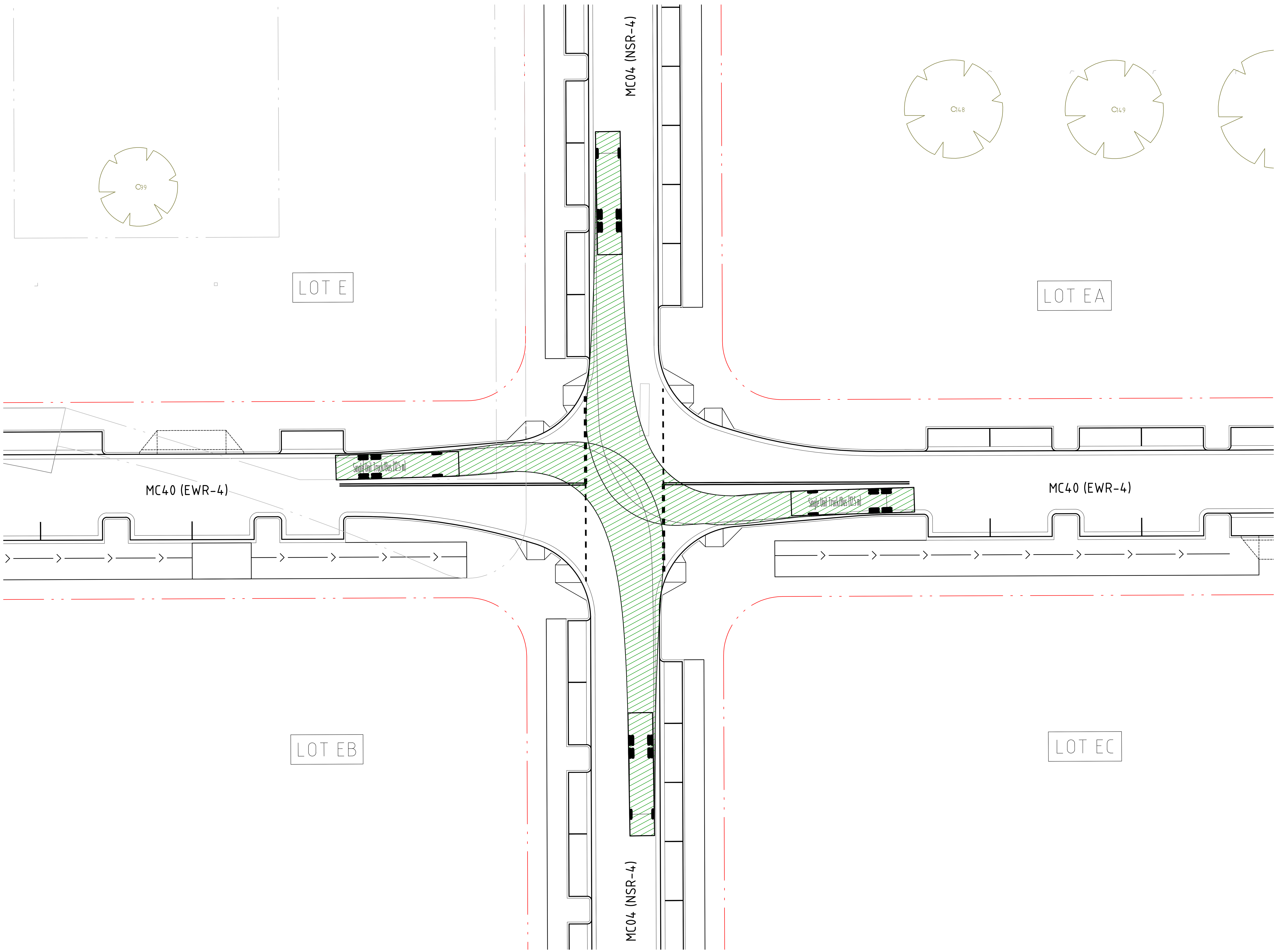
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 19

JOB NUMBER **150077-60**

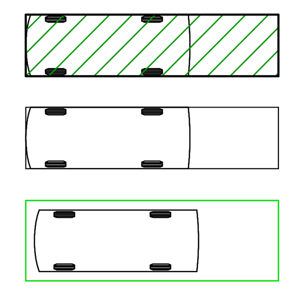
DRAWING NUMBER **C10.19** REVISION **04**

DRAWING SHEET SIZE = A1

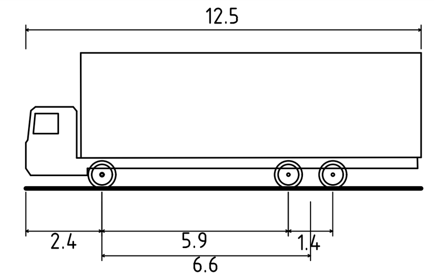


VEHICLE MOVEMENTS

FORWARD MOVEMENT



VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

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OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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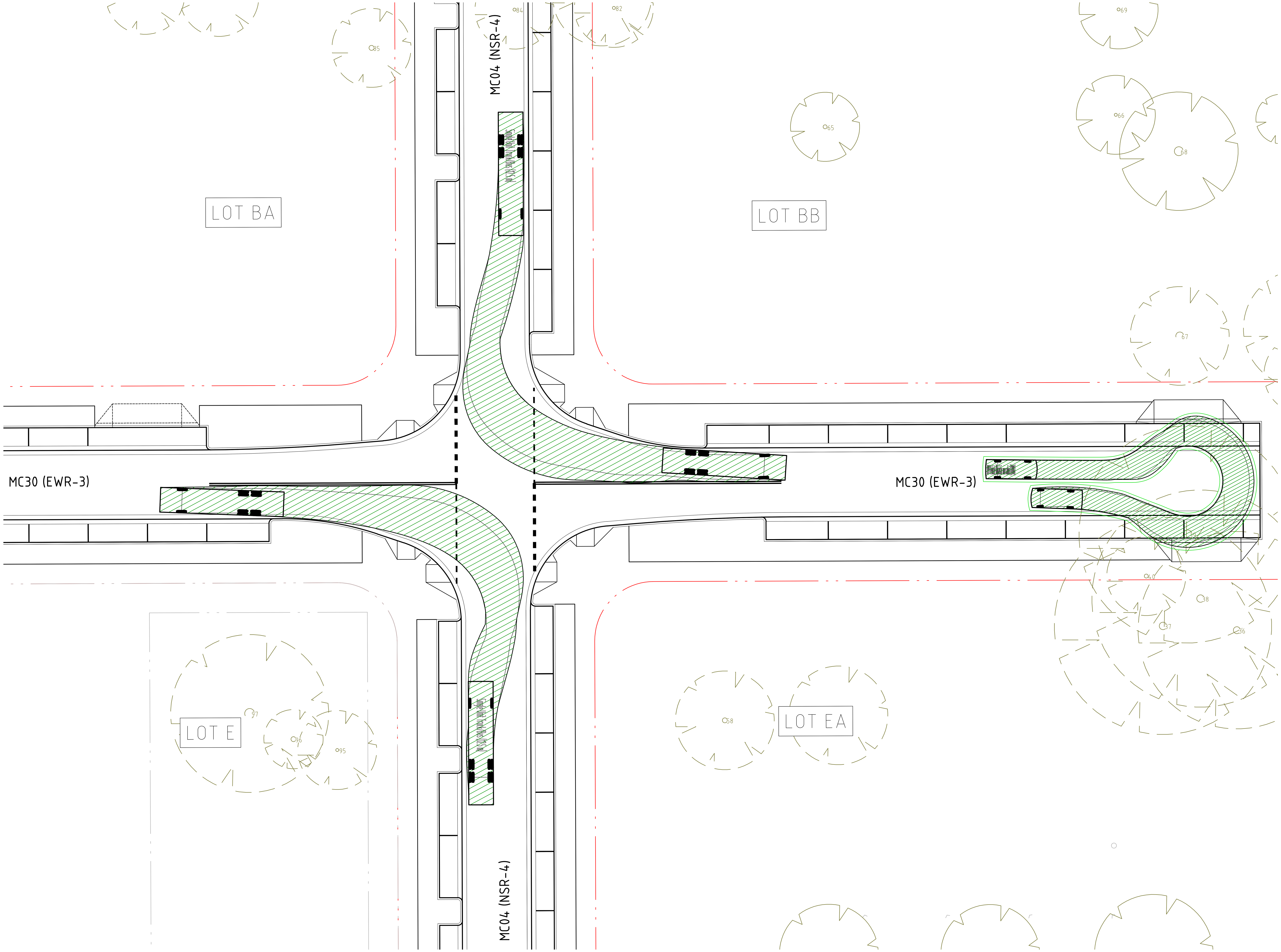
PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 20

JOB NUMBER 150077-60
DRAWING NUMBER C10.20
REVISION 04
DRAWING SHEET SIZE = A1

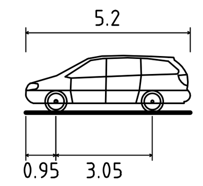


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



PASSENGER VEHICLE (5.2 m)

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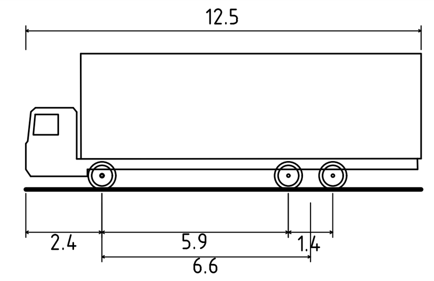
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

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OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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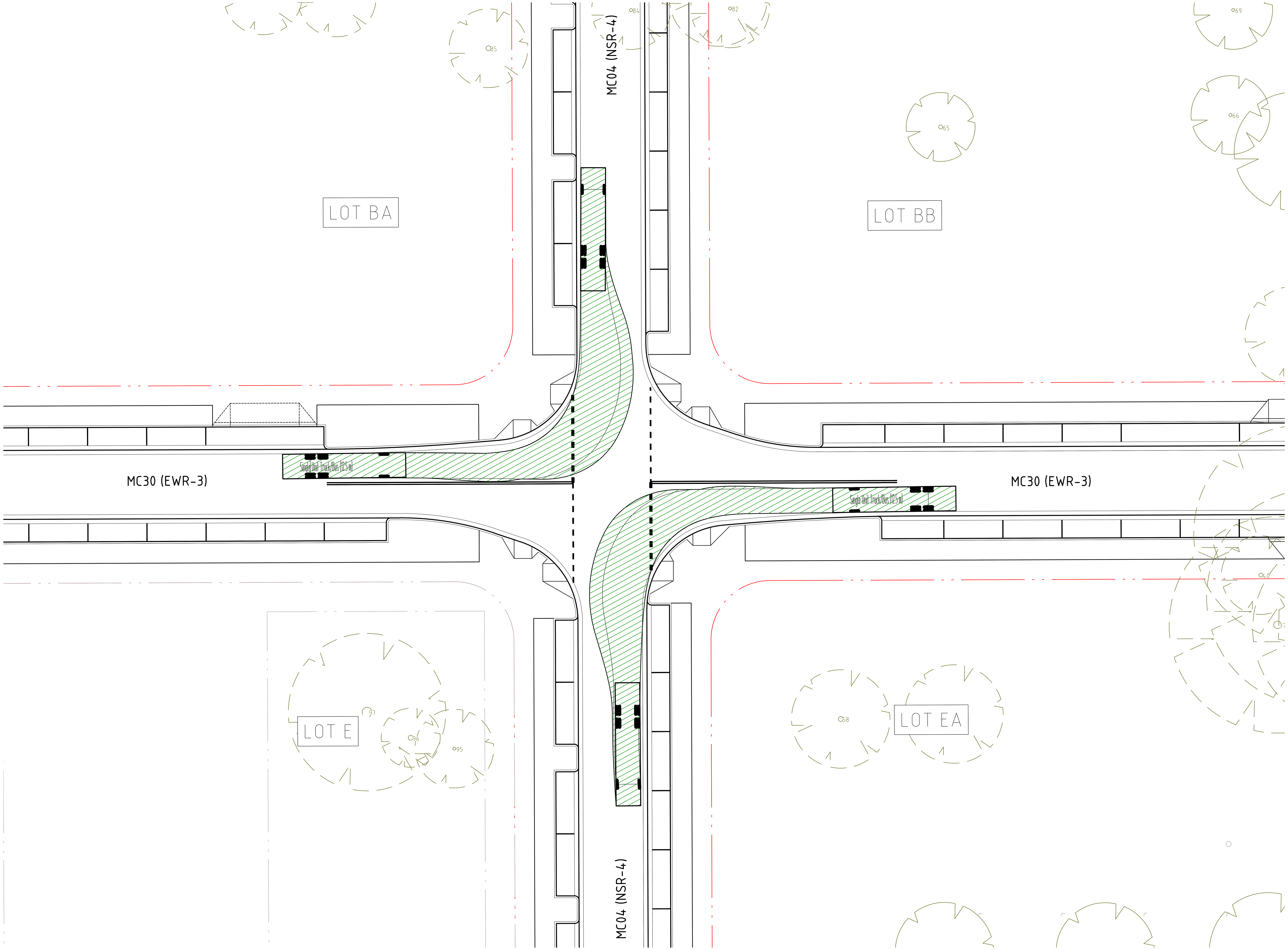
PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 21

JOB NUMBER 150077-60
DRAWING NUMBER C10.21
REVISION 04
DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

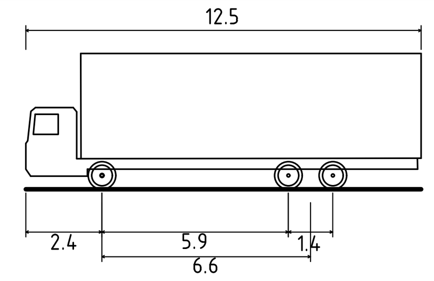
FORWARD MOVEMENT

VEHICLE BODY

VEHICLE WHEELS

VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR CLIENT REVIEW	BM		AR	26.11.21
02	ISSUED FOR DA	BM		AR	29.11.21
03	REISSUED FOR DA	BM		AR	24.01.22
04	DRAFT FOR INFORMATION	AS		AR	02.12.22

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PROJECTS

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ARCHITECT

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NORTHROP
Sydney
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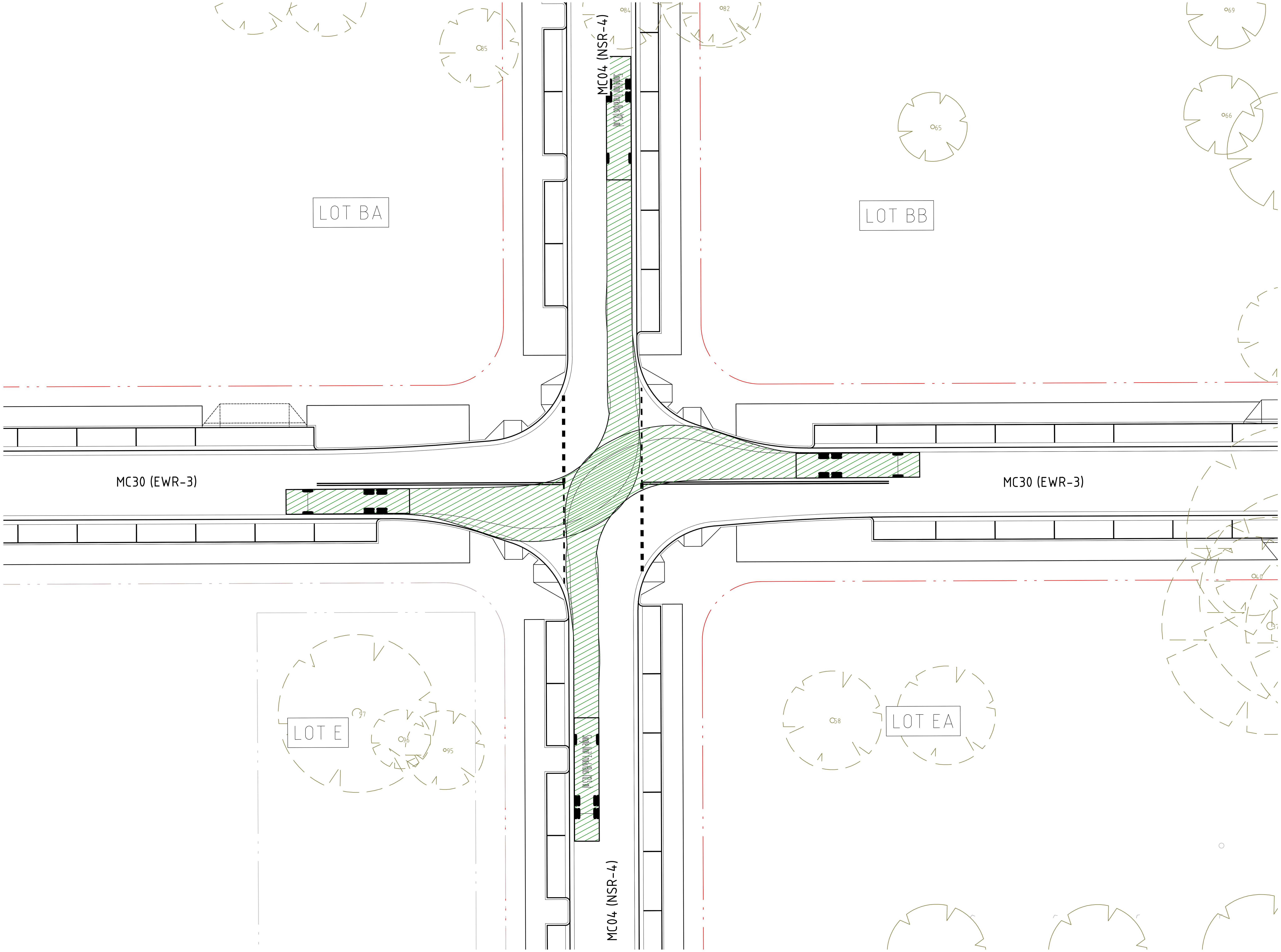
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 22

JOB NUMBER	DRAWING NUMBER	REVISION
150077-60	C10.22	04

DRAWING SHEET SIZE = A1

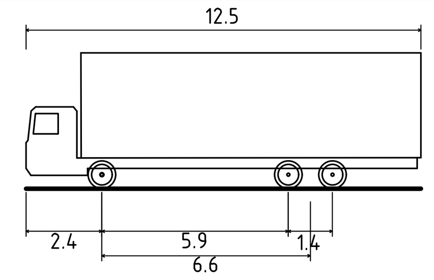


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA   DESIGNED: A.RIVETT   JOB MANAGER: P.SUTTON   VERIFIER: -

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03	REISSUED FOR DA	BM		AR	24.01.22
04	DRAFT FOR INFORMATION	AS		AR	02.12.22

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ARCHITECT

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PROJECT: MELROSE PARK INFRASTRUCTURE

DRAWING TITLE: CIVIL ENGINEERING PACKAGE

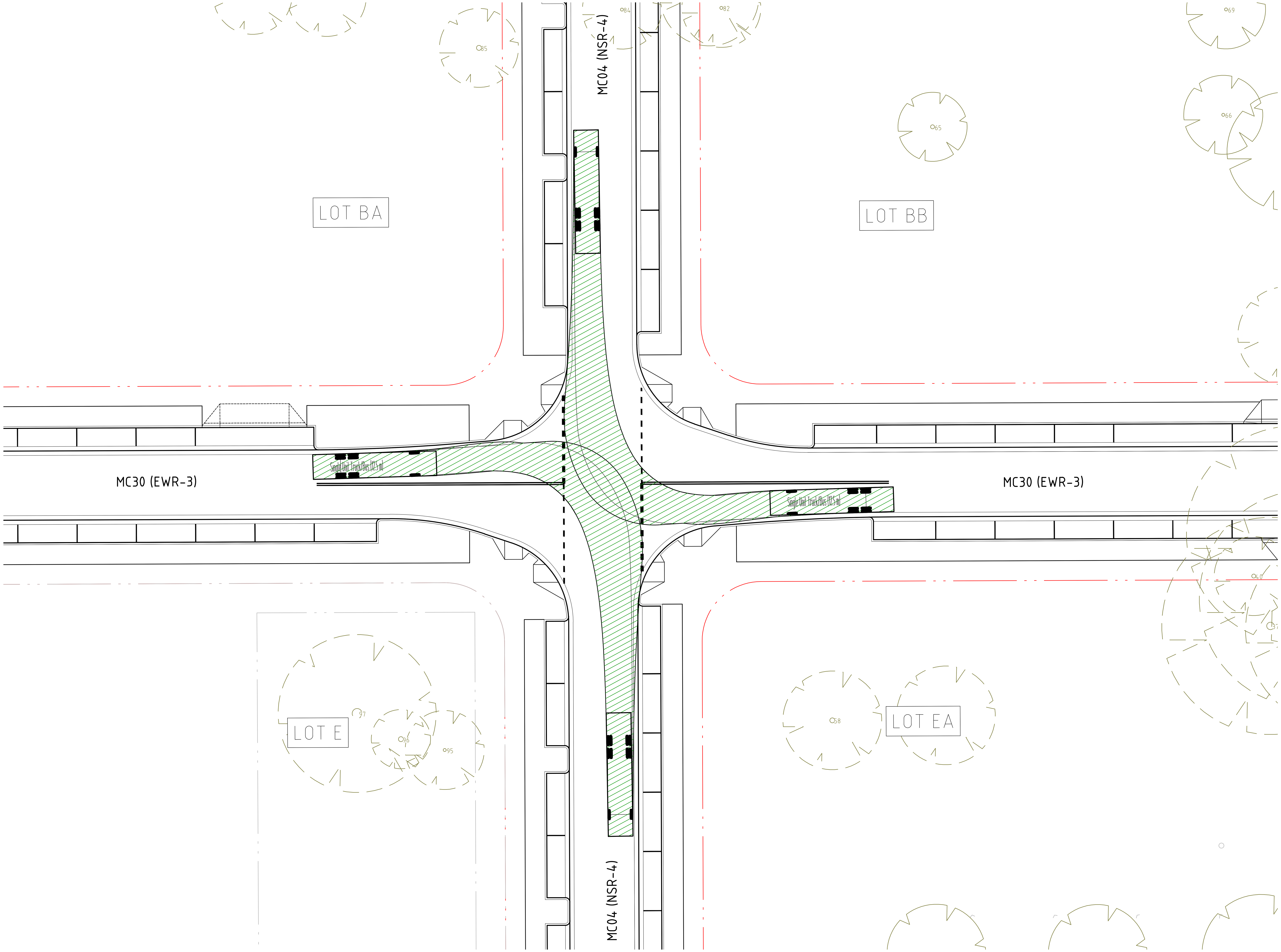
SWEPT PATHS PLAN - SHEET 23

JOB NUMBER: 150077-60

DRAWING NUMBER: C10.23

REVISION: 04

DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

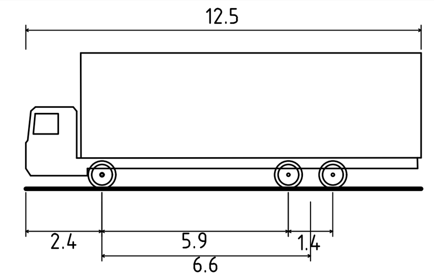
FORWARD MOVEMENT

VEHICLE BODY

VEHICLE WHEELS

VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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PROJECT
MELROSE PARK INFRASTRUCTURE

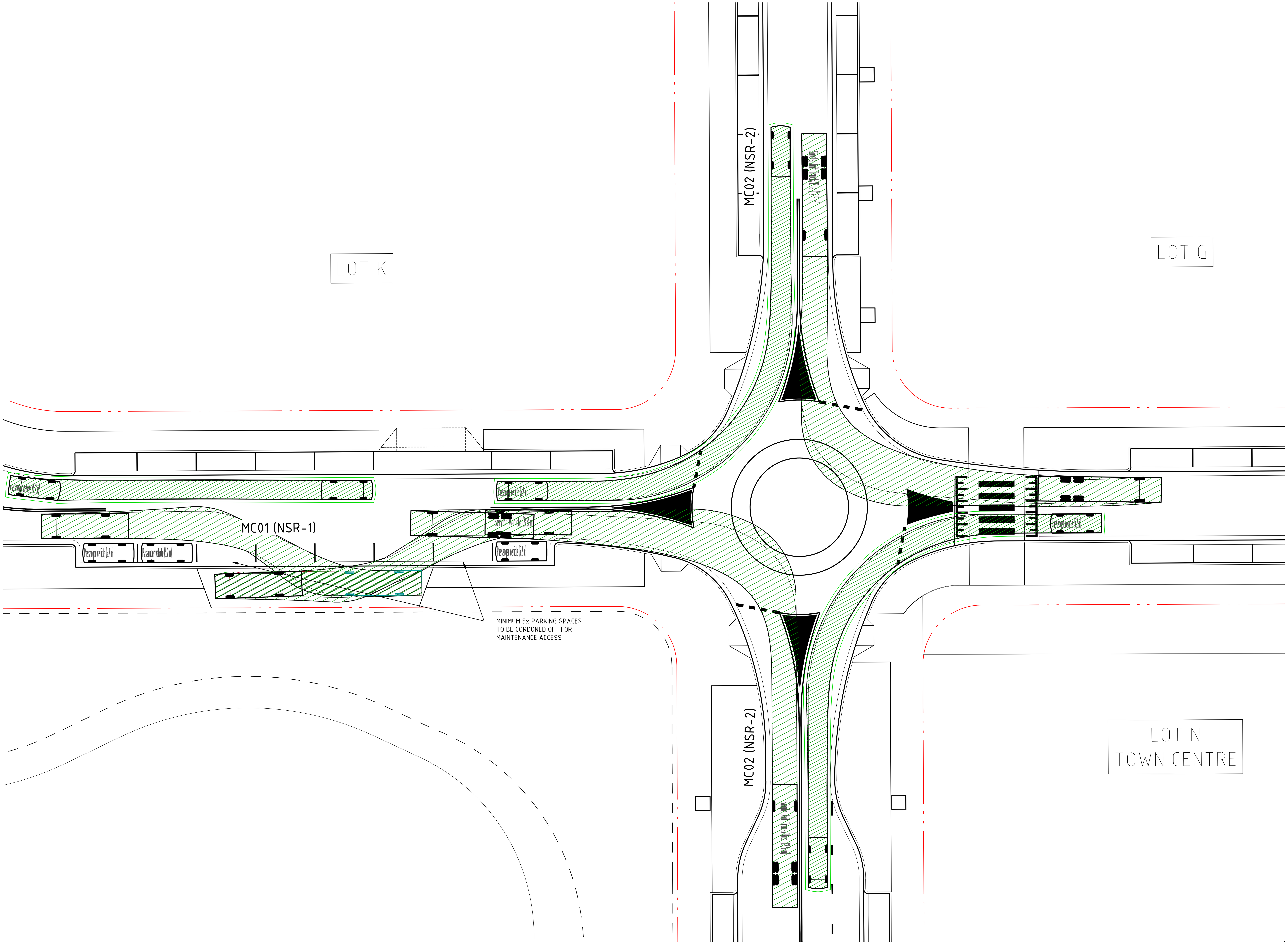
DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 24

JOB NUMBER
150077-60

DRAWING NUMBER
C10.24

REVISION
04

DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE

5.2
0.95 3.05

PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE

12.5
2.4 5.9 1.4
6.6

HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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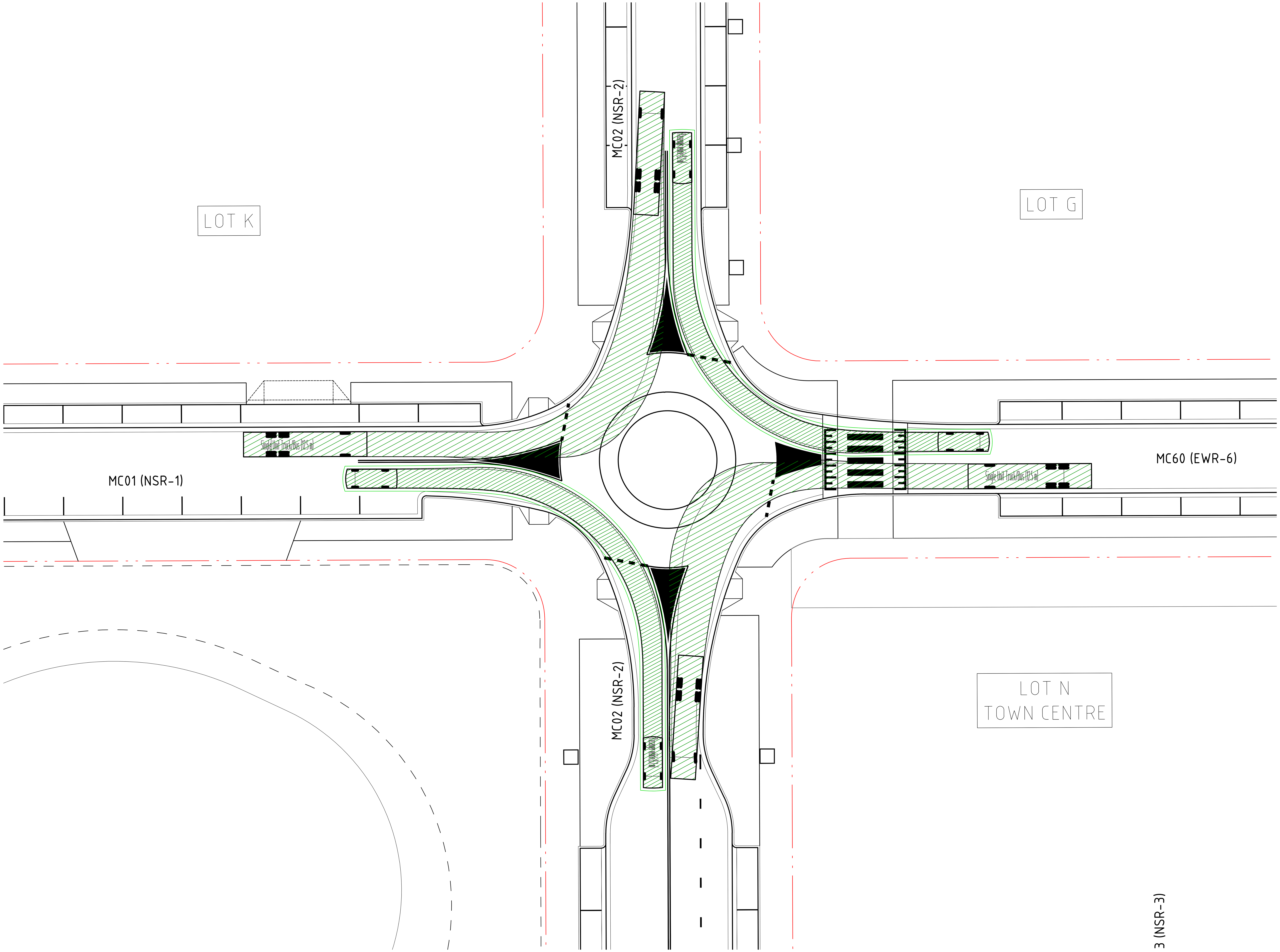
PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 25

JOB NUMBER **150077-60**
DRAWING NUMBER **C10.25**
REVISION **04**
DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE

5.2
0.95 3.05

PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE

12.5
2.4 5.9 1.4
6.6

HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA
DESIGNED: A.RIVETT
JOB MANAGER: P.SUTTON
VERIFIER: -

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PROJECTS
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ARCHITECT

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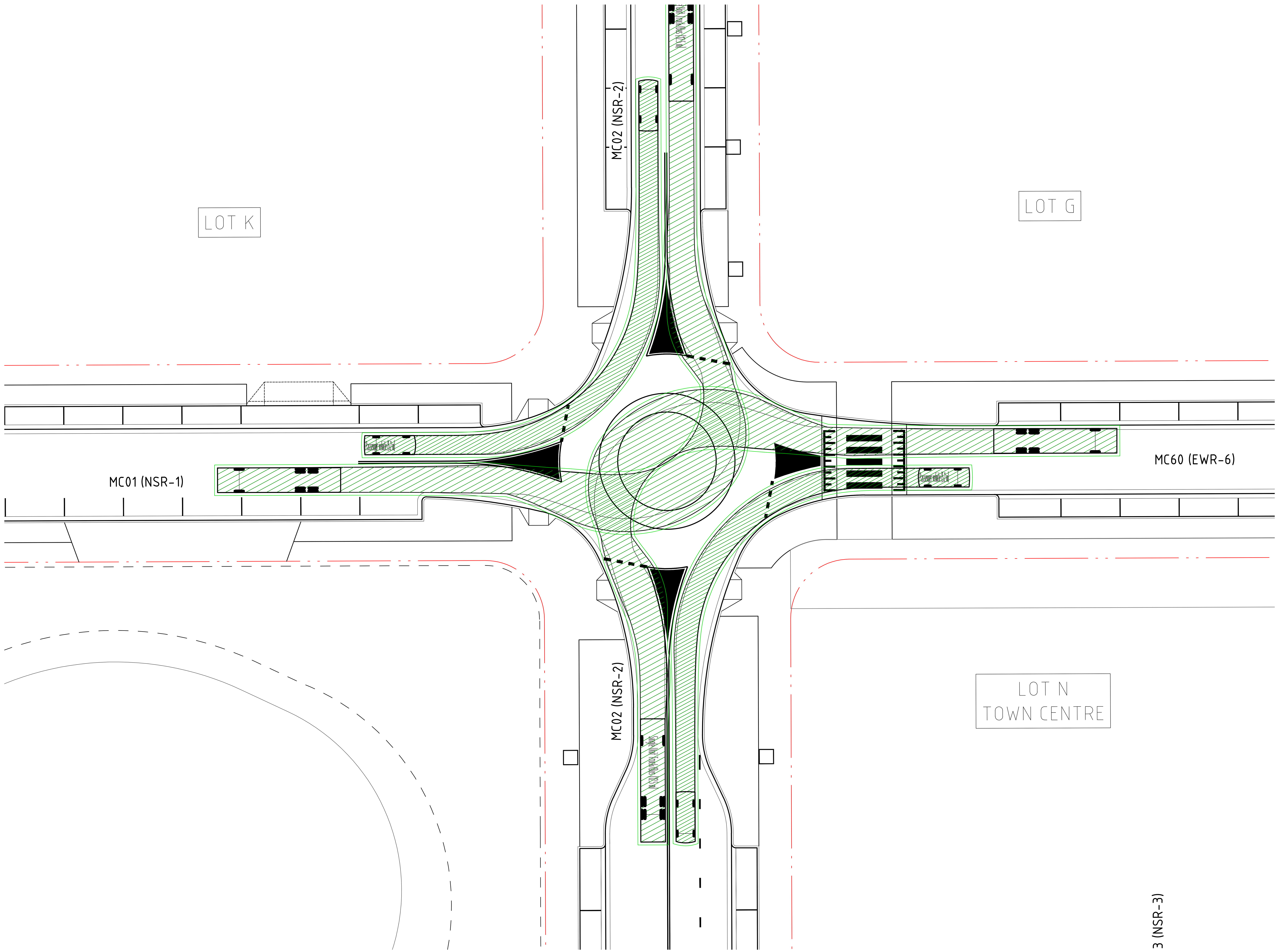
PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 26

JOB NUMBER 150077-60
DRAWING NUMBER C10.26
REVISION 04
DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE

5.2
0.95 3.05

PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE

12.5
2.4 5.9 1.4
6.6

HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

VERIFIER: -
JOB MANAGER: P.SUTTON
DESIGNED: A.RIVETT
DRAWN: B.MAZZA

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR CLIENT REVIEW	BM		AR	26.11.21
02	ISSUED FOR DA	BM		AR	29.11.21
03	REISSUED FOR DA	BM		AR	24.01.22
04	DRAFT FOR INFORMATION	AS		AR	02.12.22

CLIENT

PROJECTS

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ARCHITECT

SCALE 1:200@ A1
0 2 4 6 8 10m

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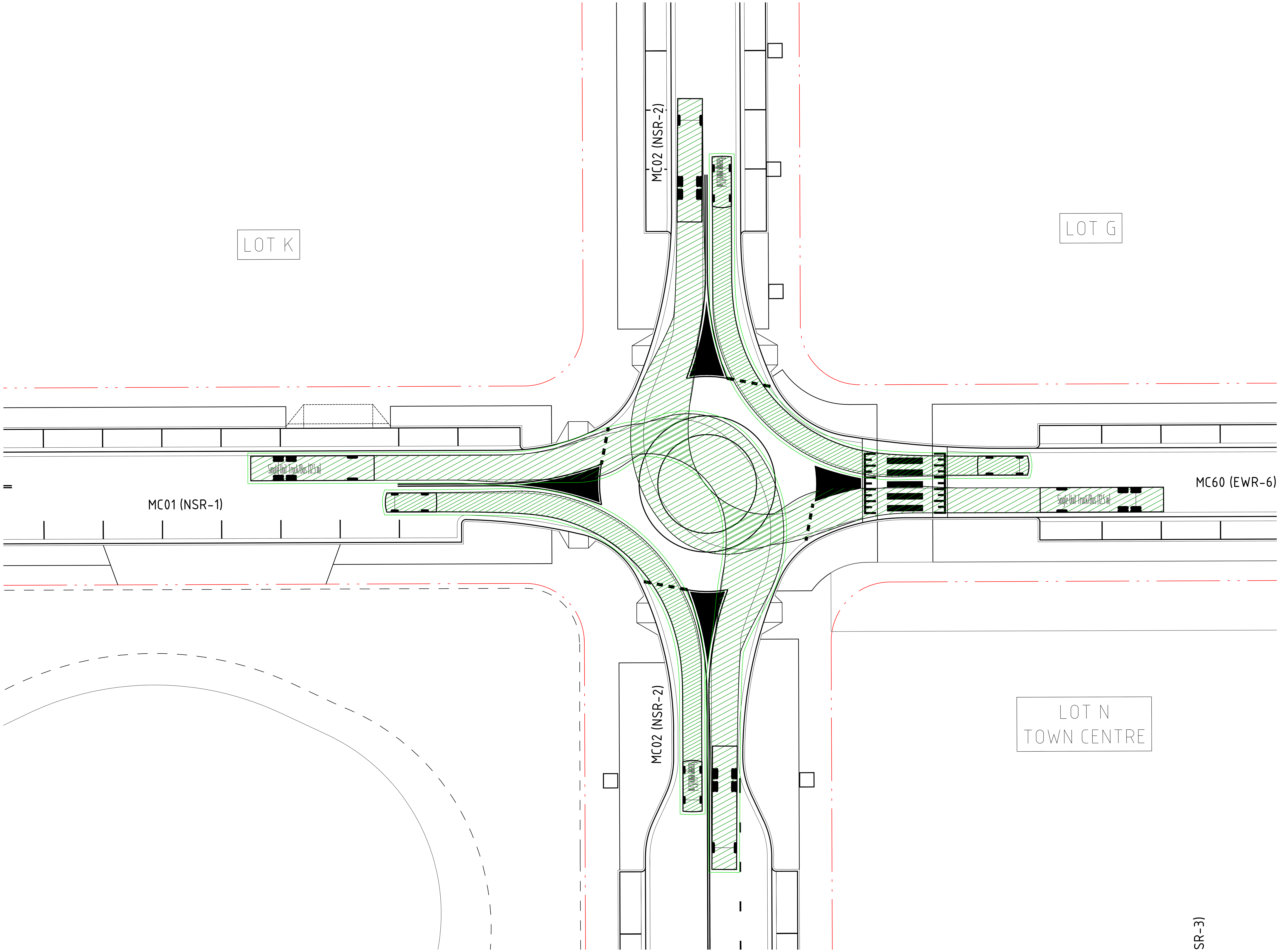
PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 27

JOB NUMBER 150077-60
DRAWING NUMBER C10.27
REVISION 04
DRAWING SHEET SIZE = A1

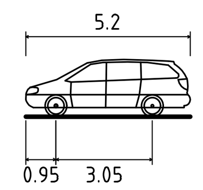


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

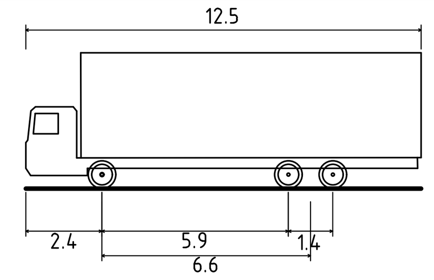
VEHICLE PROFILE



PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA
DESIGNED: A.RIVETT
JOB MANAGER: P.SUTTON
VERIFIER: -

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PROJECTS

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ARCHITECT

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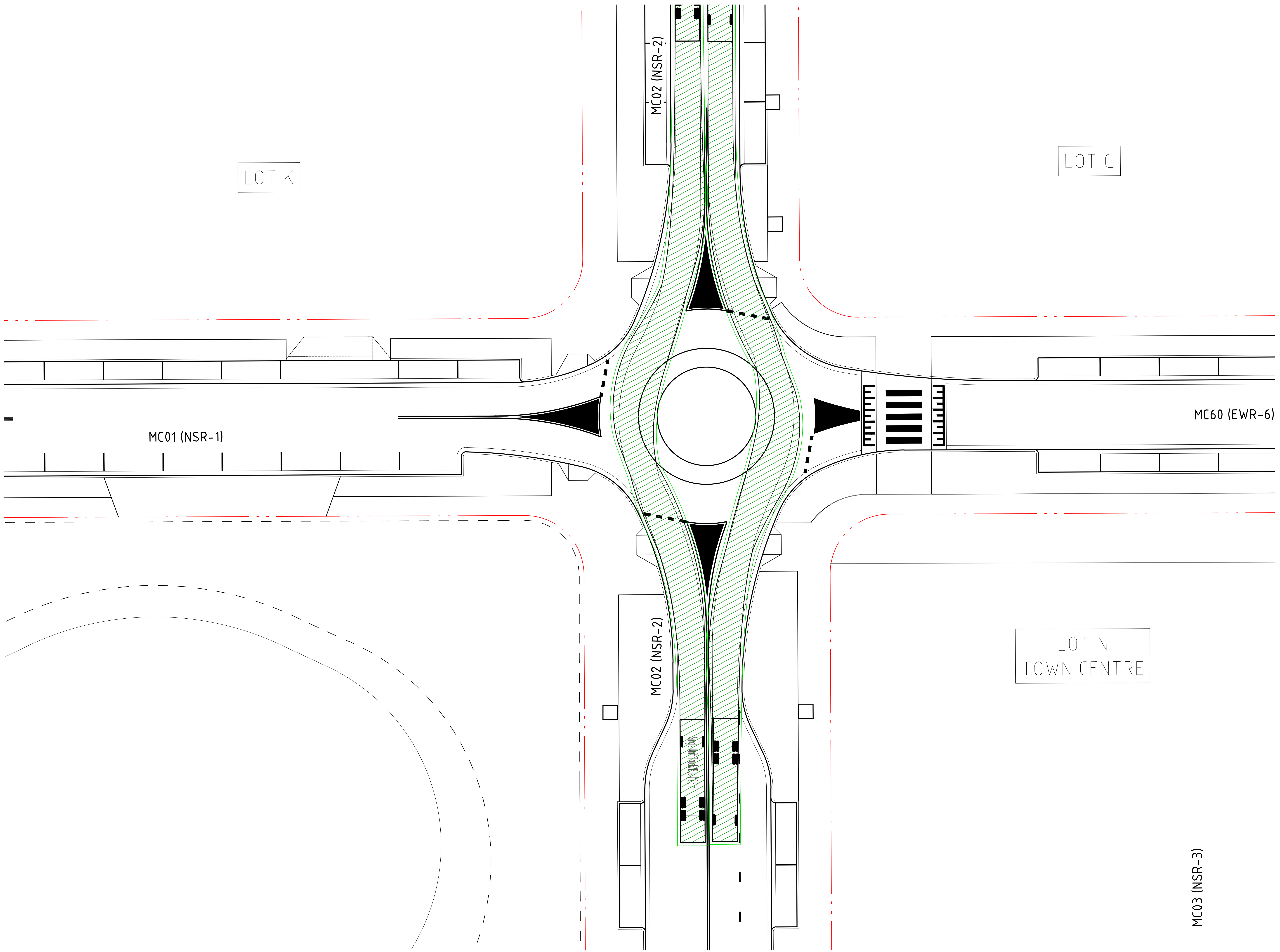
PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 28

JOB NUMBER 150077-60
DRAWING NUMBER C10.28
REVISION 04
DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

FORWARD MOVEMENT

VEHICLE BODY

VEHICLE WHEELS

VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE

12.5

2.2 6.2 1.3

SINGLE UNIT TRUCK/BUS (12.5 m)

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.490m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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PROJECT
MELROSE PARK INFRASTRUCTURE

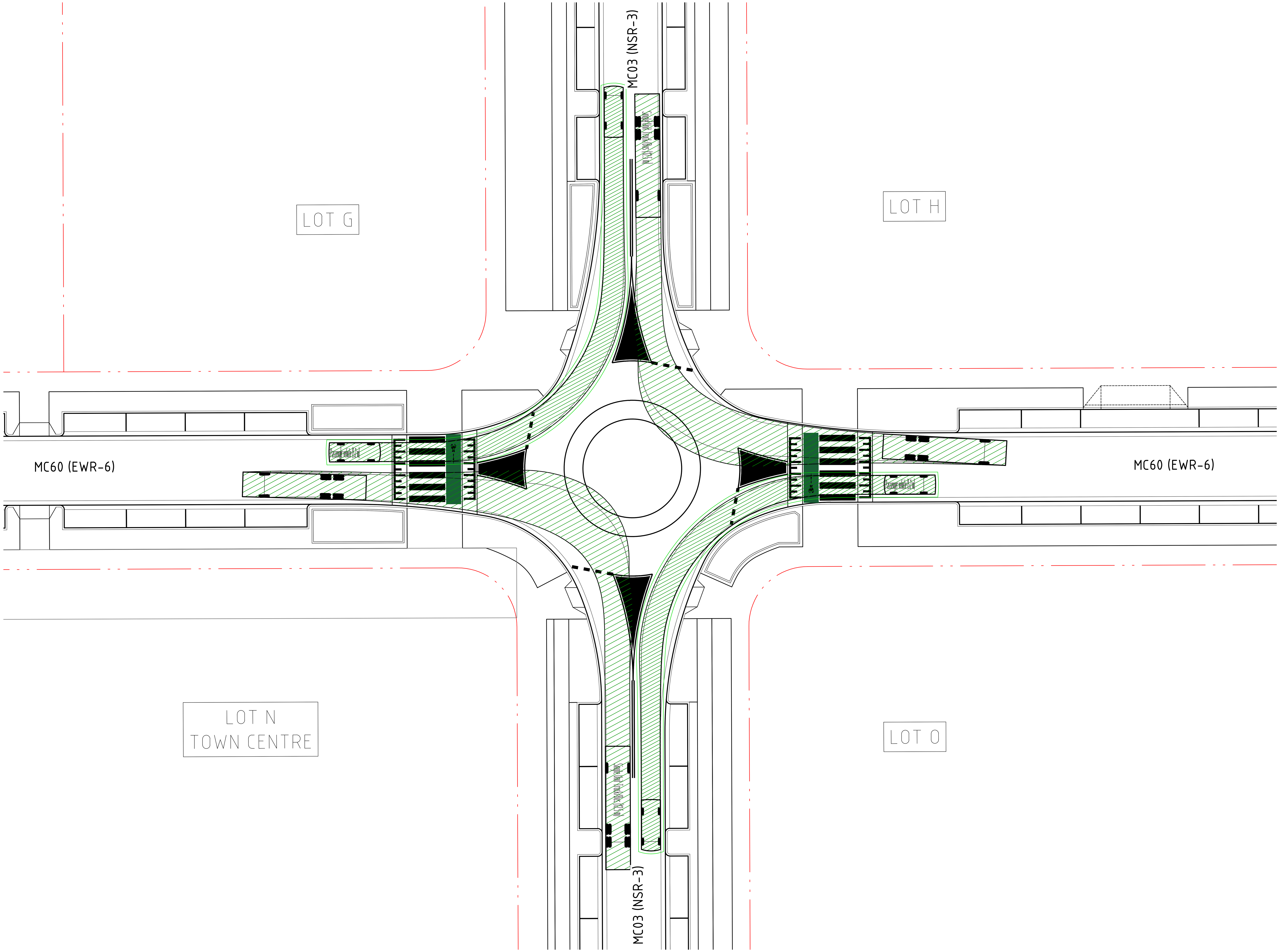
DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 29

JOB NUMBER 150077-60

DRAWING NUMBER C10.29

REVISION 04

DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE

5.2
0.95 3.05

PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE

12.5
2.4 5.9 1.4
6.6

HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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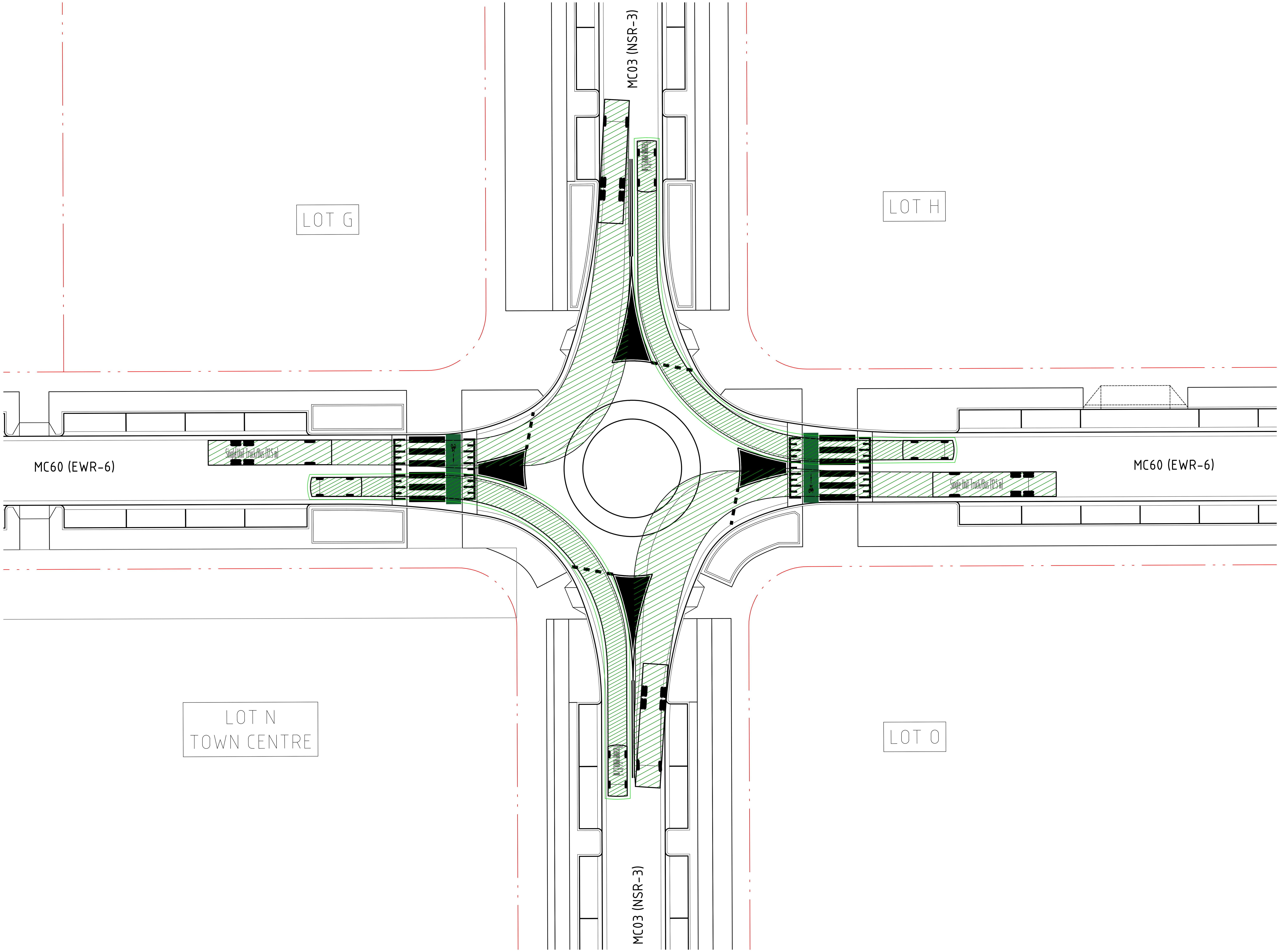
PROJECT
MELROSE PARK INFRASTRUCTURE

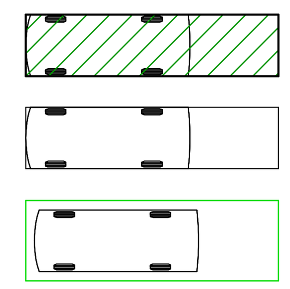
DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 30

JOB NUMBER 150077-60
DRAWING NUMBER C10.30
REVISION 04
DRAWING SHEET SIZE = A1

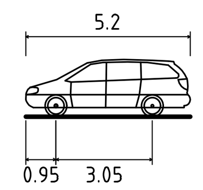


VEHICLE MOVEMENTS

FORWARD MOVEMENT



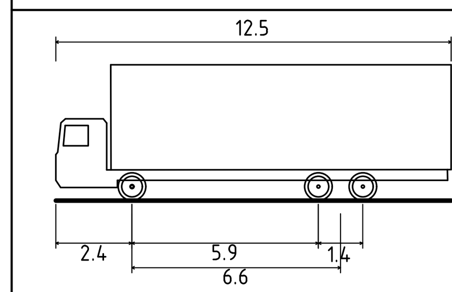
VEHICLE PROFILE



PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR CLIENT REVIEW	BM		AR	26.11.21
02	ISSUED FOR DA	BM		AR	29.11.21
03	REISSUED FOR DA	BM		AR	24.01.22
04	DRAFT FOR INFORMATION	AS		AR	02.12.22

CLIENT

PROJECTS

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ARCHITECT

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Sydney
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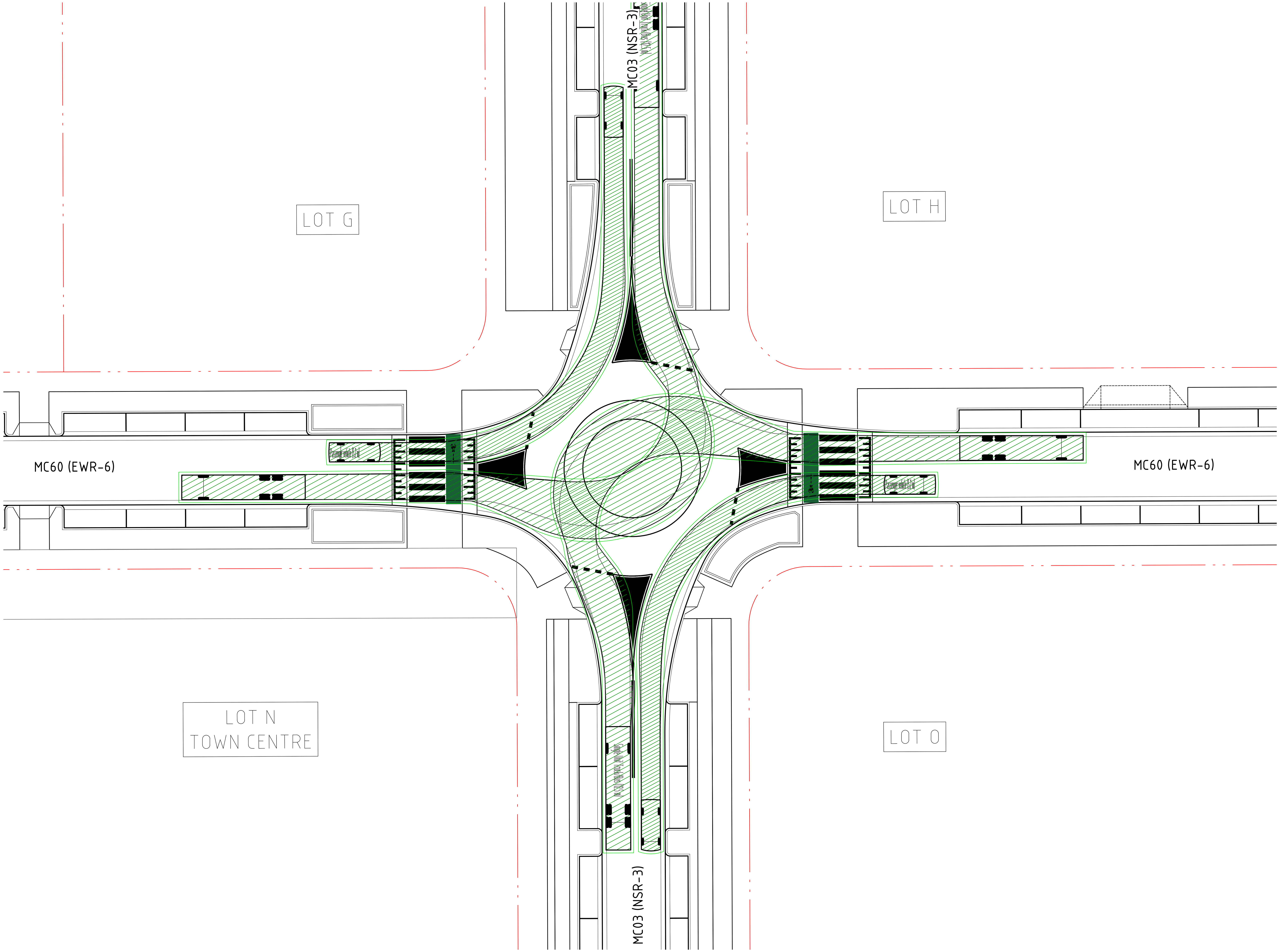
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 31

JOB NUMBER 150077-60
DRAWING NUMBER C10.31
REVISION 04
DRAWING SHEET SIZE = A1

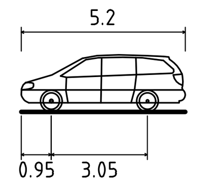


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

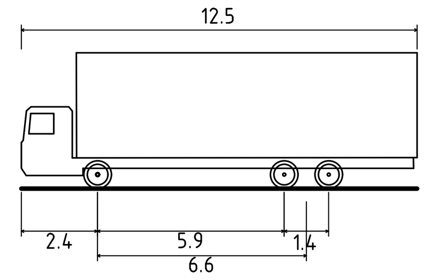
VEHICLE PROFILE



PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR CLIENT REVIEW	BM		AR	26.11.21
02	ISSUED FOR DA	BM		AR	29.11.21
03	DRAFT FOR INFORMATION	AS		AR	02.12.22

CLIENT
PROJECTS

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ARCHITECT

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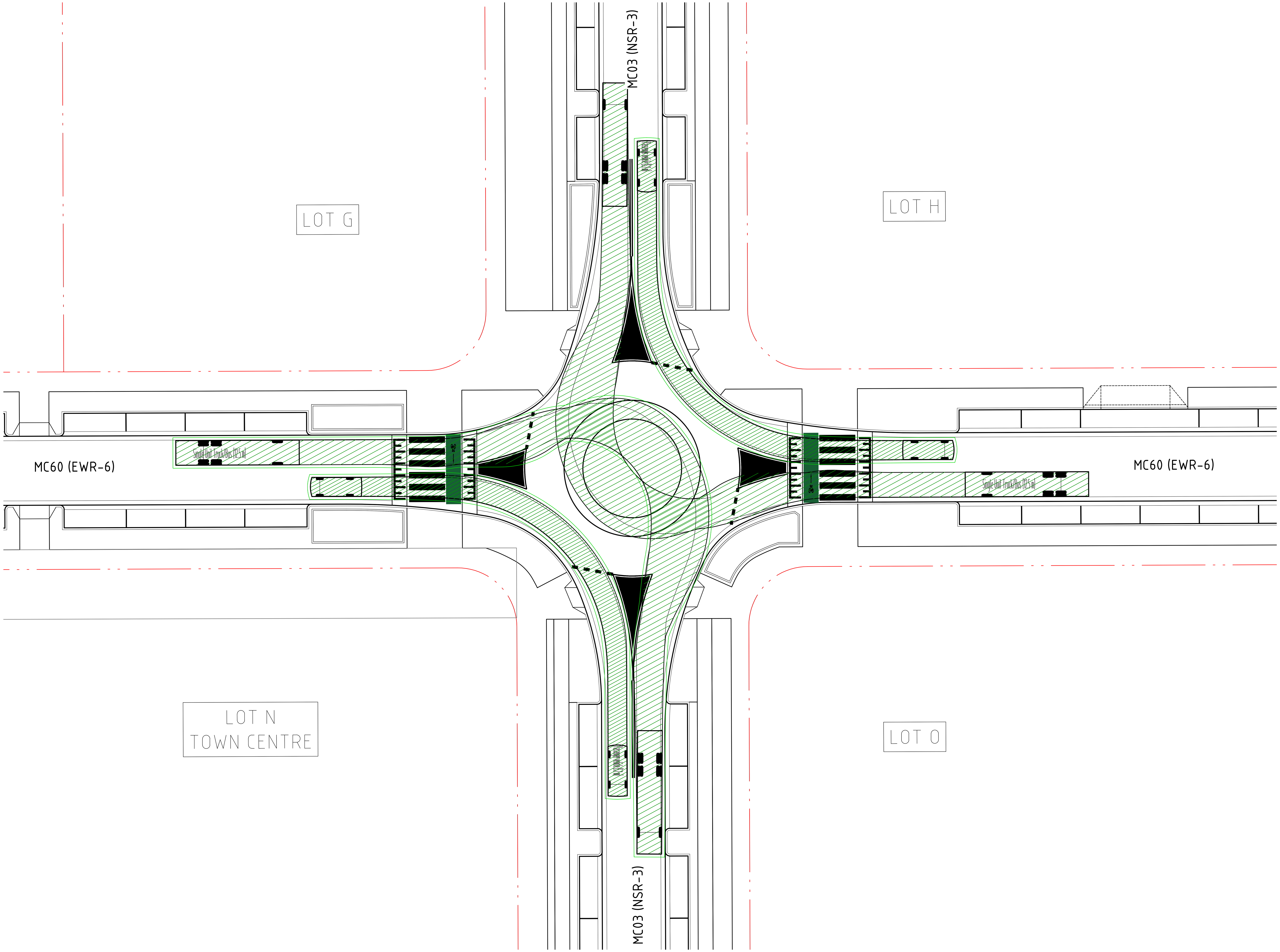
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 32

JOB NUMBER 150077-60
DRAWING NUMBER C10.32
REVISION 03
DRAWING SHEET SIZE = A1

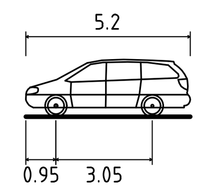


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

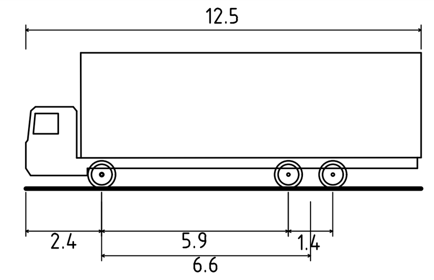
VEHICLE PROFILE



PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DA	BM		AR	29.11.21
02	REISSUED FOR DA	BM		AR	24.01.22
03	DRAFT FOR INFORMATION	AS		AR	02.12.22

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PROJECTS

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ARCHITECT

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SCALE 1:200@ A1 0 2 4 6 8 10m

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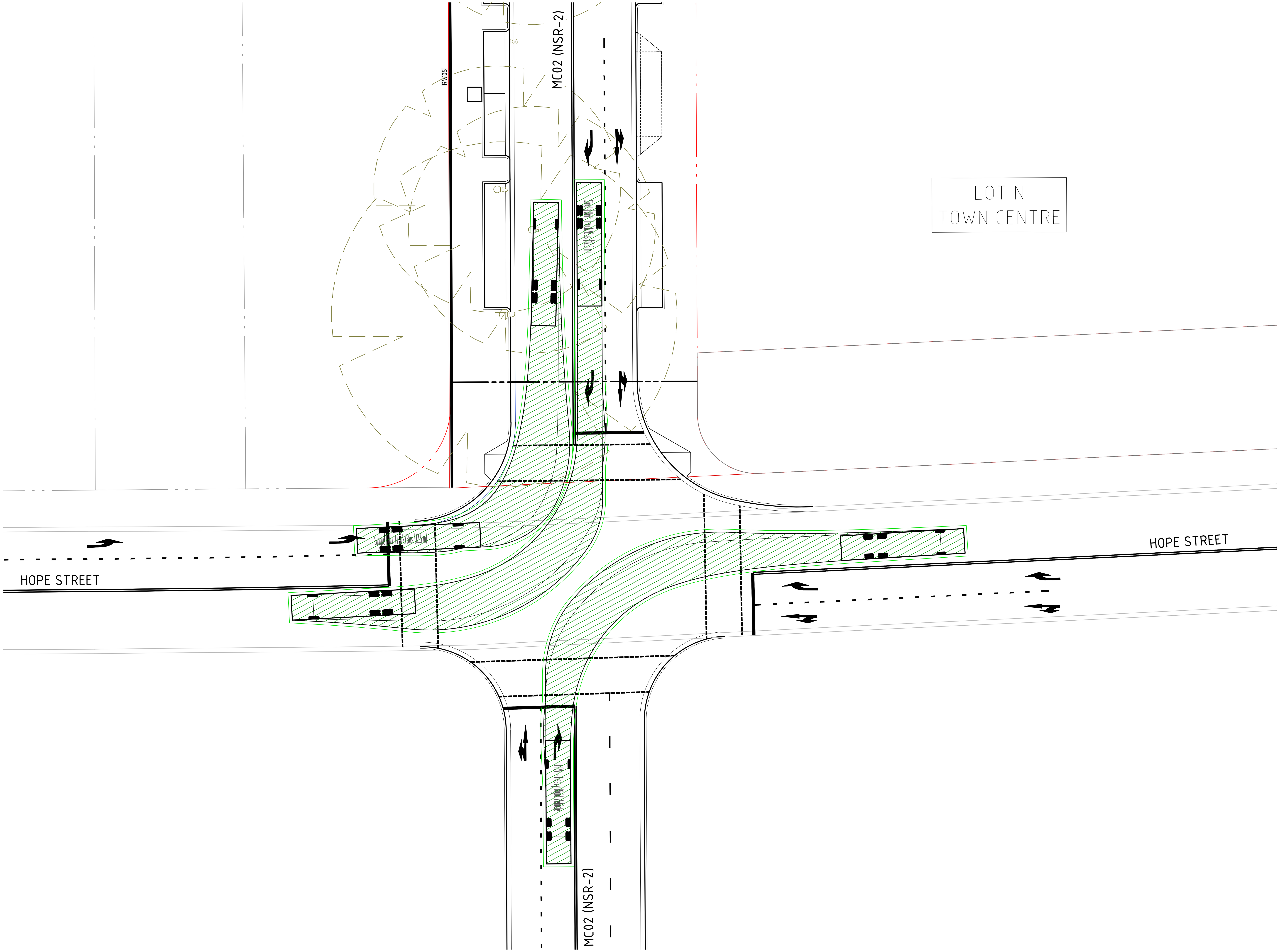
Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 33

JOB NUMBER 150077-60
DRAWING NUMBER C10.33
REVISION 03
DRAWING SHEET SIZE = A1

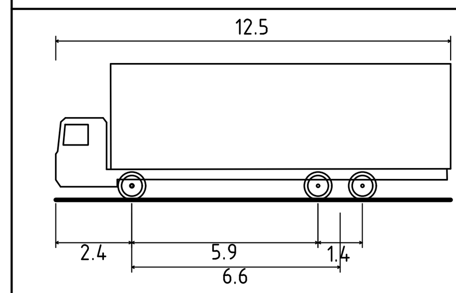


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DA	BM		AR	29.11.21
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PROJECTS

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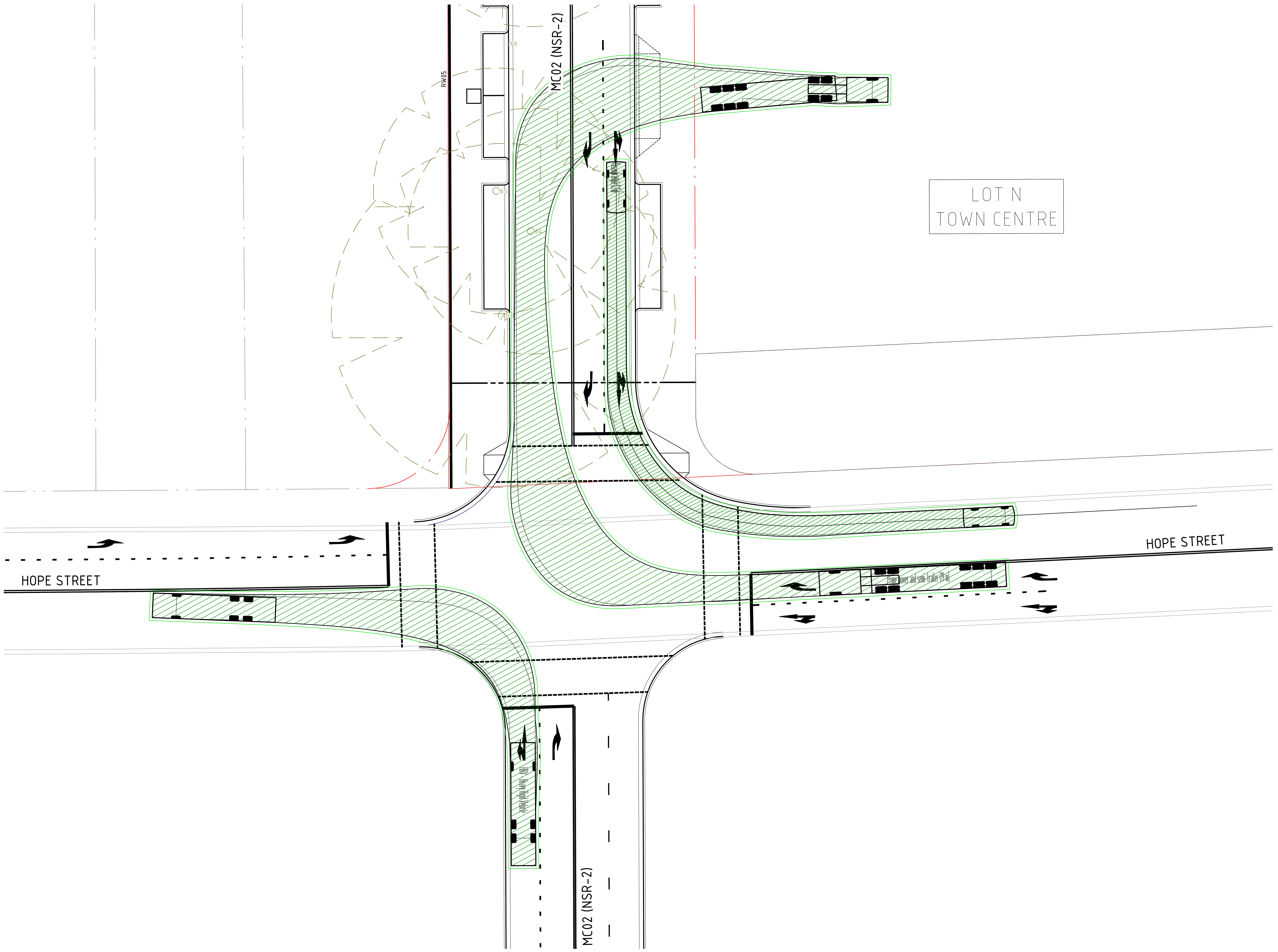
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 34

JOB NUMBER 150077-60
DRAWING NUMBER C10.34
REVISION 03
DRAWING SHEET SIZE = A1

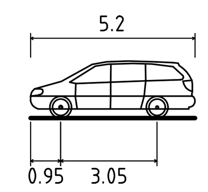


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

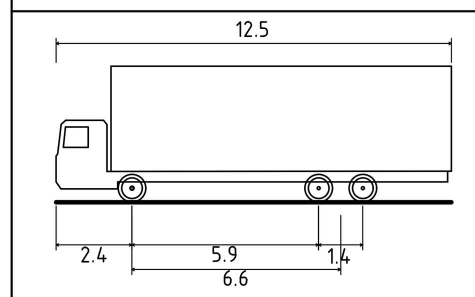
VEHICLE PROFILE



PASSENGER VEHICLE (5.2 m)

OVERALL LENGTH	5.200m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.804m
MIN BODY GROUND CLEARANCE	0.295m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	4.00s
CURB TO CURB TURNING RADIUS	6.300m
TRAVELLING SPEED	10 km/h

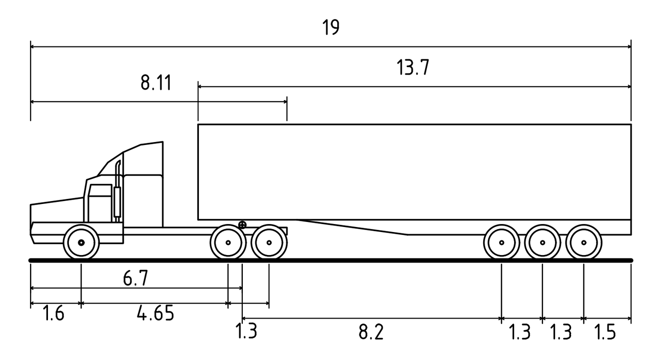
VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE



PRIME MOVER AND SEMI TRAILER (19m)

OVERALL LENGTH	19.000m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.540m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	15 km/h

DRAWN: B.MAZZA
DESIGNED: A.RIVETT
JOB MANAGER: P.SUTTON
VERIFIER: -

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DA	BM		AR	29.11.21
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PROJECTS

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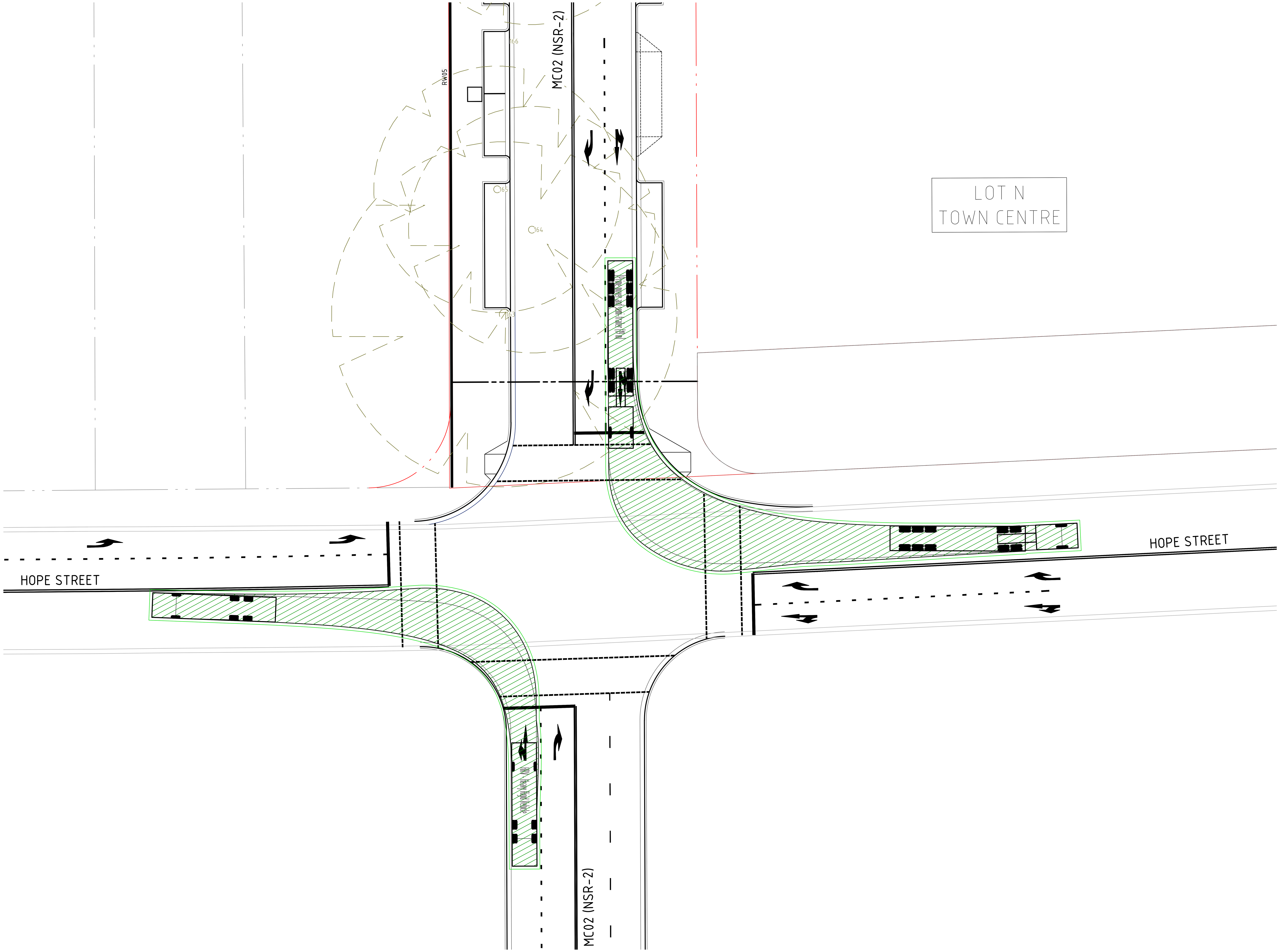
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 35

JOB NUMBER 150077-60
DRAWING NUMBER C10.35
REVISION 03
DRAWING SHEET SIZE = A1

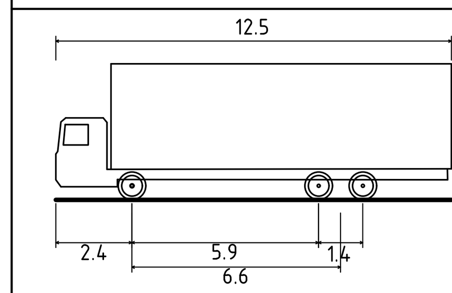


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

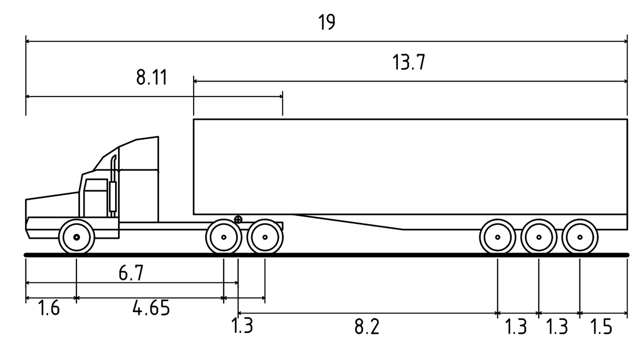
VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

VEHICLE PROFILE



PRIME MOVER AND SEMI TRAILER (19m)

OVERALL LENGTH	19.000m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.540m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	15 km/h

DRAWN: B.MAZZA
DESIGNED: A.RIVETT
JOB MANAGER: P.SUTTON
VERIFIER: -

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	ISSUED FOR DA	BM		AR	29.11.21
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PROJECTS

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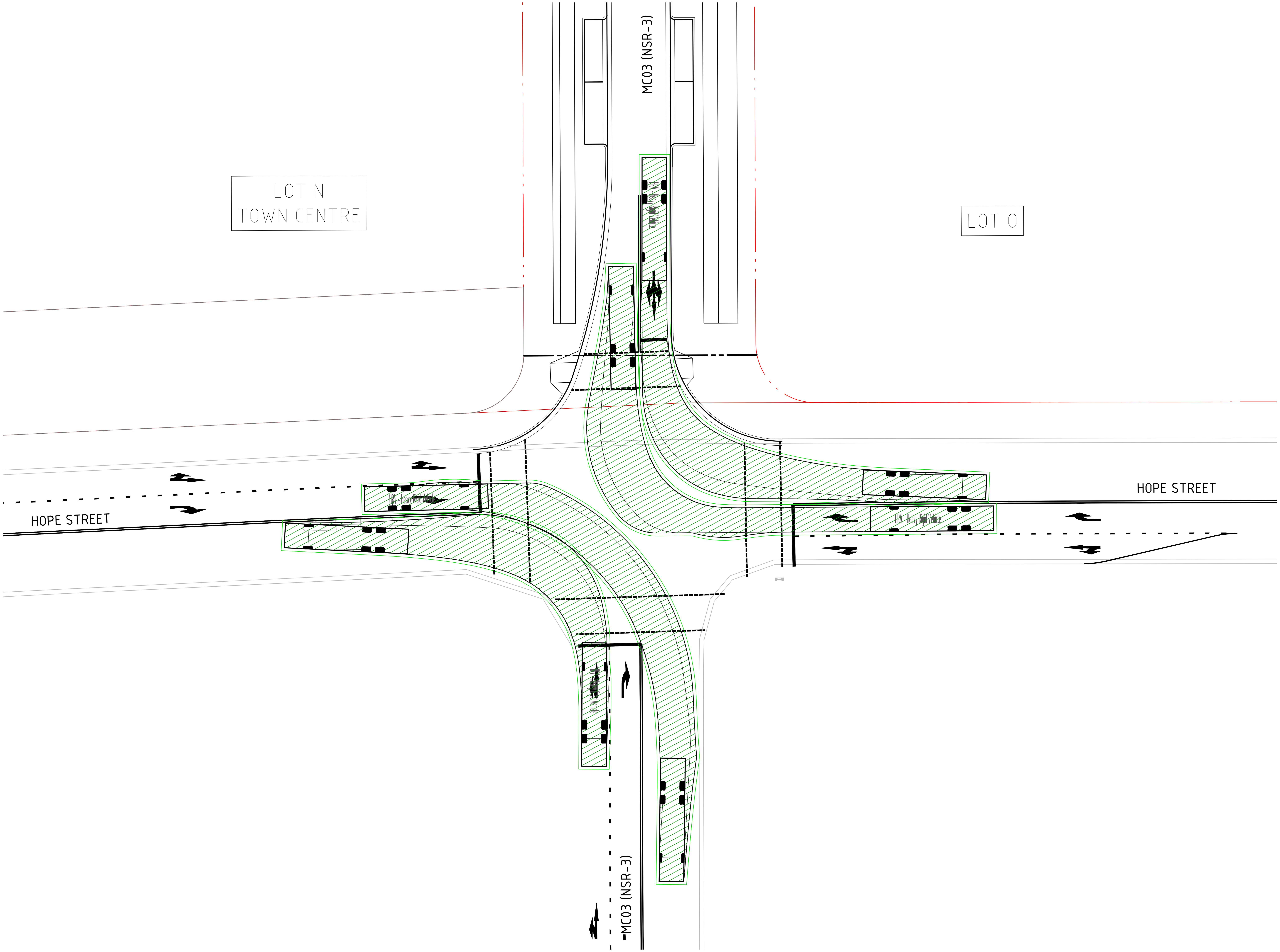
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 36

JOB NUMBER **150077-60**
DRAWING NUMBER **C10.36**
REVISION **03**
DRAWING SHEET SIZE = A1

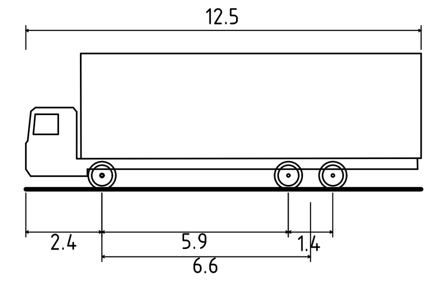


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	REISSUED FOR DA	BM		AR	11.03.22
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PROJECTS

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ARCHITECT

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SCALE 1:200@ A1 0 2 4 6 8 10m

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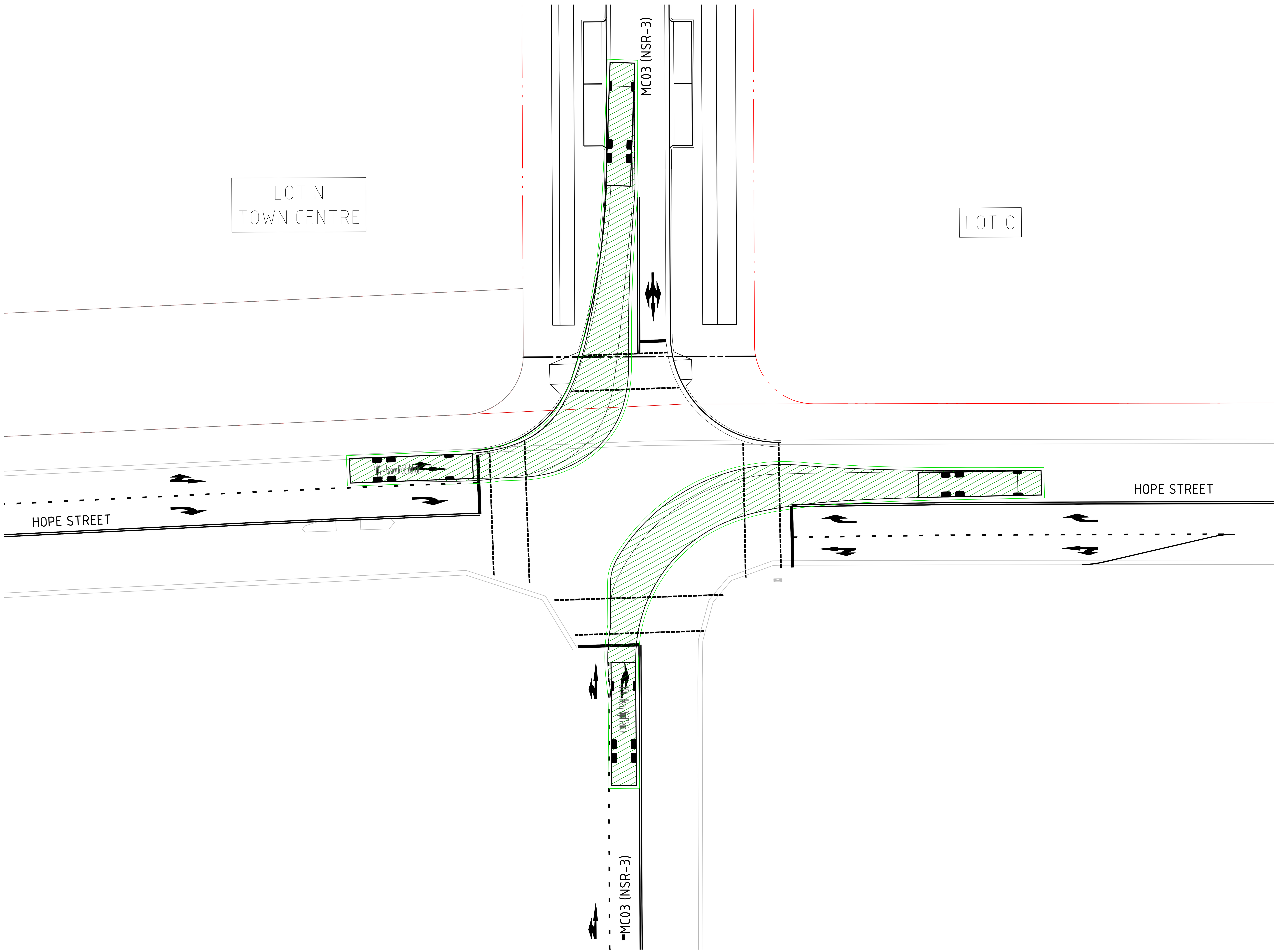
PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 37

JOB NUMBER 150077-60
DRAWING NUMBER C10.37
REVISION 02
DRAWING SHEET SIZE = A1

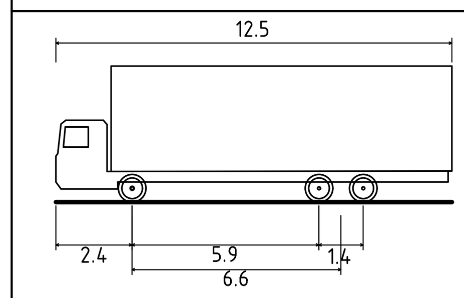


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
01	DRAFT FOR INFORMATION	AS		AR	02.12.22

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PROJECTS

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ARCHITECT

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SCALE 1:200@ A1 0 2 4 6 8 10m

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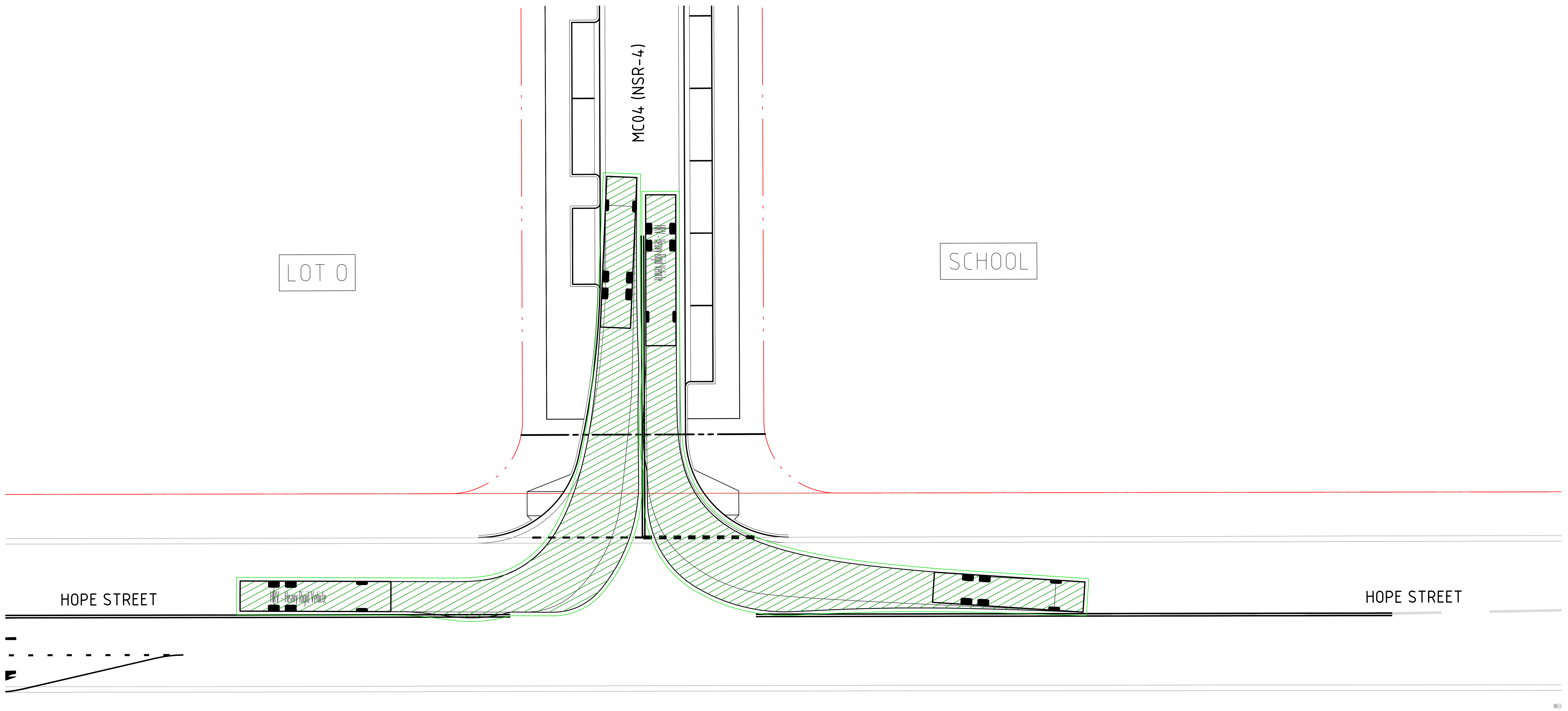
PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 38

JOB NUMBER 150077-60
DRAWING NUMBER C10.38
REVISION 01
DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

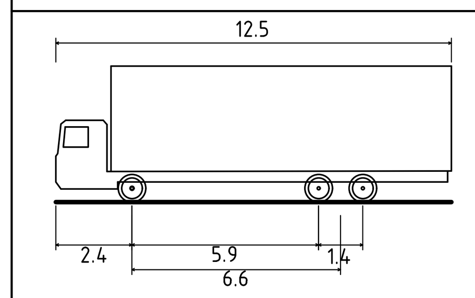
FORWARD MOVEMENT

VEHICLE BODY

VEHICLE WHEELS

VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.417m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	12.500m
TRAVELLING SPEED	10 km/h

DRAWN: B.MAZZA DESIGNED: A.RIVETT JOB MANAGER: P.SUTTON VERIFIER: -

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PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 39

JOB NUMBER 150077-60

DRAWING NUMBER C10.39

REVISION 01

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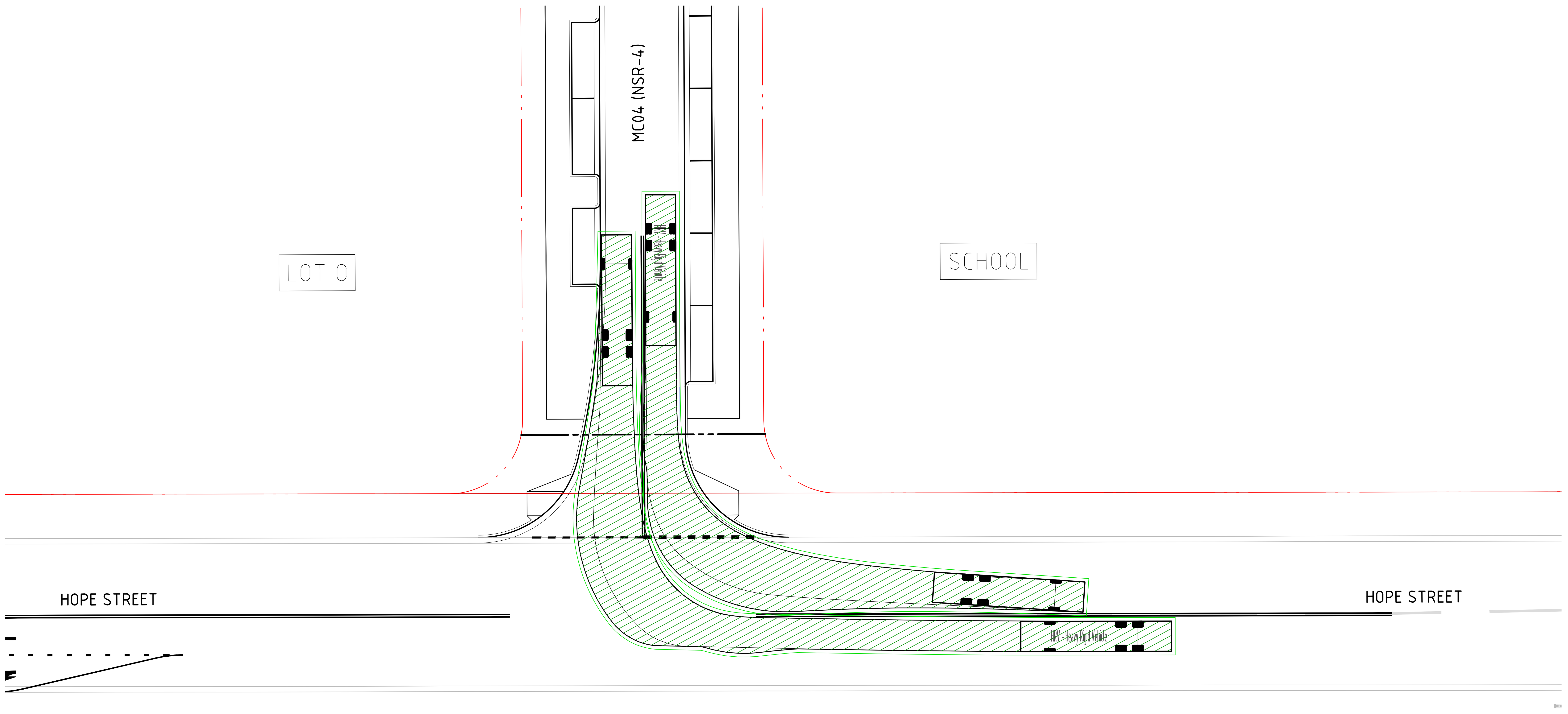


VEHICLE MOVEMENTS

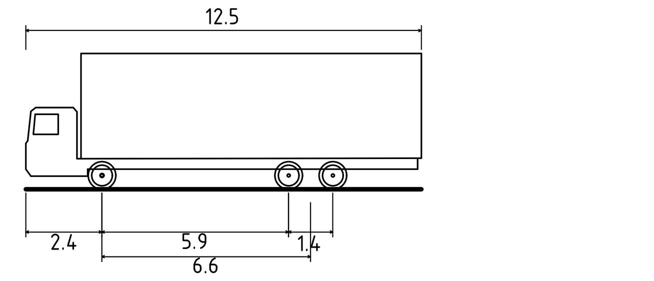
FORWARD MOVEMENT

VEHICLE BODY

VEHICLE WHEELS

VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



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PROJECT
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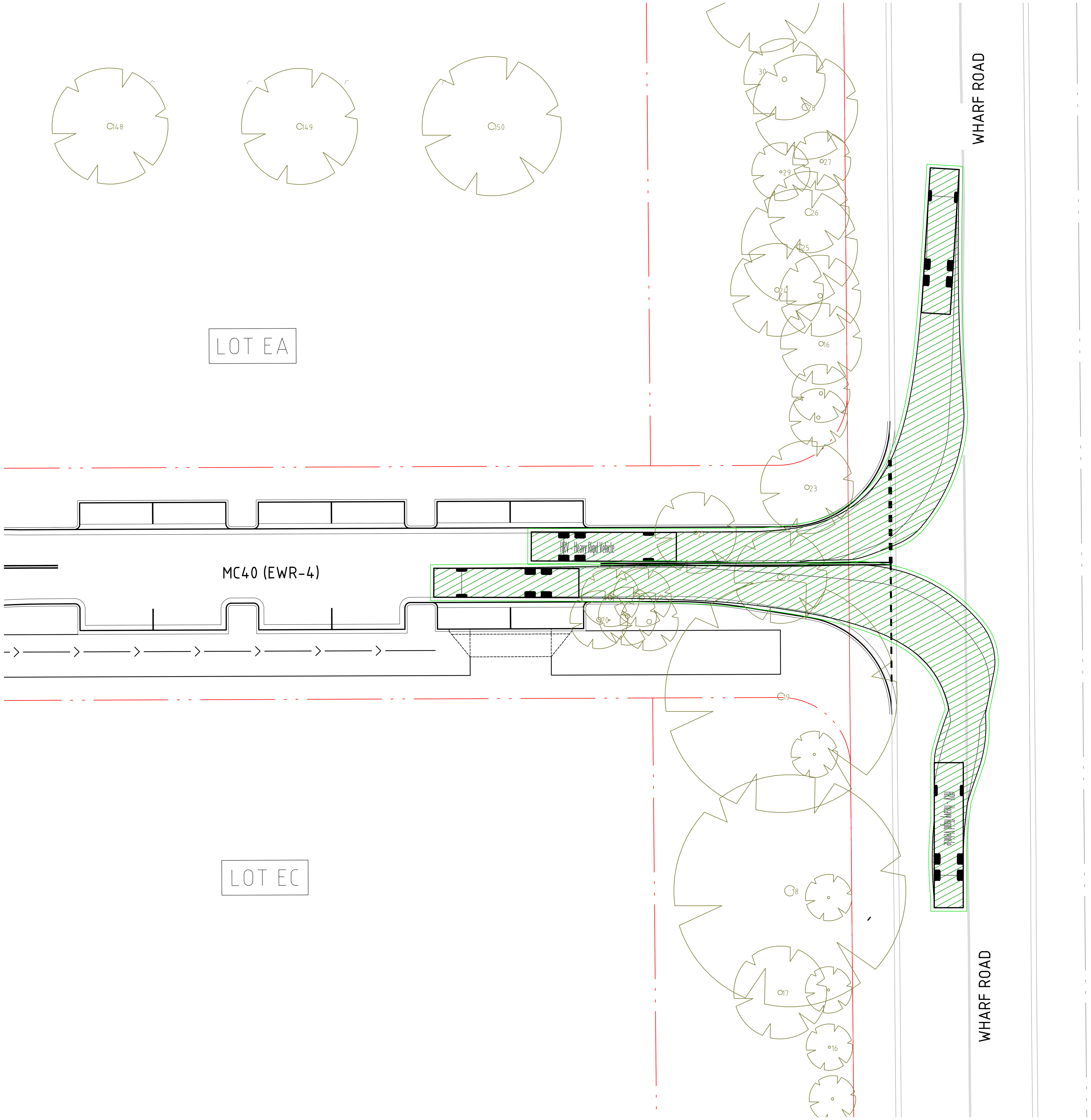
DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 40

JOB NUMBER **150077-60**

DRAWING NUMBER **C10.40**

REVISION **01**

DRAWING SHEET SIZE = A1



VEHICLE MOVEMENTS

FORWARD MOVEMENT

VEHICLE BODY

VEHICLE WHEELS

VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE

12.5

2.4 5.9 1.4

6.6

HRV - HEAVY RIGID VEHICLE

OVERALL LENGTH	12.500m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
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PROJECT
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DRAWING TITLE
CIVIL ENGINEERING PACKAGE

SWEPT PATHS PLAN - SHEET 41

JOB NUMBER 150077-60

DRAWING NUMBER C10.41

REVISION 01

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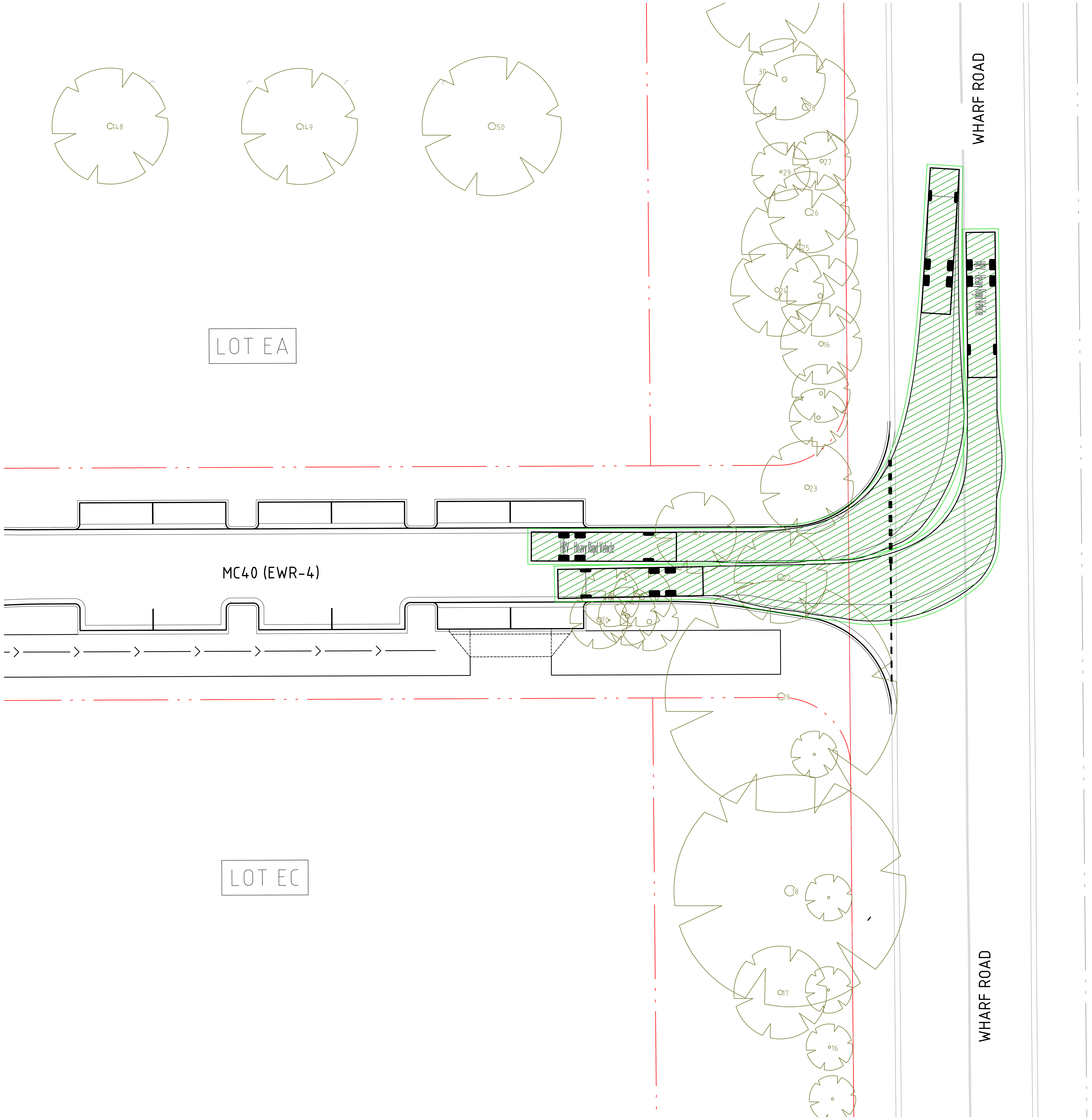
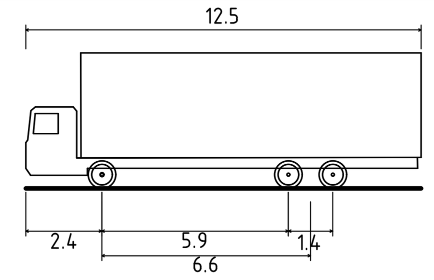


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



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DRAWING TITLE: CIVIL ENGINEERING PACKAGE

SWEPT PATHS PLAN - SHEET 42

JOB NUMBER: 150077-60

DRAWING NUMBER: C10.42

REVISION: 01

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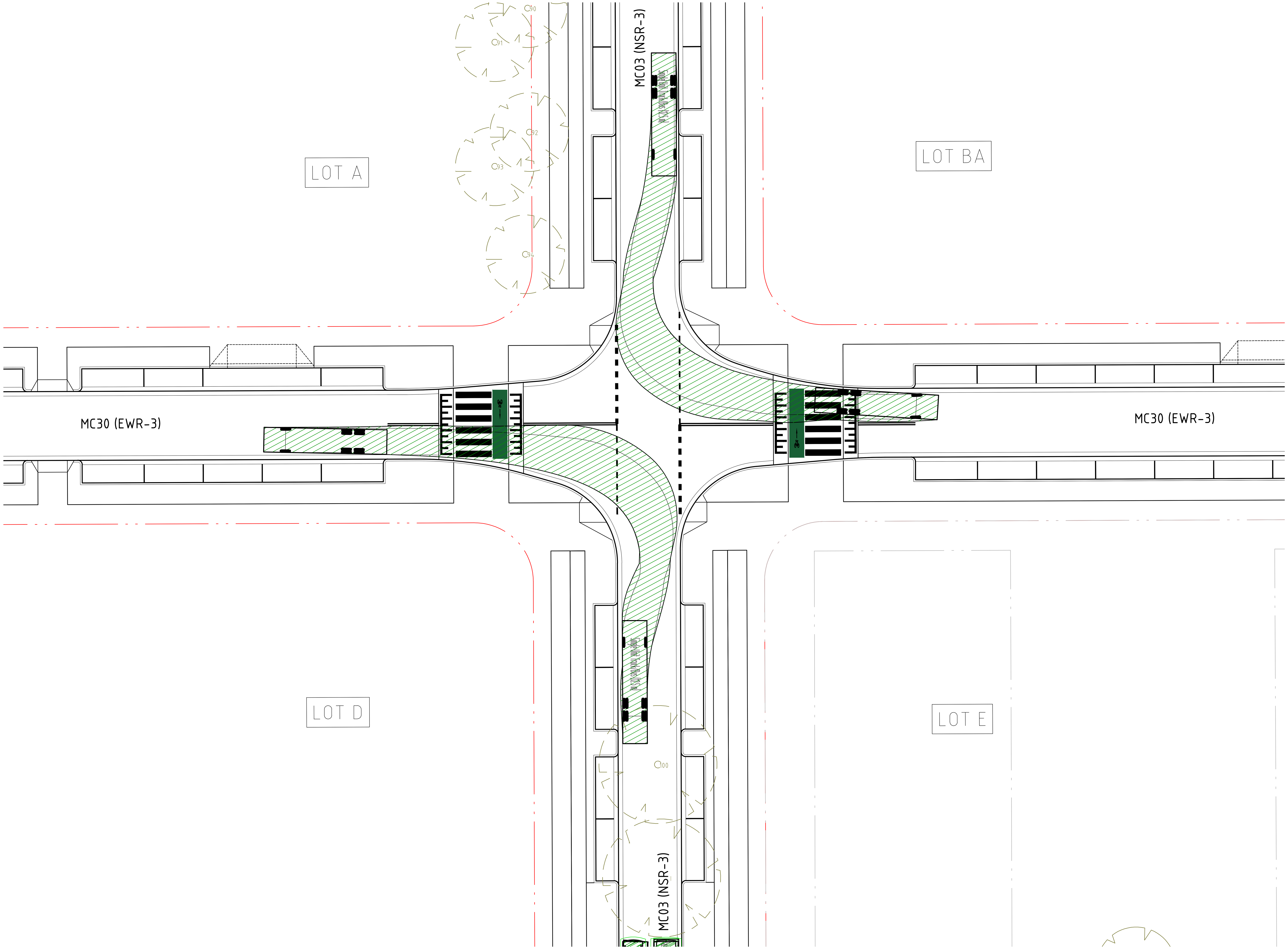
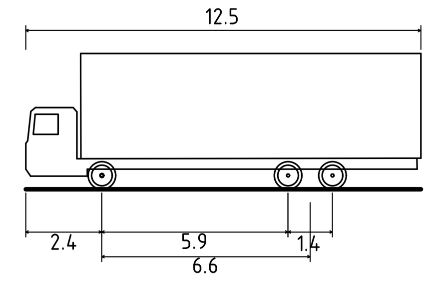


VEHICLE MOVEMENTS

FORWARD MOVEMENT

- VEHICLE BODY
- VEHICLE WHEELS
- VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



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SWEPT PATHS PLAN - SHEET 43

JOB NUMBER: 150077-60

DRAWING NUMBER: C10.43

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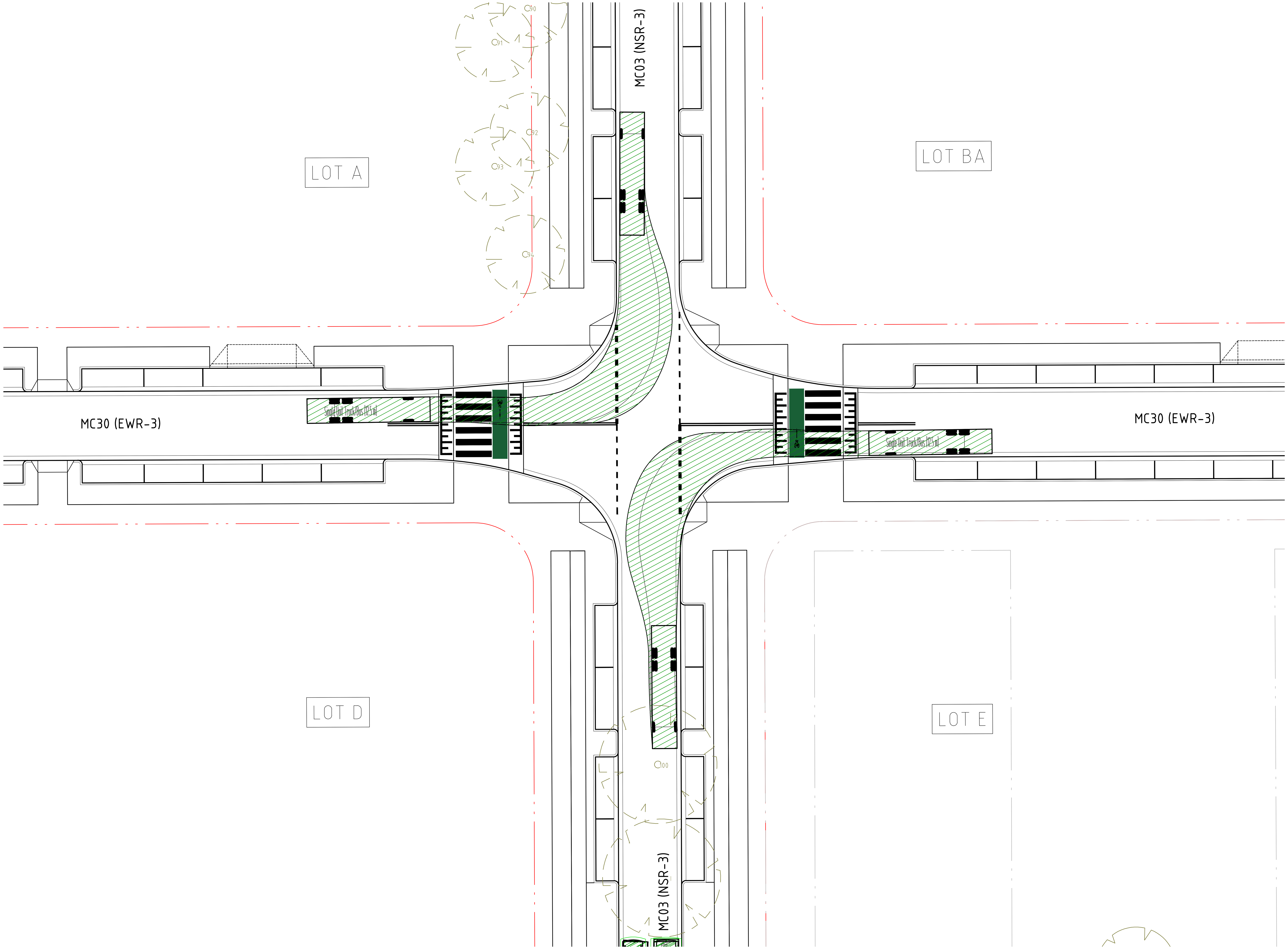
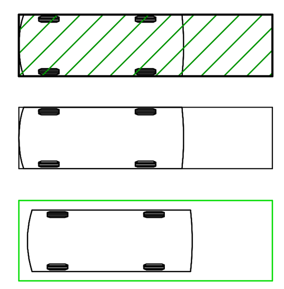


VEHICLE MOVEMENTS

FORWARD MOVEMENT



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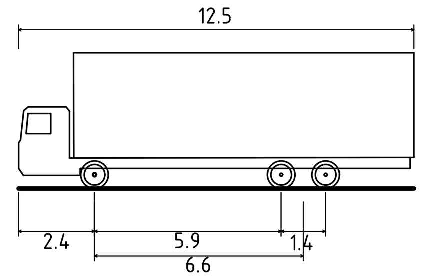

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DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 44

JOB NUMBER 150077-60
DRAWING NUMBER C10.44
REVISION 01
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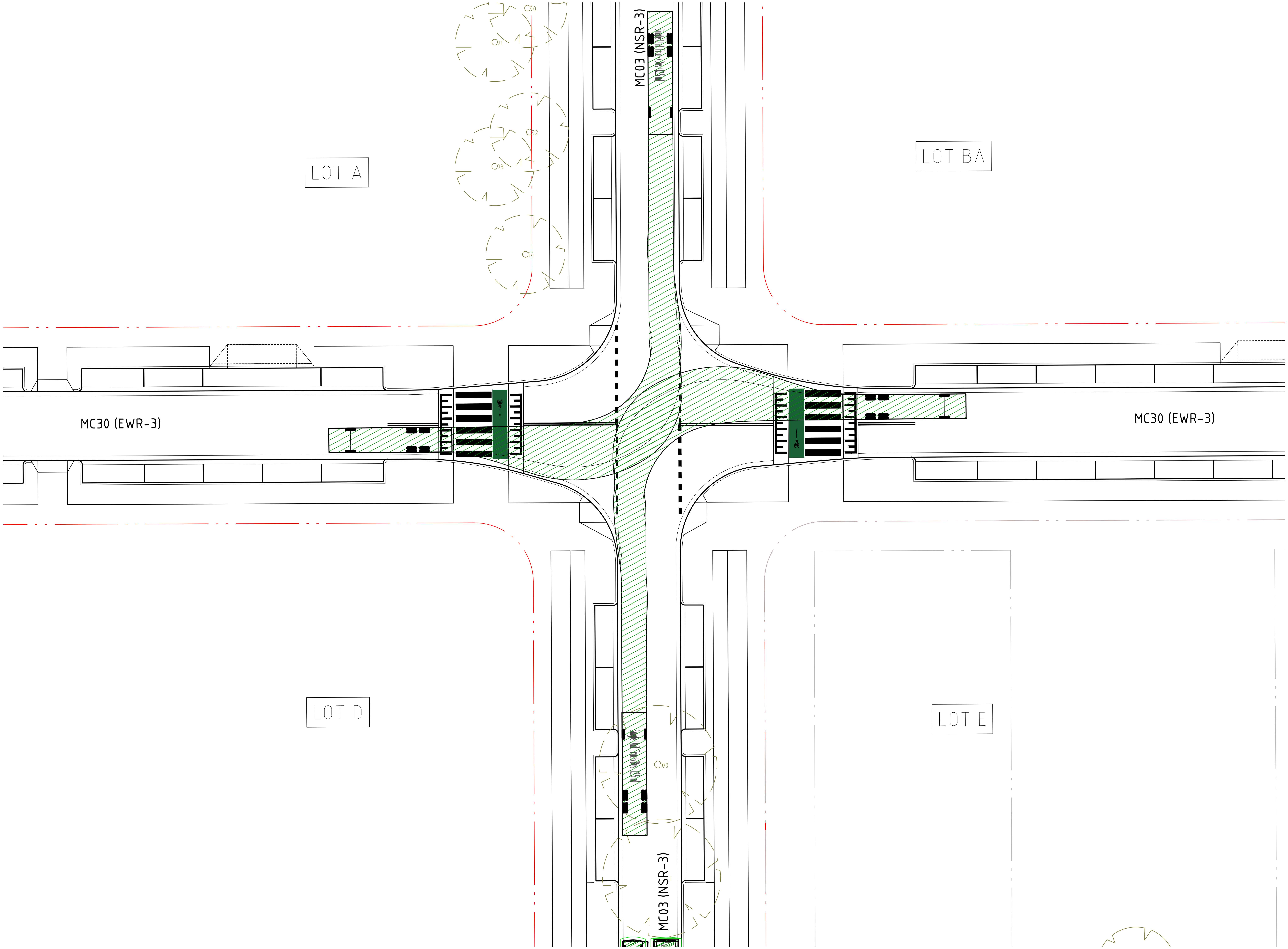
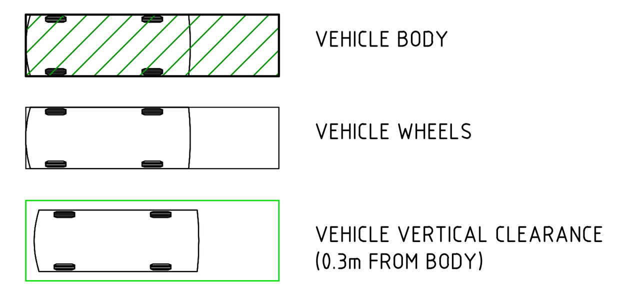
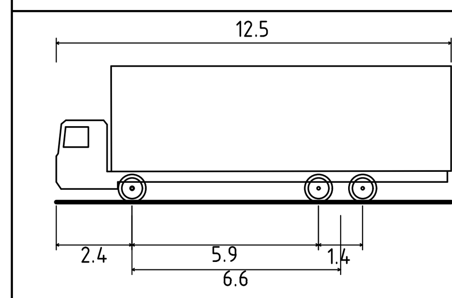


VEHICLE MOVEMENTS

FORWARD MOVEMENT



VEHICLE PROFILE



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DRAWING NUMBER C10.45
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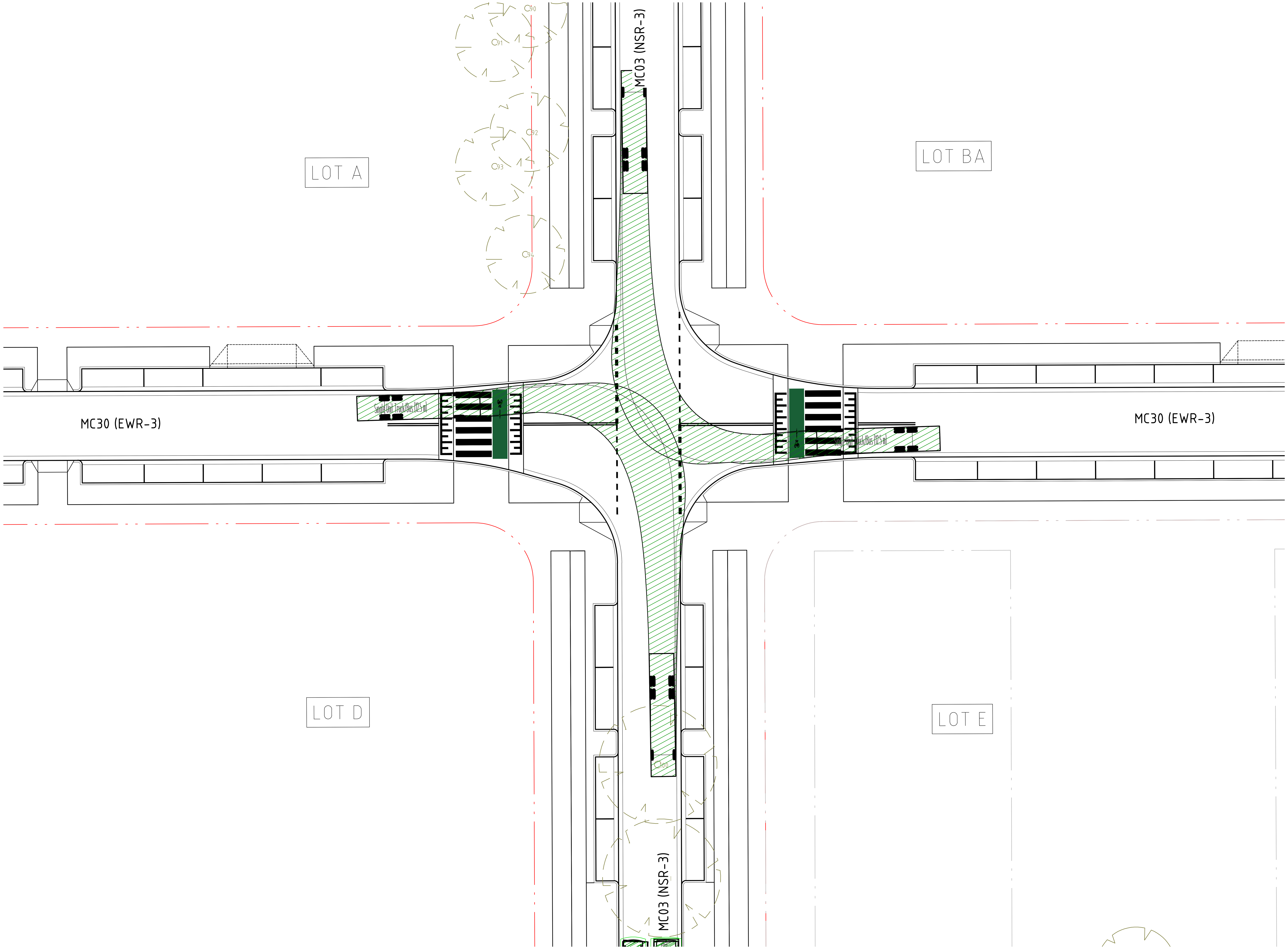


VEHICLE MOVEMENTS

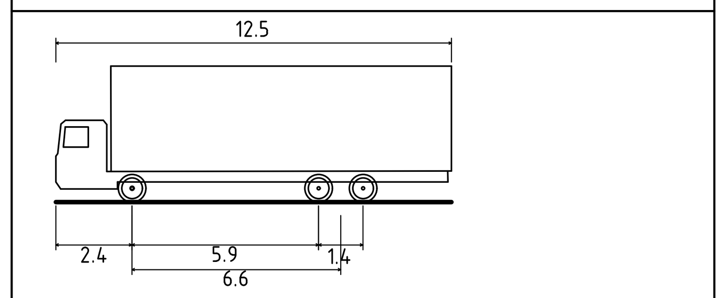
FORWARD MOVEMENT

VEHICLE BODY

VEHICLE WHEELS

VEHICLE VERTICAL CLEARANCE (0.3m FROM BODY)

VEHICLE PROFILE



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PROJECT
MELROSE PARK INFRASTRUCTURE

DRAWING TITLE
CIVIL ENGINEERING PACKAGE
SWEPT PATHS PLAN - SHEET 46

JOB NUMBER 150077-60

DRAWING NUMBER C10.46

REVISION 01

DRAWING SHEET SIZE = A1

Appendix E Melrose Park Town Centre Traffic Report – SIDRA Results

Melrose Park Town Centre

Transport Assessment

Prepared for:

Deicorp

27 July 2023

PROJECT INFORMATION

Project Name:	Melrose Park Town Centre
Client:	Deicorp
Project Number:	2240
Prepared By:	JMT Consulting

DOCUMENT HISTORY

Document Title	Revision	Date issued	Author
Melrose Park Town Centre Transport Assessment	Draft	05.08.22	JM
Melrose Park Town Centre Transport Assessment	Issue	16.08.22	JM
Melrose Park Town Centre Transport Assessment	Rev A	19.09.22	JM
Melrose Park Town Centre Transport Assessment	Rev B	27.07.23	JM

Table of Contents

Figures

Tables

JMT CONSULTING

1 Introduction

1.1 Background

JMT Consulting has prepared this transport impact assessment report for the proposed development of the Melrose Park Town Centre within the broader Melrose Park precinct.

1.2 Melrose Park precinct

The Melrose Park Precinct is located on the eastern boundary of the Parramatta LGA, approximately 7km east of the Parramatta CBD. Approximately 55 hectares in size, the Melrose Park Precinct is divided into North and South Precincts. T

he Melrose Park North Precinct is bound by Victoria Road to the north, Wharf road to the east, Hope Street to the south and Hughes Avenue to the west. The Melrose Park South Precinct is approximately 20 ha in size and is bound by Hope Street to the north, Wharf Road to the east, Parramatta River to the south, and Atkins Road to the west.

The combined Precincts are referred to as Melrose Park, however it also incorporates a portion of Ermington along the western edge. Planning for the redevelopment of this precinct has been occurring since 2016 and has involved consultation between Council, landowners, applicants and various Government agencies.

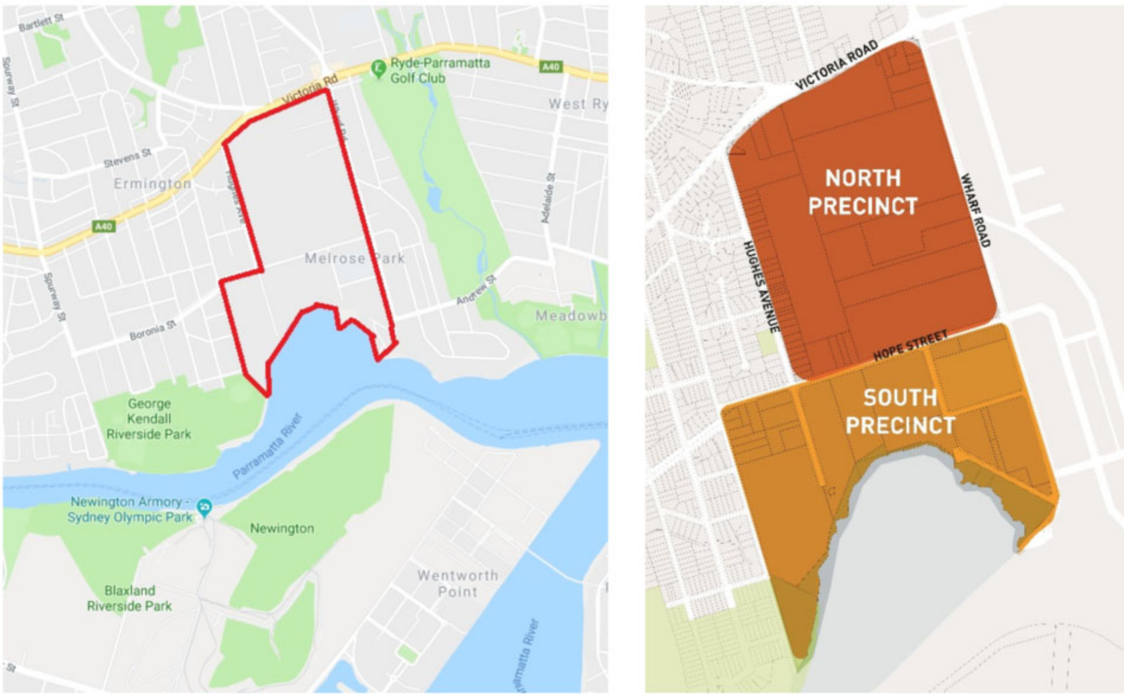


Figure 1 Melrose Park precinct context

Source: City of Parramatta Council

1.3 Melrose Park North Precinct planning proposal

Council resolved to endorse the Planning Proposal for the Melrose Park North Precinct (along with the site-specific DCP and Planning Agreement) at its meeting of 11 October 2021. The Planning Proposal was finalised by the Department of Planning on 24 June 2022.

1.4 Transport Management & Accessibility Plan (TMAP)

Traffic and transport issues were identified as a key consideration early in the planning process for the entire Melrose Park precinct (both north and south) and as a result, Jacobs was to prepare a Transport Management and Accessibility Plan (TMAP) for the precinct. A TMAP is a detailed traffic and transport study that examines the existing traffic, parking and road network conditions and public transport services for an identified area. It then makes recommendations regarding the required road infrastructure upgrades, such as intersection improvements and road widening, and identifies the required public transport improvements needed to support the area relative to the anticipated future growth. The preparation of the TMAP was also a condition of the Gateway determination associated with the Melrose Park North Planning Proposal.

A project group was created to monitor and provide input into the TMAP process. The project group comprised of stakeholders from Council, State agencies including Transport for NSW (TfNSW) and the Department of Planning and Environment (DPE), and applicants from the northern and southern precincts. The group was facilitated by the DPE. The TMAP was completed in January 2019 and has been endorsed by TfNSW. It is required to be used as a supporting technical document for all Planning Proposals within the precinct, in addition to the standard site-specific traffic and transport impact assessments that are submitted with Planning Proposal applications.

The Implementation Plan outlined in the TMAP specifies when the new infrastructure is required to be delivered/in place relative to the number of dwellings in the precinct. These are known as trigger points. The key trigger point is the bridge to Wentworth Point. Without the bridge, the number of dwellings that can be delivered across the entire precinct (north and south) is limited to 6,700. Should a bridge be constructed then the maximum 11,000 dwellings can be supported. This is providing all the other required infrastructure is also delivered.

The required infrastructure will be funded through a combination of local and State Planning Agreements between developers and Council (local Planning Agreement), developers and the State Government (State Planning Agreement), and development contributions. Local Planning Agreements typically include infrastructure that will directly service the needs of the Melrose Park residents, such as open space and community centres, whereas the State Planning Agreements typically include contributions to the infrastructure that will be utilised on a broader regional scale, such as upgrades to major roads and schools.

1.5 Melrose Park Town Centre

The Melrose Park Town Centre (MPTC) is located within the Melrose Park North Precinct as indicated in Figure 2 below.

Figure 2 Melrose Park Town Centre location

1.6 Alignment with current transport policy

The availability of various services within the MPTC, including retail, hospitality, employment, health and residential, all within close walking distance of a future light rail stop on Hope Street, aligns with the ’15-minute neighbourhoods’ concept outlined in the recently released Future Transport Strategy. The 15-minute neighbourhood concept aims to support local communities and healthy lifestyles by prioritising place making, walking, cycling, micromobility and last mile freight, to support 15-minute access to connected, local transport networks, precincts and local destinations. The MPTC will facilitate excellent access to transport, services and open space – allowing for the majority of trips to be made on foot with reduced reliance on private vehicle.

Figure 3 15-minute neighbourhood concept

Source: Future Transport Strategy (Transport for NSW, 2022)

2 Transport Context

2.1 Existing transport network

The existing network serving the Melrose Park precinct is illustrated in Figure 4, with further details provided in subsequent sections of this document.

Public transport

The major existing bus, ferry and rail corridors providing access to, through and within Melrose Park. Victoria Road is a key bus corridor serving the precinct and accommodates a number of high frequency bus routes servicing key centres such as Parramatta, Macquarie Park and the Sydney CBD

Private vehicles

The major routes for private vehicles, service and delivery vehicles, freight and taxis/ride-share vehicles providing access to, through and within Melrose Park – primarily Victoria Road which is a state classified road

Active Transport

The major walking and cycling routes providing access to, through and within Melrose Park including the active transport links along the Parramatta River

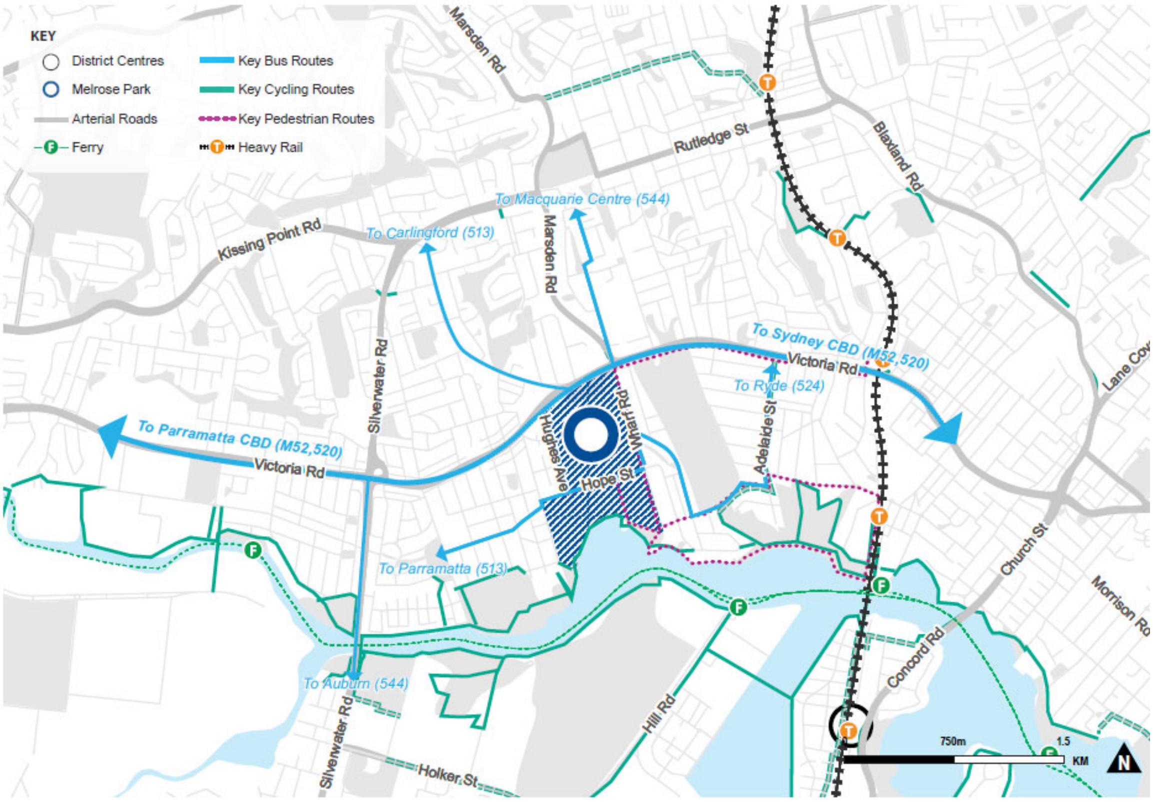


Figure 4 Strategic transport network serving Melrose Park

Source: Melrose Park TMAP (Jacobs, January 2019)

2.2 Road network

The key features of the road network in the vicinity of the Melrose Park site are as follows:

Victoria Road - Victoria Road is a State (Arterial) Road and provides a key east-west arterial connectivity between Sydney City and Parramatta. In the vicinity of Melrose Park, Victoria Road provides a divided carriageway with 3 traffic lanes in each direction, and significant additional lane infrastructure at key intersections

Wharf Road - Wharf Road is a local road which provides direct access to properties on both sides of the road. It’s main function is to facilitate the convenient and safe movement of local traffic to and from Victoria Road.

Hope Street - Hope Street is a collector road which runs east-west between Wharf Road and Atkins Road respectively. Hope Street provides 1 traffic lane in each direction, and additional kerbside lanes which are generally utilised for on-street parking and bus zones.

Hughes Avenue - Hughes Avenue is a local road which runs north-south from Victoria Road to a terminus at the Parramatta River respectively. Hughes Avenue provides 1 traffic lane in each direction, and additional kerbside lanes which are generally utilised for on-street parking

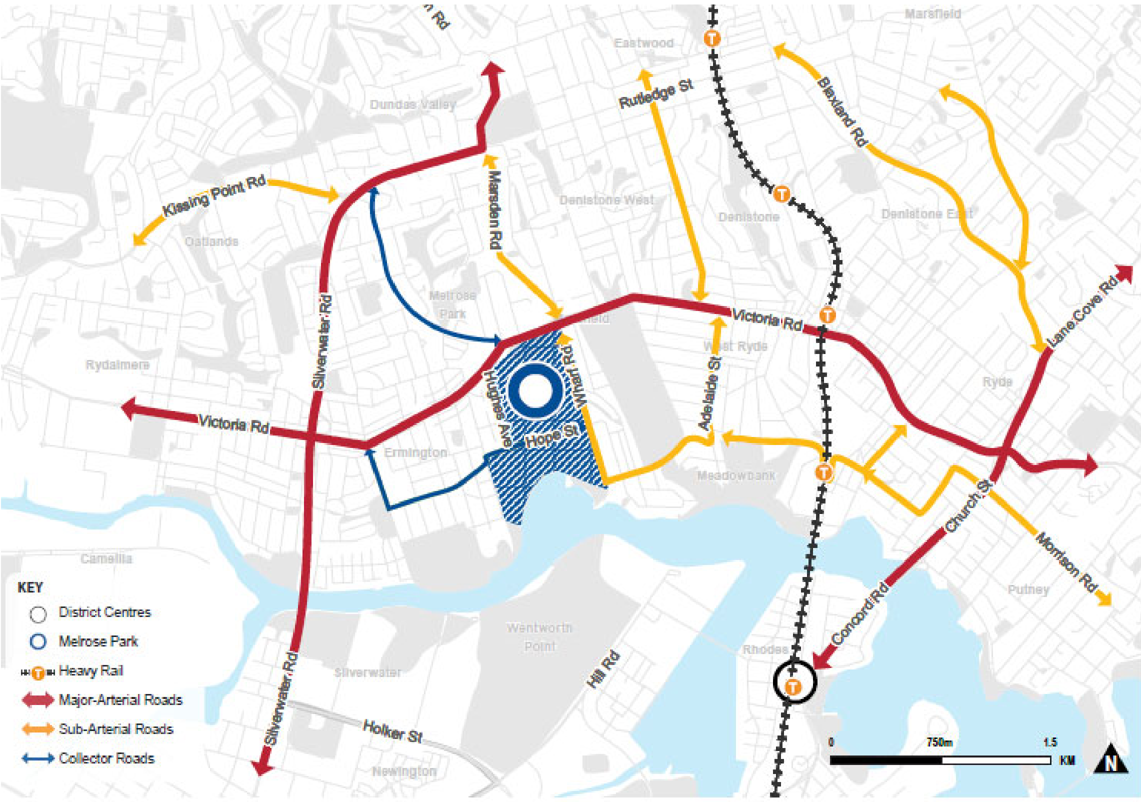


Figure 5 Existing road hierarchy

Source: Melrose Park TMAP (Jacobs, January 2019)

2.3 Rail services

Melrose Park is located approximately 2km to the west of both West Ryde Station and Meadowbank Station, both of which are located on the T1 Northern Line of the Sydney Trains Network. The T1 Northern Line in turn provides direct access to key sub-regional and regional centres, and to major transport interchanges at Epping (for trips to Hornsby, Macquarie Park and Chatswood) and Strathfield (for trips to Parramatta, Westmead and Penrith).

T1 Northern Line services through both stations provide 5 trains per hour in the AM commuter peak, then 4 services per hour across the rest of the day.

To improve access by rail between Parramatta and the Sydney CBD the NSW Government has committed to the Sydney Metro West project, which will provide a direct connection between Parramatta and Sydney via key precincts including Sydney Olympic Park and the Bays Precinct.

Sydney Metro West will effectively double the capacity of existing T1 Western Line between Parramatta and the City, and in turn free up capacity across the rail network. Further the proposed Stage 2 of the Parramatta Light Rail line (PLR Stage 2) would run along Hope Street and Wharf Road within the Melrose Park precinct and provide an immediate connection south to the Sydney Metro West at Sydney Olympic Park.

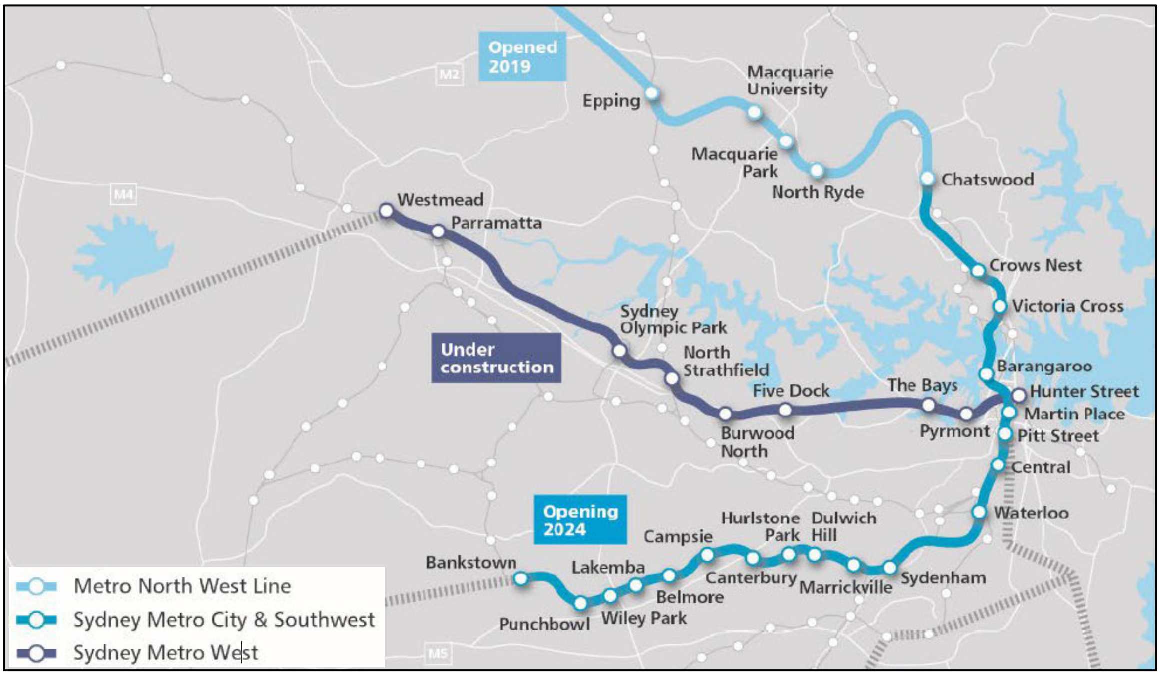


Figure 6 Future Sydney Metro West alignment

Source: Transport for NSW (2022)

2.4 Bus services

Primary bus services are provided in Victoria Road, including regional and sub-regional routes connecting Sydney (City) and Parramatta (with connections to rail and major centres). Key bus routes – the majority of which also connect to railway stations, transport interchanges and sub-regional and regional centres - are summarised in Table 1 below.

Table 1 Summary of existing bus services

Bus Route	Description	Frequency	
		Peak Periods	Off-Peak
M52	Parramatta to Sydney City via Ryde	10 min	15 min
520	Parramatta to Sydney City via Ryde	30 min	60 min
513	Carlingford to Meadowbank Ferry Wharf	30 min	60 min
523	Parramatta to West Ryde via Ermington	30 min	60 min
524	Parramatta to West Ryde via Melrose Park	30 min	60 min
544	Auburn to Macquarie Park	30 min	60 min

Sydney's Bus Future specifically identifies Victoria Road as a Rapid Bus Route (between Parramatta and the Sydney CBD via Ryde) running directly past Melrose Park and is forecast to provide 40 additional bus services every weekday, or the ability to carry more than 2,000 additional customers per day. In addition, key bus prioritisation initiatives are forecast to significantly reduce travel times. The future Victoria Road Rapid Bus Corridor is shown in Figure 7 below.

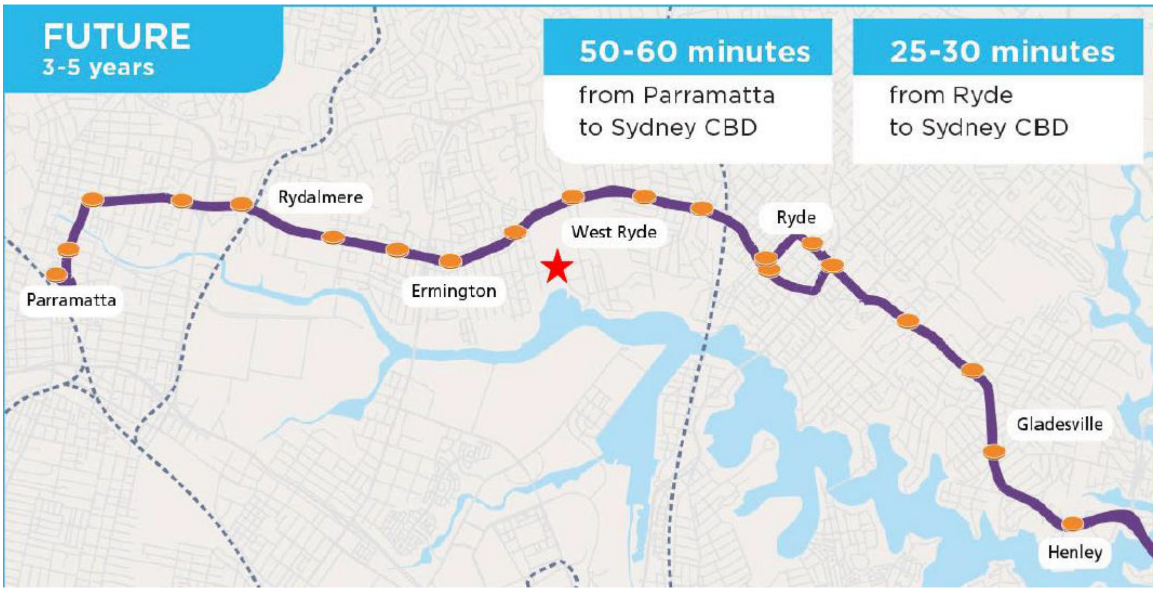


Figure 7 Parramatta to CBD Rapid Bus Improvements

Source: Transport for NSW

2.5 Ferry network

The existing ferry network is shown in Figure 8. Ferries currently run between Meadowbank Ferry Wharf and Circular Quay around twice per hour during the day. The trip takes approximately 50 minutes. Ferries currently run between Meadowbank Ferry Wharf and Parramatta once per hour and the trip takes 33 minutes.

Sydney's Ferry Future reports increases in ferry patronage over the past 10 years, with key demand for trips to/from the Sydney CBD, as well as forecast population growth in areas services by the Parramatta River wharves, and particularly those at Sydney Olympic Park, Meadowbank and Cabarita. Notwithstanding, there remains spare capacity over most of the ferry network to accommodate additional growth.

While a future ferry wharf at Melrose Park has previously been examined, the TMAP determined that a new wharf was not an essential component of the Melrose Park transport network, and that the broader suite of proposed public and active transport services and infrastructure can accommodate the future trip demands without ferry services.

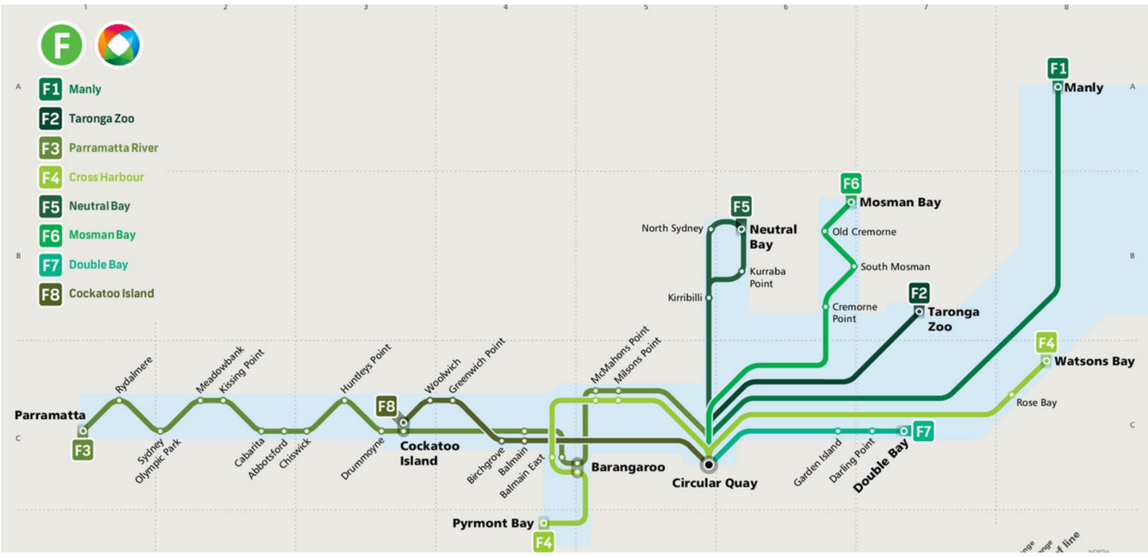


Figure 8 Existing ferry network

2.6 Light rail network

There is currently no light rail access in the vicinity of Melrose Park. Parramatta Light Rail (PLR) Stage 1 will be introduced through the Parramatta CBD connecting the major educational and health facilities of Westmead and Rydalmere. Stage 2 of the Parramatta Light Rail will connect the Parramatta CBD to Ermington, Melrose Park, Wentworth Point and Sydney Olympic Park. It will also connect to Sydney Metro West, the heavy rail in Parramatta and Sydney Olympic Park, and ferry services at Rydalmere and Sydney Olympic Park.

As part of PLR Stage 2 a light rail station within the Melrose Park precinct – directly adjacent to the Melrose Park Town Centre - will be delivered, offering an excellent public transport opportunity for future workers and residents by:

- Better integrating Parramatta CBD with Rydalmere, Melrose Park, Wentworth Point and Sydney Olympic Park;
- Providing an attractive and accessible service and the potential to reduce the need for car trips and car-parking use at Melrose Park; and
- Facilitating the development of higher density housing through better urban design and urban form at future light rail stops on Hope Street and Wharf Road.

The PLR Stage 1 and Stage 2 routes are shown in Figure 9 below.

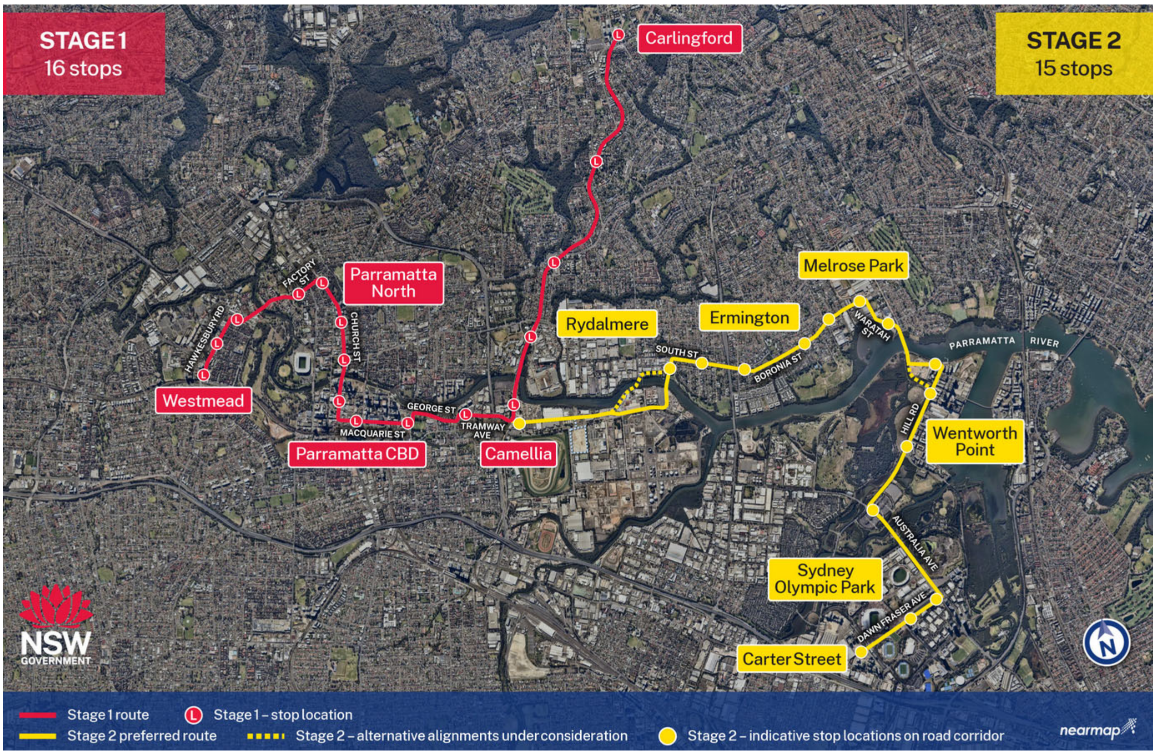


Figure 9 Parramatta Light Rail

Source: Transport for NSW

2.7 Public transport accessibility

Accessibility to and from Melrose Park within 30 minutes by public and active transport is shown in Figure 10. Approximately 45,000 residents and 28,000 jobs are currently located within a 30-minute public transport journey of Melrose Park

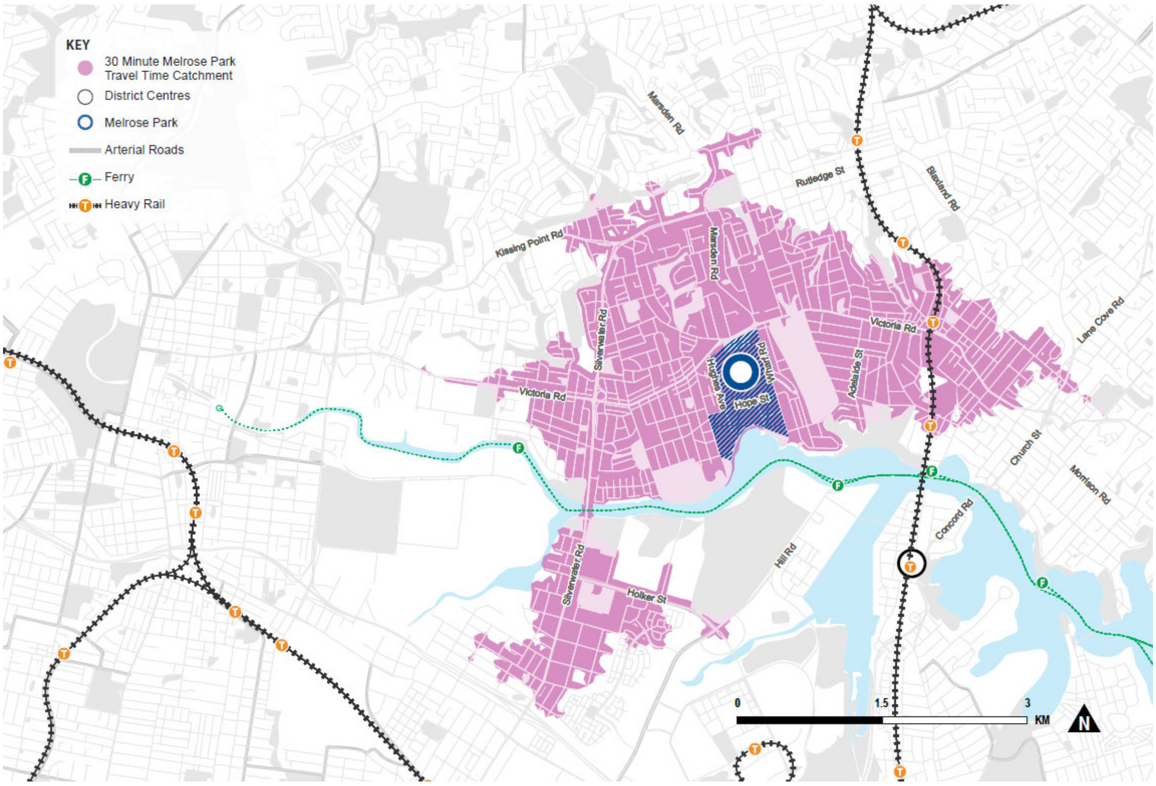


Figure 10 Existing 30-minute public transport catchment from Melrose Park

Source: Melrose Park TMAP (Jacobs, January 2019)

2.8 Active transport network

Although limited active transport connections are currently provided within the Melrose Park precinct, this will be resolved through the future delivery of a legible and accessible street network to be provided as part of future development. Pedestrian crossing points are available intermittently along Parramatta Road at signalised intersections.

There are a number of good quality cycling routes that exist in the area, including:

- Parramatta River Foreshore Pathway active transport shared path which provides a recreational and commuter cyclist connection to Meadowbank ferry wharf
- Local cycling connection on Andrew Street and Adelaide Street connecting the southern precinct of Melrose Park to Victoria Road (West Ryde)
- Active transport shared path connections to southern side of Parramatta River and to Foreshore Pathway on southern side of river, including bridges across the Parramatta River at Silverwater Road and Concord Road.

2.9 Melrose Bridge

The most significant piece of major infrastructure identified in the TMAP as being essential to the transport network to accommodate the development of Melrose Park is an active and public transport bridge over the Parramatta River to Wentworth Point. The TMAP determined that the Melrose Bridge will be required by 2028, by which time some 6,700 dwellings would be occupied within Melrose Park based on projections available at the time of the TMAP modelling.

The Melrose Bridge provides the essential active and public transport connection to the broader Sydney Metropolitan transport network, including:

- A direct link to the Sydney Metro West station at Sydney Olympic Park;
- New bus services between Top Ryde and Concord Hospital via Melrose Park;
- Direct access to the emerging Sydney Olympic Park and Rhodes regional centres; and
- Provisions for the introduction of PLR Stage 2 in the future.

The TMAP concluded that the Melrose Bridge – and moreover the active and public transport opportunities it creates – will reduce the private vehicle trip generation of Melrose Park to such a level that it can (further of course to other road network upgrades and transport strategies) appropriately accommodate the future trip demands of Melrose Park.

3 Transport Access Strategy

3.1 Local road network

The Melrose Park Town Centre will be supported by an internal network of roadways and intersections as detailed in a separate early works, public domain and infrastructure DA and indicated in Figure 11. The majority of intersections in the precinct will be controlled by roundabouts, with the exception of intersections on Hope Street where traffic lights will be installed following the introduction of the Parramatta Light Rail project. Traffic lights at these locations was a direct recommendation arising from the outcomes of the traffic modelling undertaken for the Melrose Park TMAP, and are required to provide for efficient operation of light rail vehicles as well as traffic accessing the town centre.

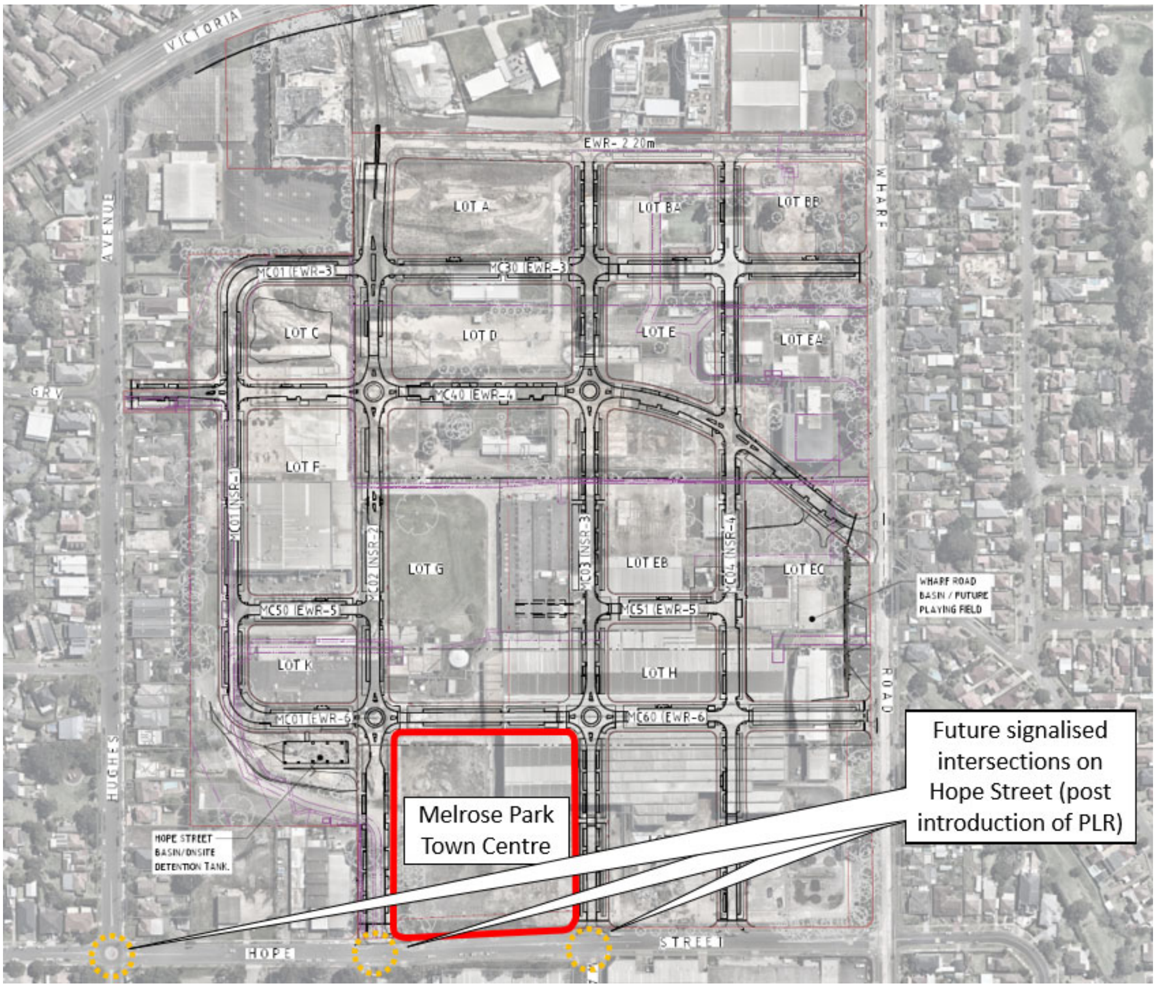


Figure 11 Local road network supporting the MPTC

Note: It is understood that the alignment of East-West Road 4 will be updated to that shown in Figure 11, however this new alignment does not impact the findings or conclusions of the study for the Melrose Park Town Centre.

3.2 Vehicle access arrangements

The vehicular access arrangements to the MPTC are illustrated in the figures below and described on the following page.

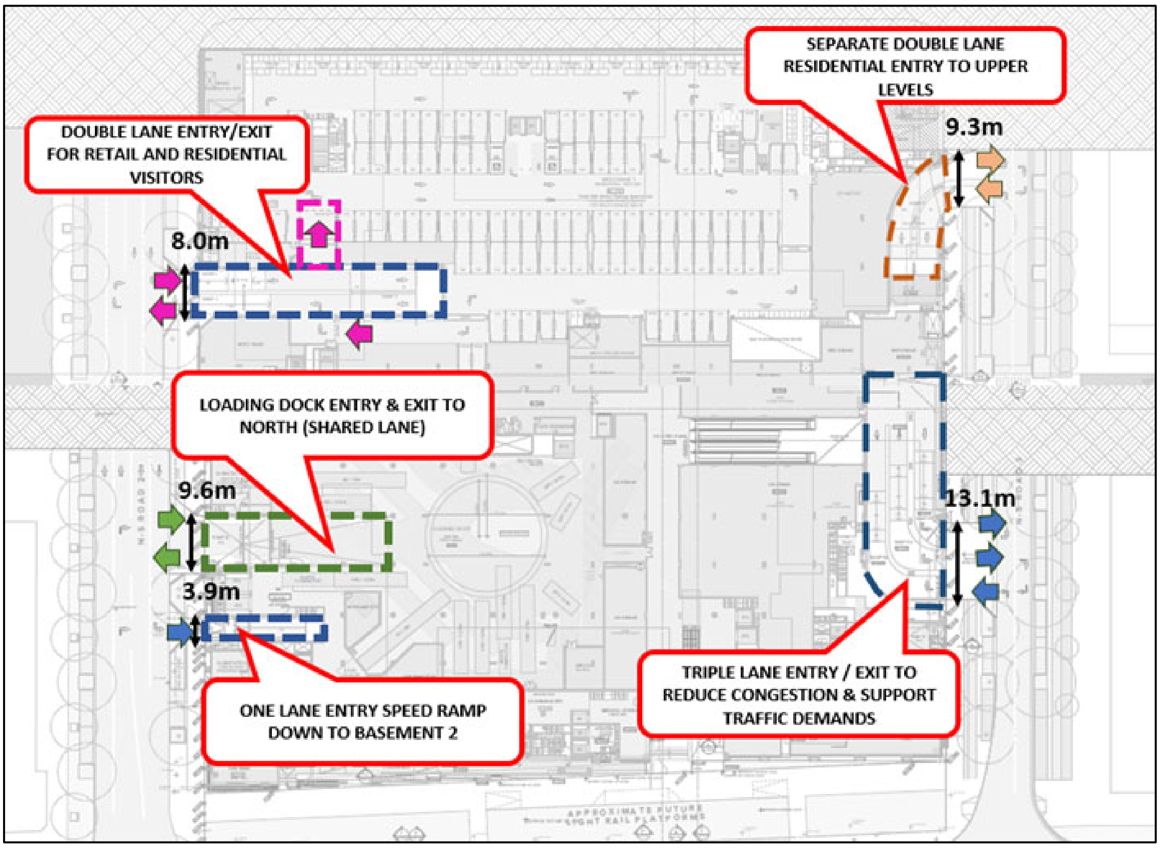


Figure 12 Proposed vehicle access arrangements

Vehicles will be able to access the MPTC via a number of entry and exit points as described in Table 2 below.

Table 2 Vehicle access options

Level	Road frontage	Access description	Permissible vehicle movements
Lower ground	N-S Road 2	Loading dock	Entry and exit
Lower ground	N-S Road 2	Express ramp to Level B2 retail car park	Entry only
Lower ground	N-S Road 3	Retail car park	Entry and exit
Mezzanine 1	N-S Road 2	Retail car park and Hospital/Staff car park	Entry and exit
Mezzanine 1	N-S Road 3	Resident car park	Entry and exit

3.3 Car park design

The car park has been designed in accordance with AS2890.1 with respect to ramp gradients, circulation aisle widths and car space dimensions. A review of the plans has found that the car park layout complies with the requirements of AS2890.1-2004 for all uses. Relevant dimensions provided include:

- Residential parking areas - aisles minimum 5.8 metres wide with parking spaces 2.4 metres wide by 5.4 metres long complying with the requirements of Class 1 parking areas
- Retail and staff parking areas - aisles minimum 6.2 metres wide with parking spaces 2.7 metres wide by 5.4 metres long complying with the requirements of Class 3A parking areas

For the residential car parking areas ramp gradients of 1:4 with 1:8 transitions are provided on all internal circulation ramps, with the main entry ramp to have a 5% gradient for the first 6m beyond the property boundary in accordance with AS2890.1. For the retail car parking areas the maximum ramp gradient provided is 1:5 given the publicly accessible nature of the car park.

3.4 Vehicle clearance heights

The following vehicle clearance heights will be provided in the on-site car parking areas to accommodate the safe movement of vehicles:

- 4.5m clearance height within the loading dock to accommodate a range of delivery vehicles including 19m articulated vehicles.
- 2.2m clearance height within the basement and mezzanine levels, as per the requirements of AS2890.1. The exception to this will be a 2.5m clearance height above accessible car parking spaces and adjoining shared areas as required under AS2890.6.

3.5 Loading and servicing provision

A substantial loading dock will be provided to accommodate the various servicing requirements of the uses within the MPTC. The loading dock is shown below and includes parking for the following vehicles:

- 2 * 19m long articulated vehicles
- 5 * 12.5m long Heavy Rigid Vehicles (HRVs)
- 4 * 8.8m long Medium Rigid Vehicles (MRVs)
- 2 * 6.4m long Small Rigid Vehicles (SRVs)

As per the requirements of AS2890.2, a gradient of 5% for 7m has been provided at the entry to the loading dock on N-S Road 2.

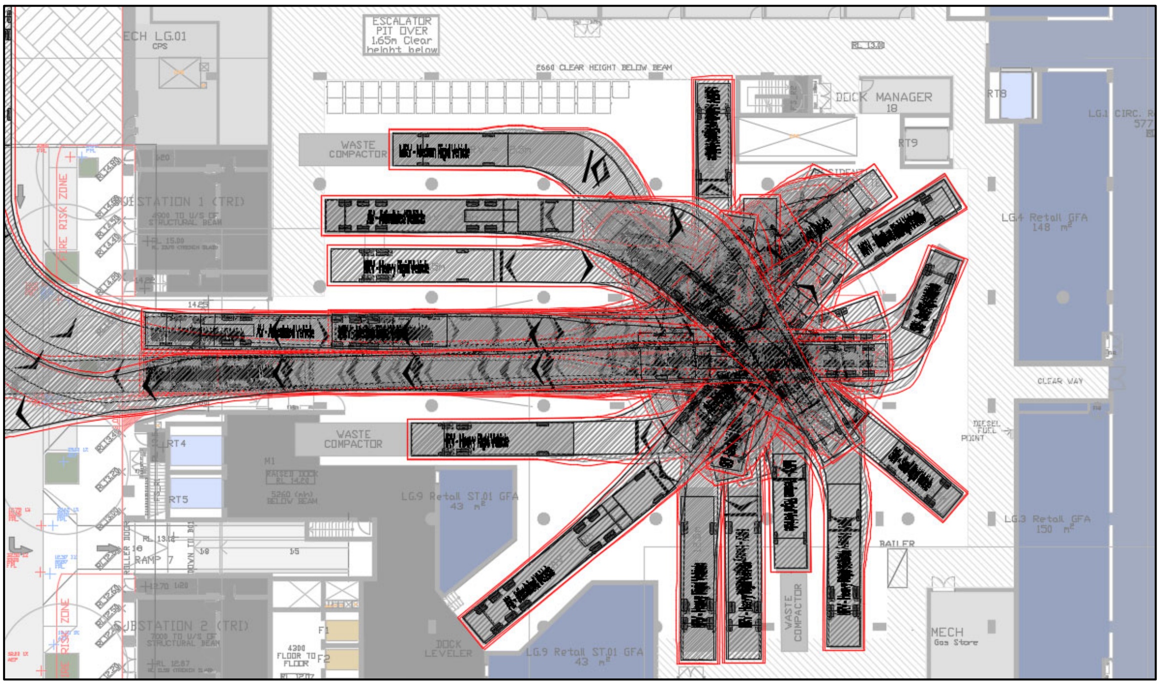


Figure 13 On-site loading dock

In addition to the truck loading dock, a further 12 car parking spaces (all 2.7m wide) are allocated for the purpose of smaller deliveries, courier vehicles and long stay vehicles (e.g. tradies) within the Lower Ground retail car park, which has direct access to the loading area. The intention of the 12 service vehicle spaces within the mezzanine levels is for service vehicles classed as 'small vehicles' – i.e. B99, vans, utes. All of these vehicle types have a headheight of 2.2m or below and is consistent with the guidance provided in the TfNSW Last Mile Toolkit. The spaces will be used by tradespeople, contractors and for deliveries to smaller tenancies – all managed via an online booking system. There is no need to locate these spaces in the main loading dock area given the type of vehicles anticipated. The online booking system in place will inform drivers of how to access the service vehicle parking areas including suitable paths of travel and access points.

The preferred arrangement in terms of vehicle access is for trucks to access the loading dock from the south via Hope Street and N-S Road 2 and turn right into the site. Egress would be via a left turn out onto N-S Road and back onto Hope Street. Should NSR-2 be closed at Hope Street following the introduction of light rail then vehicles would access the loading dock by travelling down NSR-2 directly from Victoria Road. All intersections on NSR-2 north of Hope Street have been designed to accommodate a range of service vehicles, with mountable roundabouts provided to enable large vehicles to utilise this road without resulting in significant intersection footprints. Loading vehicles have the ability to turn left into the loading dock from NSR-2 and similarly turning right out the loading dock to travel back towards Victoria Road.

3.6 Loading and servicing demand

This section presents the number of daily delivery trips for the MPTC and the loading bay requirements to manage the daily demand.

The estimated daily delivery and servicing trips to the MPTC were calculated using a benchmarking approach based on survey information from similar mixed-use developments. The generation tool applies a delivery and servicing vehicle trip rate for each of the proposed site uses to the relevant gross floor area (GFA) for that area use. This approach is now commonly adopted as the most suitable method of determining daily servicing trips and in turn number of service vehicle bays required. Most recently it has been used to inform the loading bay requirements for the NSW Government's 'Tech Central' precinct at Central Station.

The trip rates, which are generally expressed as vehicles per 100m² GFA per day, have been derived from survey data from office, retail, residential and other facilities. The following assumptions have been used to determine the daily number of delivery trips:

- 0.18 vehicles/100m²/day for commercial deliveries
- 0.06 courier vehicles/ /100m²/day for Office/commercial deliveries
- 0.53 vehicles/100m²/day for Retail/Supermarket deliveries
- 2.20 vehicles/100m²/day for Restaurant/Café deliveries
- 0.14 vehicles/residential apartment/day for residential deliveries

For the purposes of this assessment (as a conservative assumption) the Day Hospital and medical suites are assumed to generate demands similar to retail uses.

The number of daily deliveries to the MPTC, based on the proposed uses, have been calculated and are shown in Table 3 below.

Table 3 Forecast daily servicing demand for the MPTC

Use	GFA (m²) / Number of Units	Daily Servicing Vehicles
Commercial	6,572m²	10
General Retail / Day Hospital / Medical Suites	20,319m²	108
F&B	4,709m²	104
Residential units	494	69
Total		**291**

The loading dock will be managed so that vehicle arrivals are evenly distributed throughout the day, with an expected length of stay of 30 minutes per vehicle on average. The exception to this is the parking bays allocated to trades vehicles which will have a typical length of stay of two hours. Based on the loading dock operating over a 12 hour period, each truck / courier parking space could accommodate 24 different vehicles over a given day. Each trades vehicle parking space could accommodate 6 different vehicles a day based on the average two hour length of stay. This yields the following requirements in terms of parking bays based on the expected vehicle demands.

Table 4 Forecast loading requirements by vehicle type

Vehicle size	Vehicles per day	Loading requirement	Provided
Semi-trailer / HRV / MRV / SRV	146	6	13
Light vehicle (general deliveries)	116	5	7
Light vehicle (trades vehicle)	29	4	5
Total	291	15	24

As evident in Table 4 the parking provision for service vehicles allocated in the submitted plans will be sufficient to accommodate the expected loading and servicing demands of the various uses within the MPTC.

3.7 Vehicle swept paths

Vehicle swept path analysis indicating the suitability of the various access points, along with the internal vehicle circulation arrangements, are provided in Appendix A of this document. The swept path analysis confirms there are appropriate levels of circulation space for various vehicle types to manoeuvre into, within and out of the MPTC.

3.8 Green Travel Plan

Appendix C of this document contains a Green Travel Plan (GTP) and Transport Access Guide – prepared in accordance with standard TfNSW guidance.

4 Traffic Movements and Car Parking

4.1 Traffic generation (Melrose Park Town Centre)

The Melrose Park TMAP goes into significant detail regarding the ultimate level of traffic generation from the Melrose Park precinct and considered traffic movements arising from three generic uses, those being residential, retail and commercial. The MPTC project however proposes a range of specific uses that were not contemplated in the TMAP including a Day Hospital, childcare centre and medical suites.

Details of the traffic generation assumptions adopted are noted below:

4.1.1 Residential traffic generation

The TMAP adopted a traffic generation rate of 0.25 trips / dwelling for all residential development within the MPTC. Given however the advent of the (now confirmed) Parramatta Light Rail Stage 2, with a light rail stop located directly adjacent to the MPTC, it is considered appropriate to adopt the Sydney wide average trip rates for residential uses in the MPTC as documented in the *Guide to Traffic Generating Developments (2013 update)* document. Reduced car parking rates have been adopted for the residential uses reflective of sites' future proximity to the light rail stop (i.e. within 400m) as recommended by Council – further supporting the use of the Sydney wide average rates.

This traffic generation rate is consistent with the rate adopted for the residential uses on the former Bartlett Park site. At the time the TMAP was developed delivery of Stage 2 of PLR was not confirmed. It should be noted that the higher trip rate of 0.25 / dwelling has been retained for the remainder of residential development within the Melrose Park precinct despite the significantly improved public transport accessibility.

4.1.2 Commercial trip generation

The traffic generation rates adopted in the TMAP for commercial uses, those being 1.6 and 1.2 trips per 100m^2 GFA in the AM and PM peak hours respectively, have been maintained in this assessment. This is considered conservative given almost one third of the commercial GFA comprises of the gym which will largely serve residents and workers of the MPTC along with those within the broader Melrose Park precinct. It is therefore not expected the gym will in itself generate standalone traffic movements during the commuter peak hours – trips to the gym may be linked to trips to other uses such as the retail or commercial.

4.1.3 Retail traffic generation

The TMAP adopted traffic generation rates for retail uses of 2.5 and 5.0 vehicle trips per $100m^2$ in the AM and PM peak periods respectively – this has been adopted in the analysis for the MPTC project. Consistent with the TMAP a 20% allowance has been made for linked trips.

4.1.4 Child care centre

Recent surveys undertaken by TfNSW (*provided in Roads & Maritime Services Validation Trip Generation Surveys: Child Care Centre Data Report, 2015 prepared by TEF Consulting*) show that child care centres in areas with higher densities and access to public transport and general services are in the order of 0.37 trips per child in both the AM and PM peak hours. This rate has been adopted for the analysis.

4.1.5 Medical suites

Recent surveys undertaken by TfNSW (*provided in Roads & Maritime Services Validation Trip Generation Surveys: Medical Centres, 2015 prepared by TEF Consulting*) show that traffic generation from medical centres is approximately 1.9 trips / $100m^2$ in the AM peak hour and 2.4 trips / $100m^2$ in the PM peak hour.

4.1.6 Day hospital

Former RMS nor current TfNSW guidelines do not nominate a traffic generation rate for a Day Hospital. The traffic generation from the Day Hospital has been estimated based on the number of parking spaces to be provided – with a conservative assumption of 50% of these parking spaces generating traffic movements during the morning and afternoon peak hours.

4.1.7 Total traffic generation

The resultant traffic generation from the various uses proposed is summarised in Table 5 below. This volume of traffic has been accounted for as part of the extensive traffic modelling undertaken in support of the Melrose Park TMAP.

Table 5 Forecast MPTC traffic generation

Use	Quantum	Units	Traffic Generation Rate		Traffic Generation	
			AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Retail	18295	m^2 GFA	2.50	5.00	343	686
Commercial	4276	m^2 GFA	1.60	1.20	68	51
Medical Suites	735	m^2 GFA	1.90	2.40	14	18
Day Hospital	125	Parking Spaces	0.75	0.75	63	63
Childcare	150	Children	0.40	0.40	56	56
Residential	494	Apartments	0.25	0.25	94	74
Total					**638**	**948**

4.2 Traffic generation (Melrose Park precinct)

The TMAP considered the overall traffic generation arising from the full development of the Melrose Park precinct which in turn informed the detailed mesoscopic traffic modelling. The development yields and uses considered in the TMAP were high level and since the finalisation of the TMAP there has been greater definition provided in relation to the development mix and densities within the precinct – particularly in relation to the former Bartlett Park site as well as the MPTC. Table 6 below summarises the expected traffic generation based on the latest development mix and yields and confirms that the overall traffic movements from the precinct is consistent or lower in comparison to that considered in the TMAP– with a significant reduction of approximately 3.8% during the PM peak hour. This demonstrates that the findings and conclusions of the TMAP remain valid based on the development of the MPTC as proposed.

Table 6 Traffic generation comparison – Melrose Park precinct

Site	Use	Quantum	Units	Traffic Generation Rate		Traffic Generation	
				AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Former Bartlett Park Site	Retail	413	m^2 GFA	2.50	5.00	10	21
	Residential	1070	Dwellings	0.19	0.15	203	161
Melrose Park Town Centre	*Refer to Table 5 Forecast MPTC traffic generation*					638	948
Melrose Park North (Balance)	Residential	4576	Dwellings	0.25	0.25	1144	1144
	School	800	Children	0.26	0.05	204	40
Melrose Park South	Residential	4615	Dwellings	0.25	0.25	1154	1154
	Retail	960	m^2 GFA	2.50	5.00	19	38
	Commercial	1800	m^2 GFA	1.60	1.20	29	22
Total Traffic Generation - Melrose Park (Current)						***3400***	***3526***
Total Traffic Generation - Melrose Park (Original TMAP Assumption)						***3399***	***3664***
Change Compared to TMAP Assumptions						***+0.0%***	***-3.8%***

4.3 Traffic modelling – ultimate arrangements

4.3.1 Aimsun traffic modelling

As previously noted detailed Aimsun traffic modelling has previously been undertaken during the TMAP development which considered the operation of the surrounding road network. The extents of this Aimsun modelling are indicated in Figure 14.

Figure 14 Melrose Park mesoscopic traffic model extents

Source: Pentelic Advisory

This Aimsun modelling has recently been updated by Pentelic Advisory to consider a number of changes since the finalisation of the TMAP, including:

- Adjustment of the Parramatta Light Rail Stage 2 alignment along Hope Street to Waratah Street (previously assumed to use Wharf Road).
- Adjustment of internal travel zone connections to reflect the locations of driveways under the revised internal street layout for Melrose Park North.
- Revision of the traffic generation assumptions to consider the current development schedule for the precinct as previously described in Section 4.2 of this document.
- Revision of the land use assumptions for the Melrose Park southern precinct based on the updated structure plan supporting the recently submitted Planning Proposal.

4.3.2 SIDRA traffic modelling

While the TMAP considered in detail the operation of the State and Regional road network, in particular Victoria Road, it did not specifically analyse the internal intersections on the perimeter of the Melrose Park Town Centre.

Minutes of the pre-lodgement meeting undertaken for the MPTC noted that SIDRA traffic modelling should be undertaken for intersections surrounding the town centre, with the advice noting the following:

"*The TIA is to include assessment of the operation of the surrounding road network and the proposed access driveways. This assessment is to include a review of the access driveway locations. The assessment should also be supported by traffic modelling of the nearby intersection*"

In response to the advice provided in the pre-lodgement meeting a SIDRA Network model has been developed which considers the operation of all intersections and access points and factors in any upstream or downstream queuing impacts from adjoining intersections. The SIDRA Network model has been coded to include the distances between the respective driveway access points as well as the future Hope Street intersections. The outputs of the updated Aimsun traffic model, for the future year 2036 inclusive of the full development of the Melrose Park precinct, have been used to inform SIDRA traffic modelling at nine intersections / access points serving the MPTC as indicated in Figure 15.

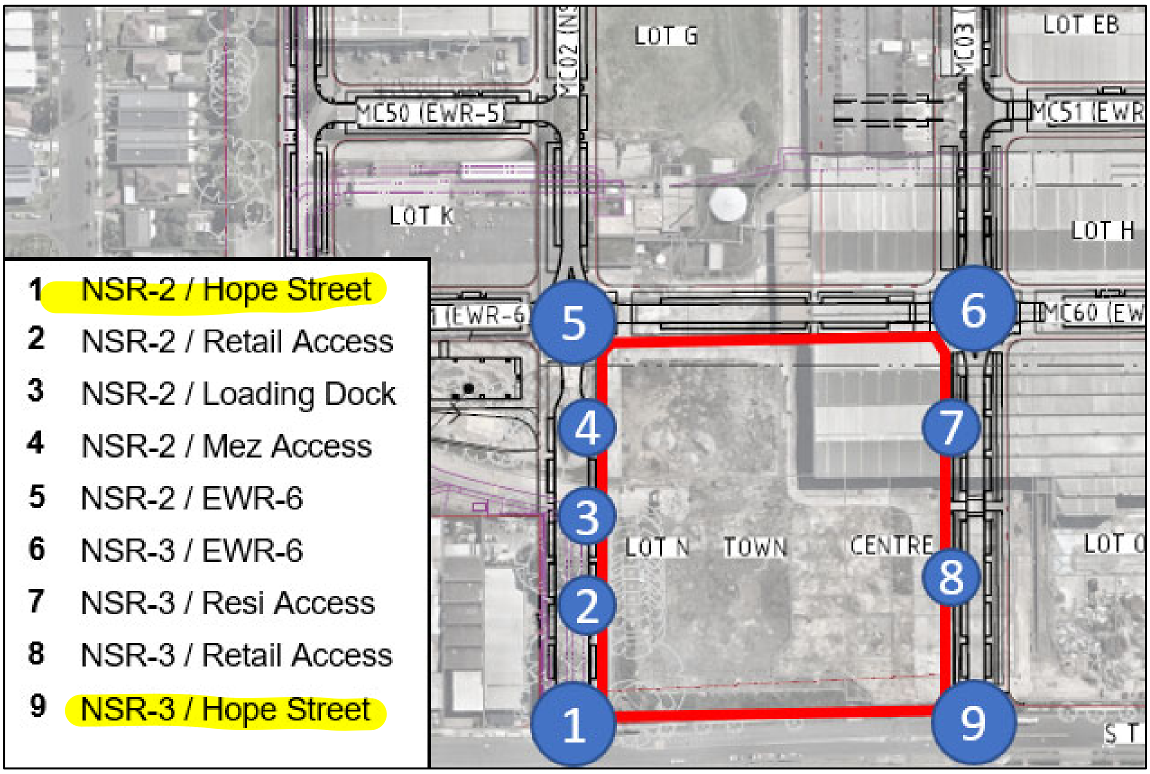


Figure 15 Modelled intersections

4.3.3 Traffic modelling outputs

The traffic modelling metric used to analyse the performance of the intersections is intersection Level of Service (LOS). Level of Service is a measure that uses the average delay experienced by vehicles to categorically assign each approach and movement with a qualitative ordinal grade (A through F, with A being the best and F being the worst). RMS Traffic Modelling Guidelines indicate the average delay relating to each grade, this is outlined in Table 7. In typical urban environments it is typical for intersections to operate at Level of Service D or E and still remain within acceptable performance levels.

Table 7 Level of service grades / description

Level of service grade	Average delay (seconds)	Description
A	Less than 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity. At signals, incidents will cause excessive delays. Roundabouts require other control mode
F	Greater than 71	Unsatisfactory with excessive queuing

A summary of the traffic modelling outputs is provided in Table 8 and demonstrate acceptable levels of performance in both the AM and PM peak hours for all locations assessed. This demonstrates that the road network supporting the MPTC, including the proposed driveway locations, is suitable to support traffic generated from the site as well as the broader Melrose Park precinct. Full SIDRA outputs are provided as Appendix B to this report.

Table 8 Traffic modelling outputs

Location	Intersection Level of Service	
	AM Peak Hour	PM Peak Hour
NSR-2 / Hope Street	C	C
NSR-2 / Retail Access	A	A
NSR-2 / Loading Dock	A	B
NSR-2 / Mez Access	A	A
NSR-2 / EWR-6	A	A
NSR-3 / EWR-6	A	A
NSR-3 / Resi Access	A	A
NSR-3 / Retail Access	A	A
NSR-3 / Hope Street	C	C

4.3.4 Sensitivity testing

Following advice from Council and TfNSW an additional traffic modelling scenario has been assessed which considers the closure to traffic of NSR-2 at Hope Street following the introduction of the light rail. In this event traffic would access the town centre from Hope Street via the North-South Road 3 intersection. This intersection has the ability to accommodate expected traffic movements should no access from Hope Street into NSR-2 be permitted following the introduction of light rail. As shown in the traffic modelling outputs provided as Appendix B, the NSR-3 / Hope Street intersection operates at Level of Service C during the morning and afternoon peak hours, even considering a scenario where traffic previously using NSR-2 at Hope Street is redistributed to NSR-3.

4.4 Interim arrangements prior to PLR2

Prior to the introduction of PLR2 the intersection of NSR-2 & Hope Street will operate as a standard 'priority control' T-Junction. This interim layout is shown in Figure 16 and includes a dedicated right turn bay for traffic turning from Hope Street into NSR-2.

Consistent with Council's recommendation a roundabout control will be implemented at the intersection of NSR-3 and Hope Street prior to it's signalisation at the time of the light rail delivery. Updated civil design plans prepared by Mott Macdonald show a pedestrian/cyclist refuge now integrated with the temporary roundabout at the NSR-3 / Hope Street intersection. This will allow pedestrians and cyclists to cross Hope Street and travel towards the raised crossing on Hope Street via a shared pathway – consistent with Council's recommendations.

Traffic modelling confirms these proposed interim intersection controls will be suitable to accommodate the expected level of traffic movements prior to the introduction of traffic lights on Hope Street. The intersection performance for the interim layouts is summarised in Table 9 with detailed outputs provided in Appendix B.

Table 9 Traffic modelling outputs – interim arrangements

Location	Intersection Level of Service	
	AM Peak Hour	PM Peak Hour
NSR-2 / Hope Street	A	A
NSR-3 / Hope Street	A	A

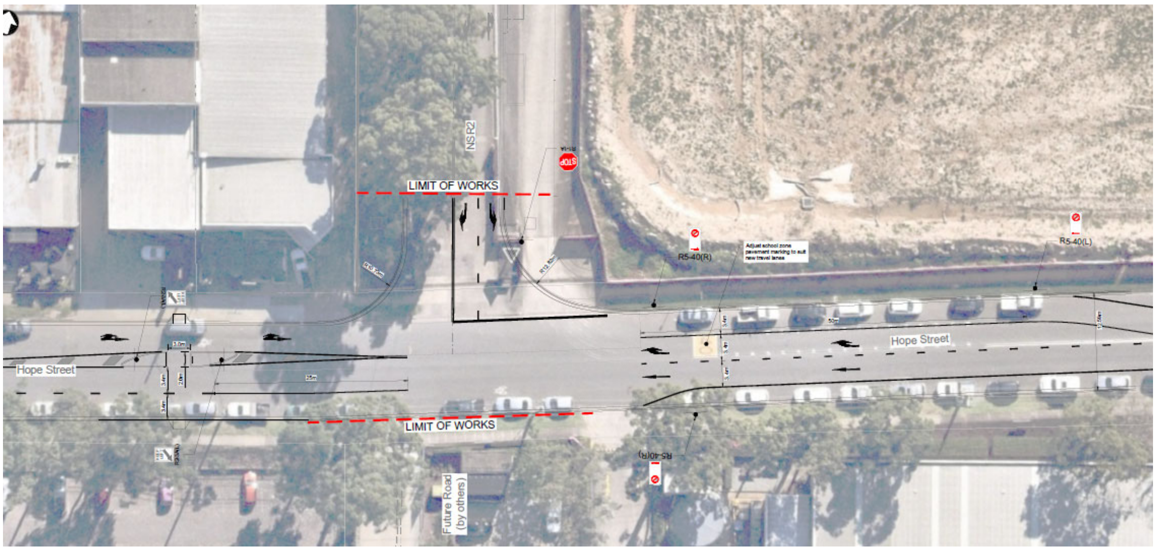


Figure 16 Interim traffic arrangements - NSR-2 & Hope Street

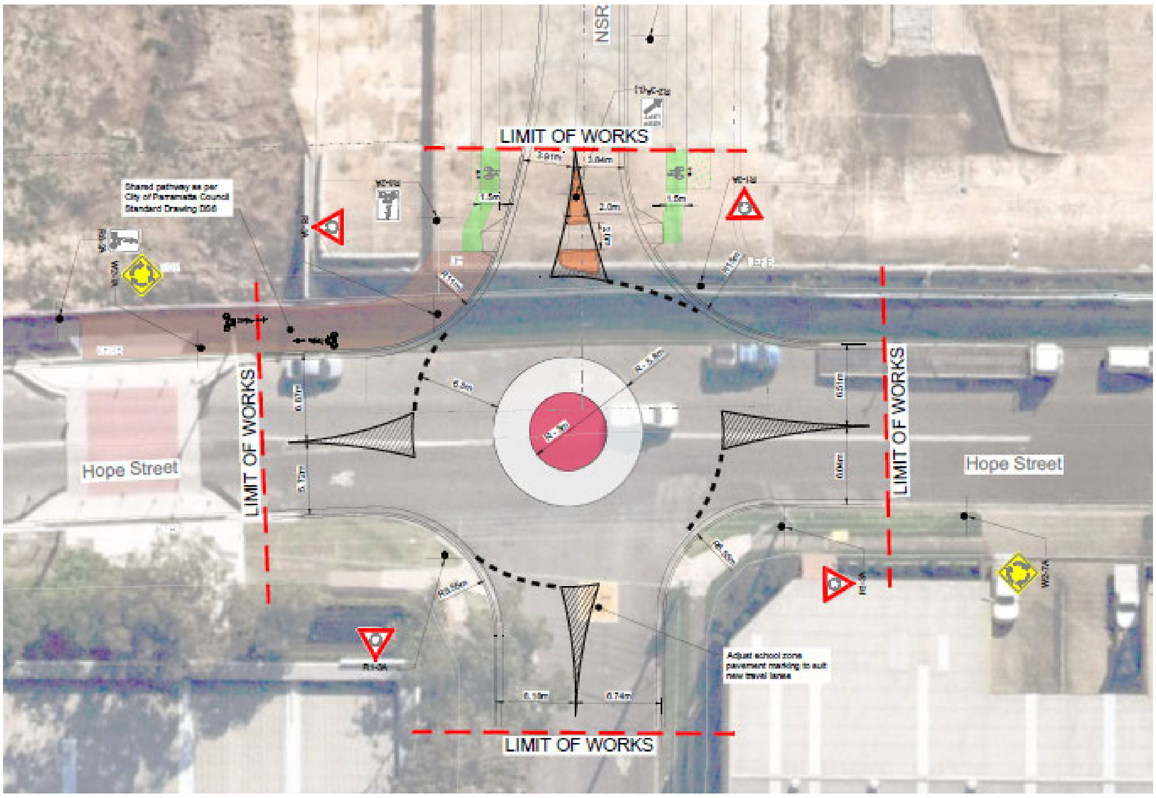


Figure 17 Interim traffic arrangements - NSR-3 & Hope Street

4.5 Car parking

Car parking for the MPTC has been provided in accordance with the maximum parking rates noted in the site specific DCP, which separately references the parking rates contained in Table 3.6.2.3 of the Parramatta DCP. A summary of the car parking (and associated rates) provided for the MPTC is contained in Table 10. Generally the Parramatta DCP parking rates have been adopted as per the site specific DCP with the following exceptions:

- Medical Suites / Day Hospital– the suggested parking rate of 1 space / 30m^2 outlined in the Roads & Maritime Services Validation Trip Generation Surveys: Medical Centres, 2015 prepared by TEF Consulting has been adopted. This rate aligns with the retail car parking rate, noting that the Parramatta DCP doesn't nominate a suggested parking rate for medical suites or Day Hospitals.

Table 10 Proposed MPTC car parking

Use		Quantum	Units	Maximum parking rate	Maximum parking provision	Proposed parking provision
Retail		18,295	m^2 GFA	1 per 30m^2 GFA	610	532
Commercial		4,276	m^2 GFA	1 per 50m^2 GFA	86	84
Medical Suites		735	m^2 GFA	1 per 30m^2 GFA	25	22
Day Hospital		4,396	m^2 GFA	1 per 30m^2 GFA	147	125
Childcare		150	Children	1 per 4 Children	38	38
Residential	1 bed	96	Units	1 / dwelling	96	96
	2 bed	336	Units	1 / dwelling	336	336
	3 bed	62	Units	1.2 / dwelling	74	74
	Visitor	494	Units	0.25 / dwelling	124	105
Total					***1,536***	***1,412***

The analysis demonstrates that the proposed car parking provision for the MPTC is lower than the **maximum** permissible car parking number based on the parking rates outlined in the Parramatta DCP. This reduction of approximately 10% in on-site parking compared to the maximum permissible allowance will assist in managing the road network impacts of the proposal.

4.6 Bicycle parking

Bicycle parking is to be provided for the MPTC in accordance with the rates outlined in the Parramatta DCP as summarised in Table 11 below.

Table 11 Proposed MPTC bicycle parking

Use	Quantum	Units	Bicycle parking rate	Required bicycle parking	Proposed bicycle parking
Retail	18,295	m^2 GFA	1 per 200m2 GFA	91	91
Commercial	4,276	m^2 GFA	1 per 200m2 GFA	21	21
Medical Suites	735	m^2 GFA	1 per 200m2 GFA	4	4
Day Hospital	4,396	m^2 GFA	1 per 200m2 GFA	22	22
Childcare	2,299	m^2 GFA	1 per 200m2 GFA	11	11
Residential	494	Dwellings	1 per 2 dwellings	247	247
Total				**396**	**396**

150 bicycle parking spaces for building staff are provided which is consistent with Council's minimum requirements. End of trip facilities (lockers, showers and change areas) are also provided in accordance with Council requirements and are located in close proximity to North-South Road 2. In addition to the above allocation 30 visitor bicycle parking spaces will be provided within the public domain in close proximity to site access points.

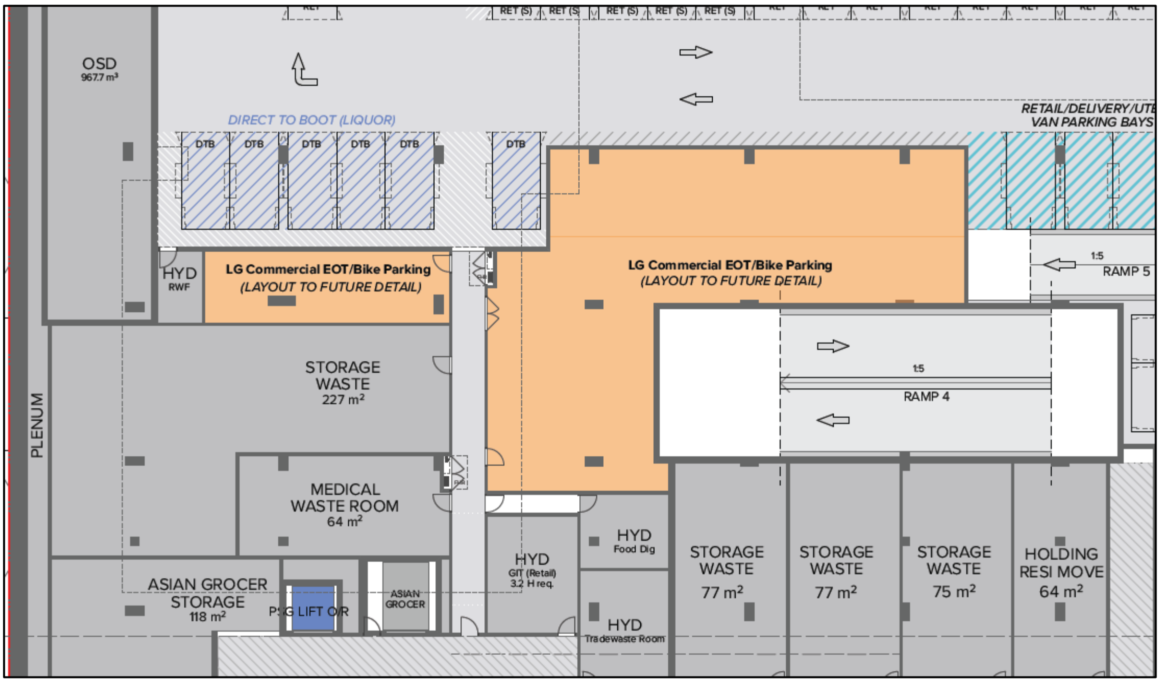


Figure 18 Bicycle parking and end of trip area

4.7 Motorcycle parking

The site specific DCP requires that, at a minimum, one motorcycle parking space be provided for every 50 car parking spaces provided (or part thereof). Based on the 1,412 car parking spaces provided 28 motorcycle parking spaces would be required at this rate. The proposal provides for 35 motorcycle parking spaces in total, comprising of 28 spaces within the retail car park and a further 7 spaces in the mezzanine car parking area. This motorcycle parking provision complies with the site specific DCP requirements and is therefore considered suitable to accommodate future demands.

5 Summary

This transport assessment report has been prepared by JMT Consulting to assess the implications of the proposed Melrose Park Town Centre (MPTC) within the broader Melrose Park precinct. The MPTC will deliver residential apartments, commercial, retail and medical uses across a range of buildings up to 24 storeys.

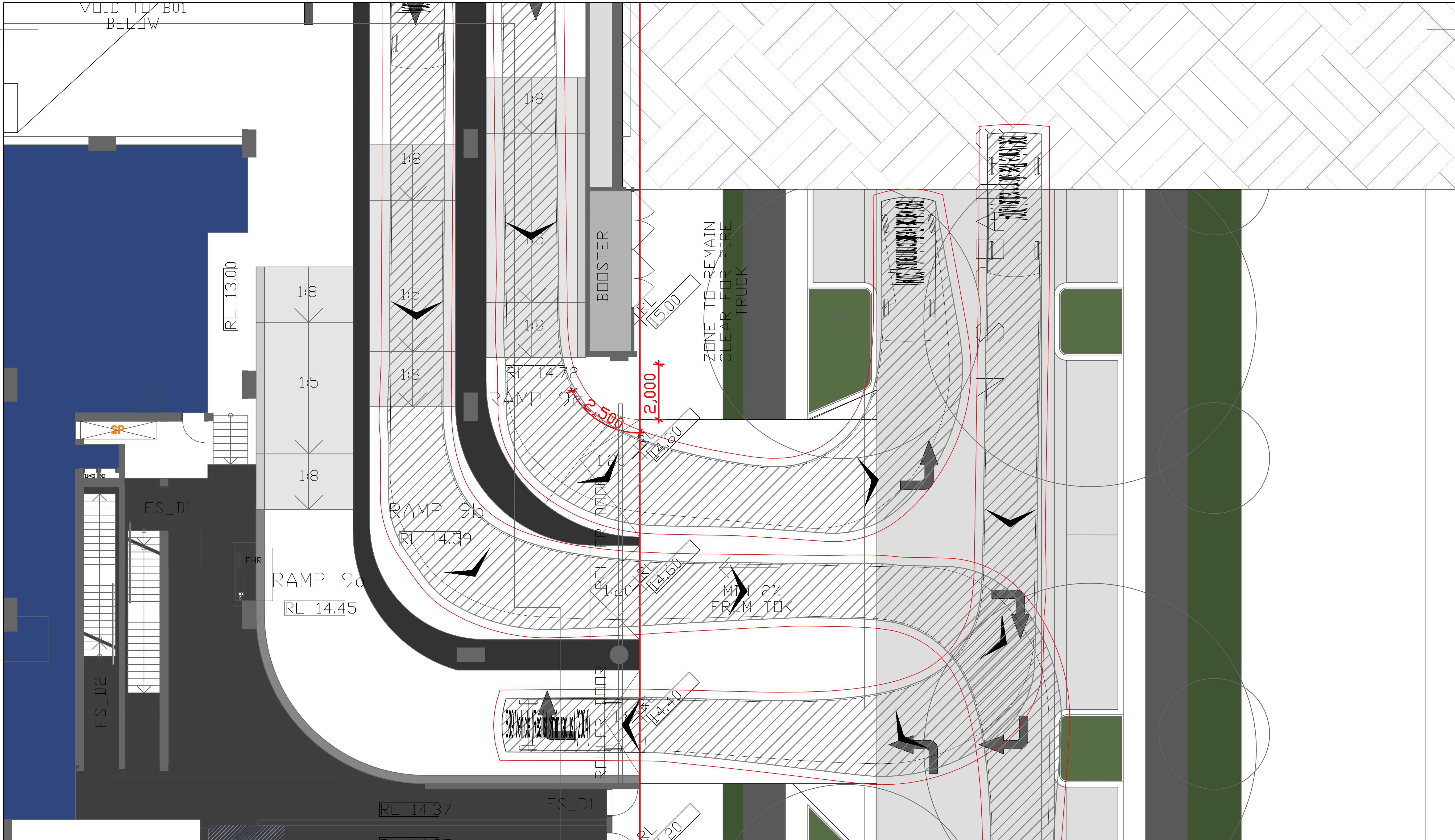
Significant amount of transport planning work have been undertaken to support the Melrose Park precinct including the development envisaged within the MPTC. A Transport Management and Accessibility Plan (TMAP) for the precinct was prepared which identified a suite of infrastructure measures to accommodate the additional level of transport demand generated by future uses. The overall traffic movements from all development in Melrose Park based on the most recent planning for the precinct, inclusive of the MPTC, is lower compared to that considered in the TMAP– with a significant reduction of approximately 3.8% during the PM peak hour. This demonstrates that the findings and conclusions of the TMAP remain valid based on the development of the MPTC as proposed.

Vehicles will be able to access the MPTC via a number of entry and exit points which will allow traffic to be distributed across the site and not concentrated on a single point of entry. The car parking areas have been designed in accordance with the relevant Australian Standards and provide for safe and efficient manoeuvring of vehicles within the site. SIDRA traffic modelling confirms all driveway access points and intersections surrounding the site will operate at a strong level of service following the development of the precinct.

On-site car, motorcycle and bicycle parking will be provided within the MPTC in accordance with Council controls, including the site specific Development Control Plan (DCP). A large on-site loading area is available which has capacity for up to 13 trucks as well as a further 12 vans and couriers. Analysis has demonstrated that this loading provision, based on the development yields proposed, will have the capacity to accommodate the servicing demands generated by the MPTC.

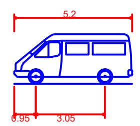
In the above context, the transport and parking impacts arising from the proposal are considered acceptable.

Appendix A: Vehicle Swept Path Analysis



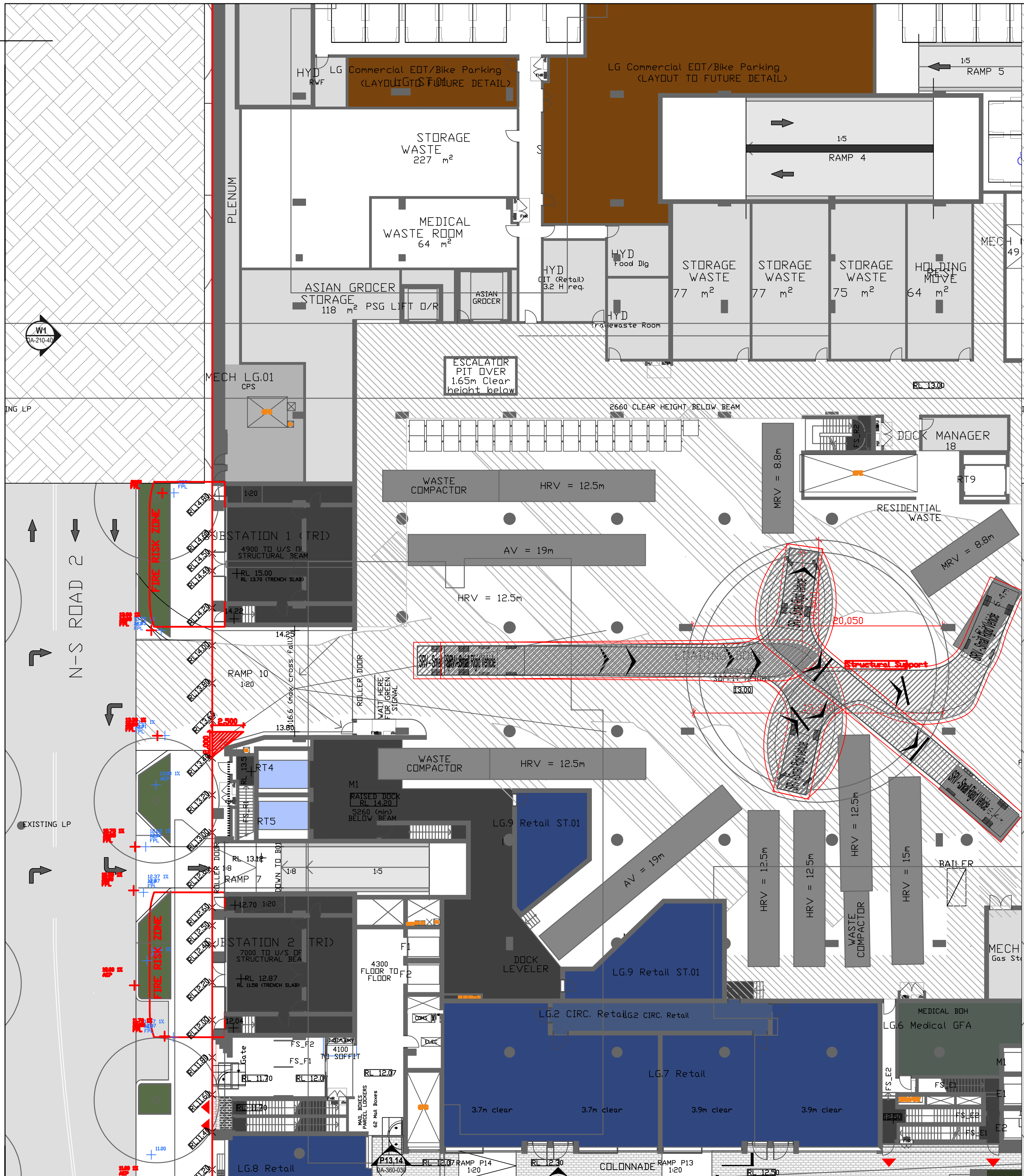
Job Title Melrose Park Town Centre	**Drawing Title** Turning Paths N-R Road 3	**Legend** Body Envelope 300mm Envelope Wheel Envelope
Client Deicorp	**Drawing No** 2240_02	**Job No** 2240
JMT Consulting ABN: 32 6358 30054 www.jmtconsulting.com.au PO Box 99, Kingsford NSW 2032	**Date** 12.07.23	**Scale at A3** 1:200

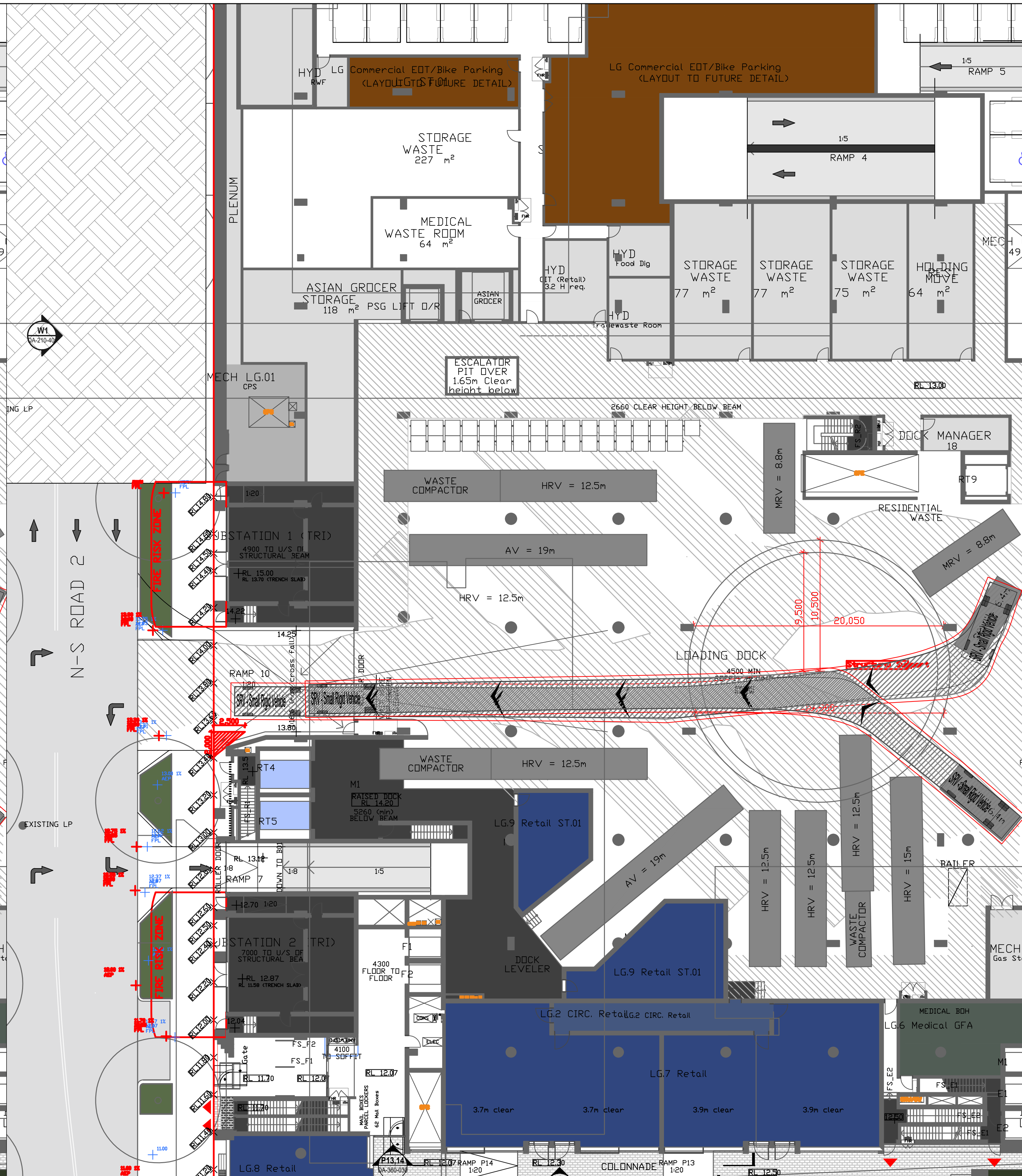
Vehicle type(s)



B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	2.200m
Min Body Ground Clearance	0.312m
Track Width	1.840m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	6.250m





Job Title
Melrose Park Town Centre

Client
Deicorp

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www.jmtconsulting.com.au
PO Box 99, Kingsford NSW 2032

Drawing Title
Turning Paths
SRVs

Drawing No
2240_01(d)

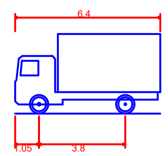
Date
12.07.22

Legend
Body Envelope
300mm Envelope
Wheel Envelope

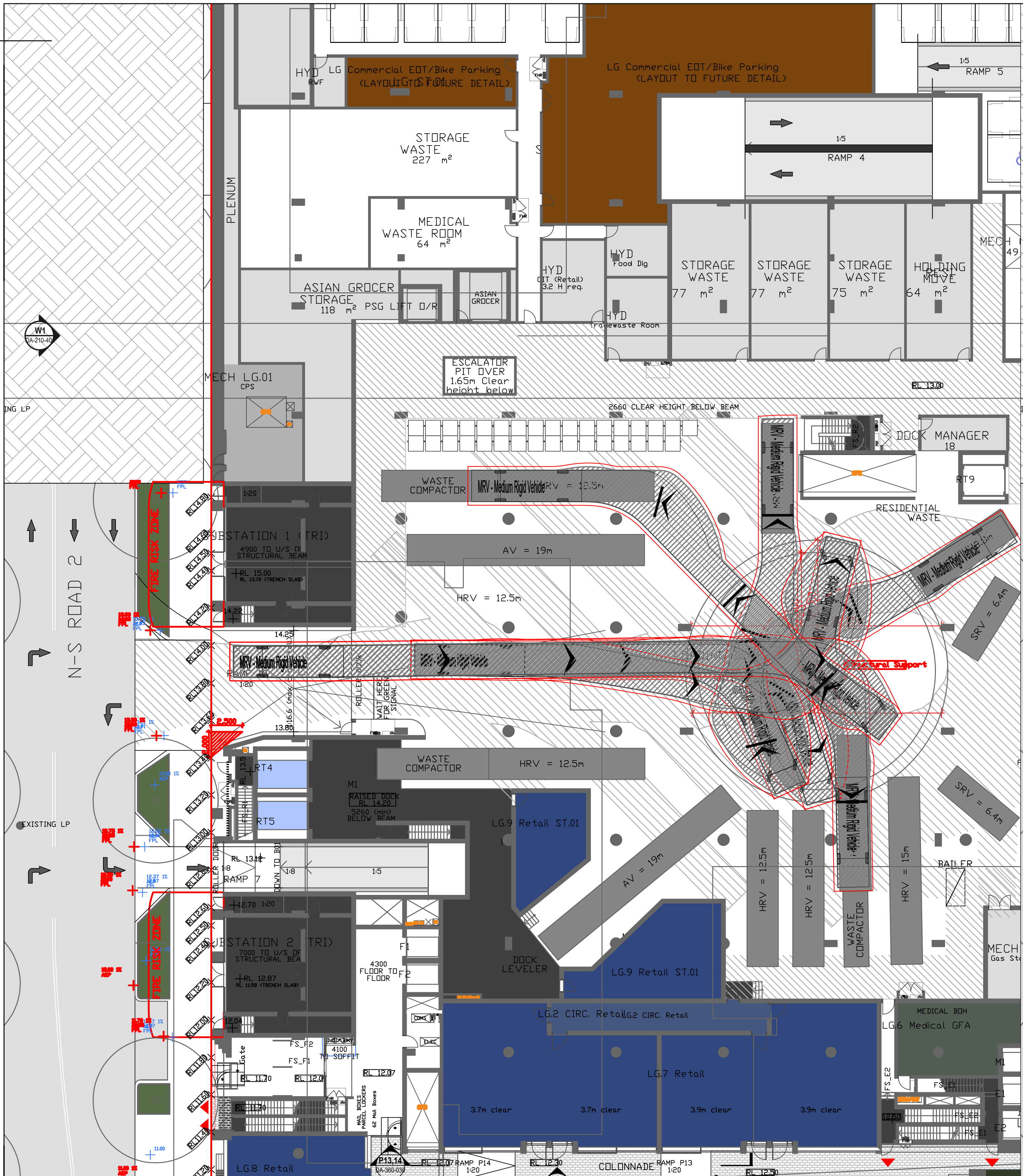
Job No
2240

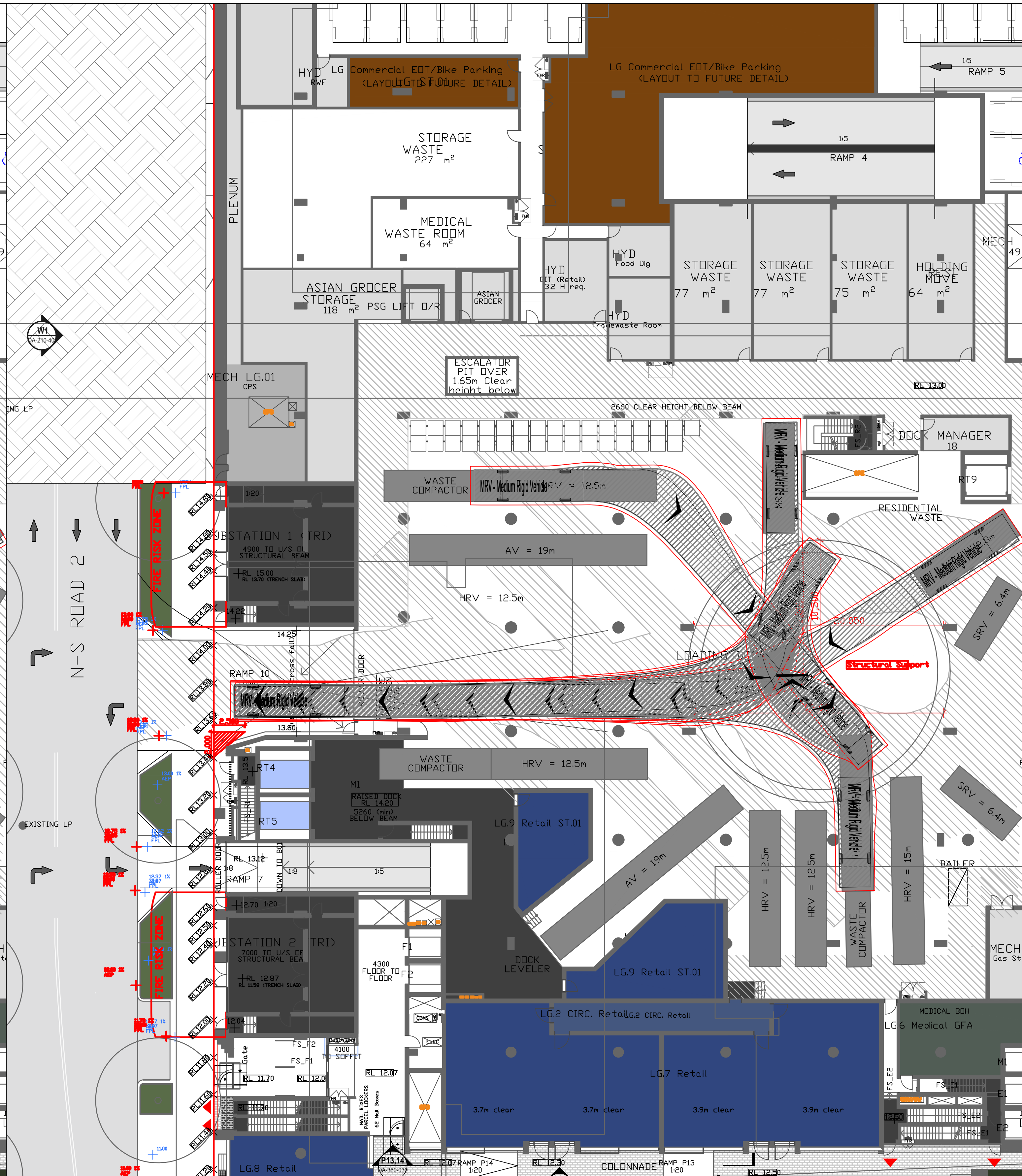
Scale at A3
1:250

Vehicle type(s)



SRV - Small Rigid Vehicle	
Overall Length	6.400m
Overall Width	2.330m
Overall Body Height	3.500m
Min Body Ground Clearance	0.398m
Track Width	2.330m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	7.100m





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Drawing Title
Turning Paths
MRVs

Drawing No
2240_01(c)

Date
12.07.22

Legend
Body Envelope
300mm Envelope
Wheel Envelope

Job No
2240

Scale at A3
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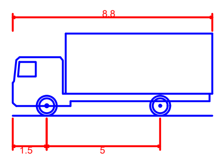
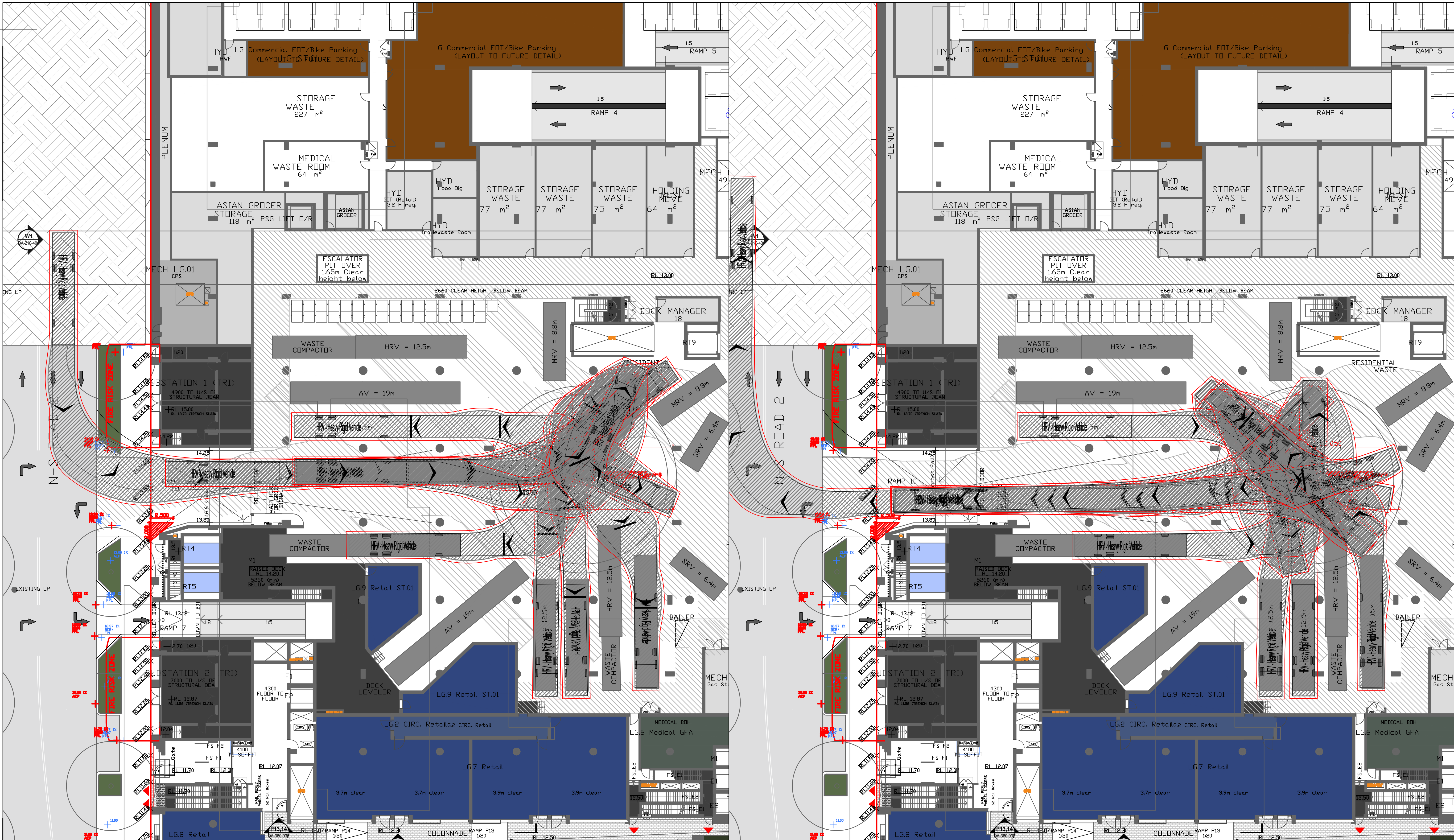
Vehicle type(s)



MRV - Medium Rigid Vehicle	
Overall Length	8.800m
Overall Width	2.500m
Overall Body Height	3.633m
Min Body Ground Clearance	0.428m
Track Width	2.500m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	10.000m



Job Title	Melrose Park Town Centre
Client	Deicorp
Drawing Title	Turning Paths HRVs
Drawing No	2240_01(b)
Date	12.07.22
Job No	2240
Scale at A3	1:250

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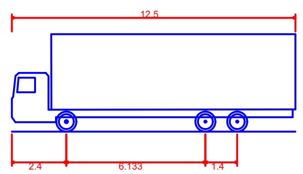
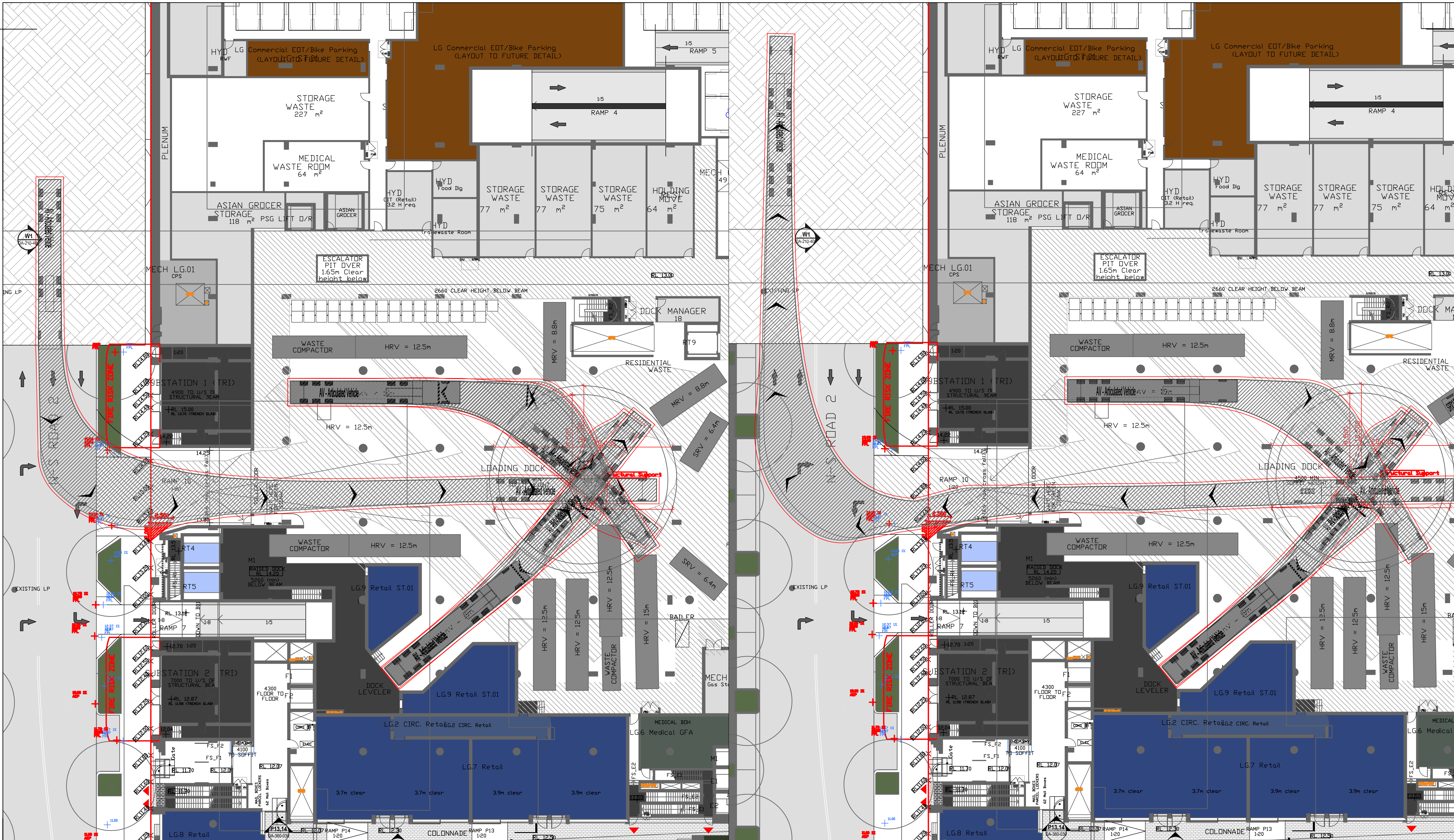
Legend

- Body Envelope
- 300mm Envelope
- Wheel Envelope

Vehicle type(s)

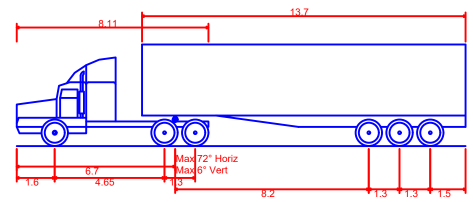


HRV - Heavy Rigid Vehicle	
Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.417m
Track Width	2.500m
Lock to Lock Time	6.00 sec
Curb to Curb Turning Radius	12.500m

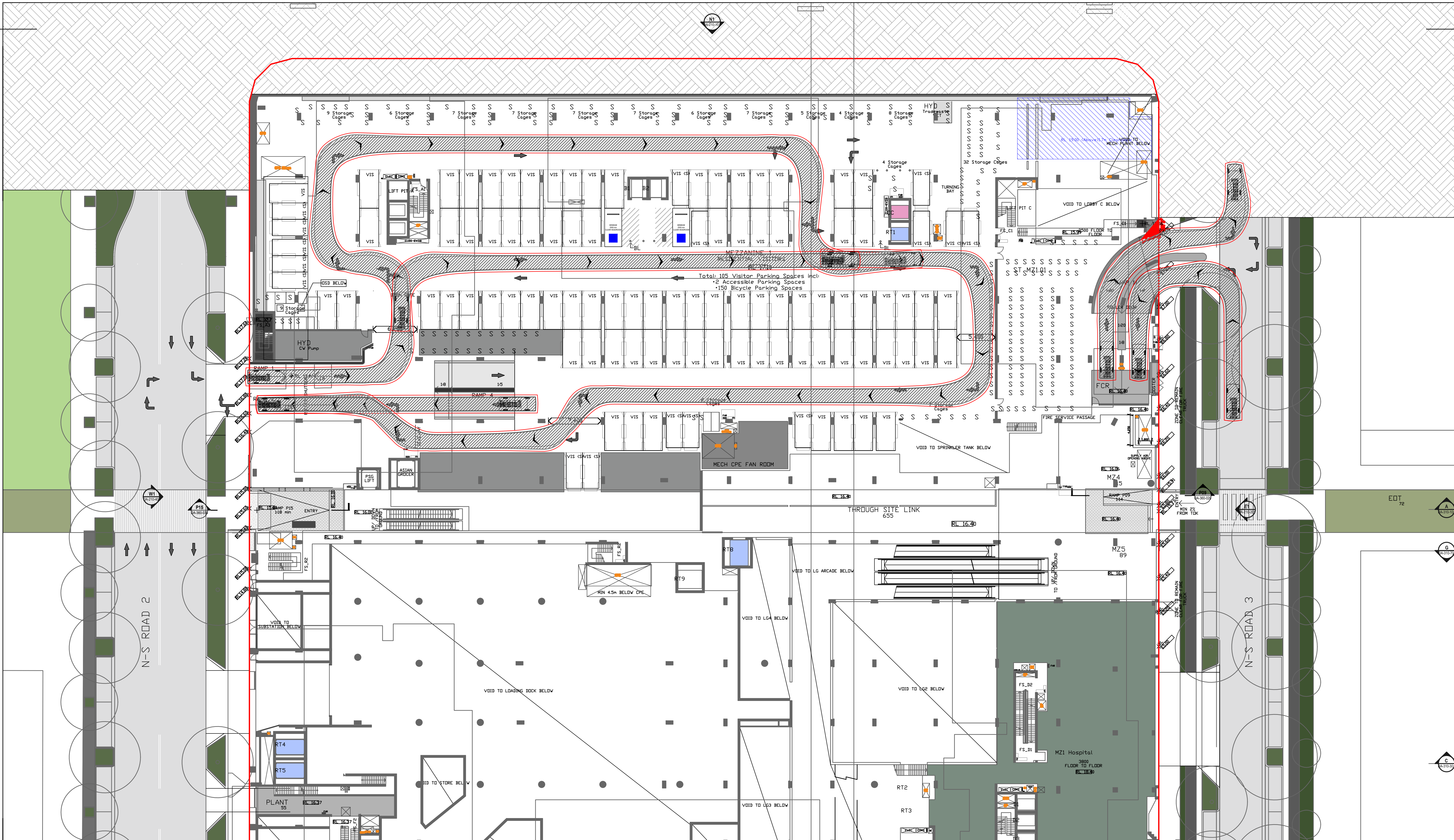


Job Title	**Drawing Title**	**Legend**	**Vehicle type(s)**
Melrose Park Town Centre	Turning Paths Articulated Vehicles	Body Envelope 300mm Envelope Wheel Envelope	
Client	**Drawing No**	**Job No**	
Deicorp	2240_01(a)	2240	
JMT Consulting ABN: 32 6358 30054 www.jmtconsulting.com.au PO Box 99, Kingsford NSW 2032	**Date** 12.07.22	**Scale at A3** 1:250	

JMT CONSULTING



Single Articulated (19 m)	
Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock to Lock Time	6.00 sec
Curb to Curb Turning Radius	12.500m



Job Title

Melrose Park Town Centre

Client

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Drawing Title

Turning Paths
Mezannine Level

Drawing No

2240_02

Date

12.07.23

Legend

Body Envelope
300mm Envelope
Wheel Envelope

Job No

2240

Scale at A3

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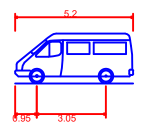
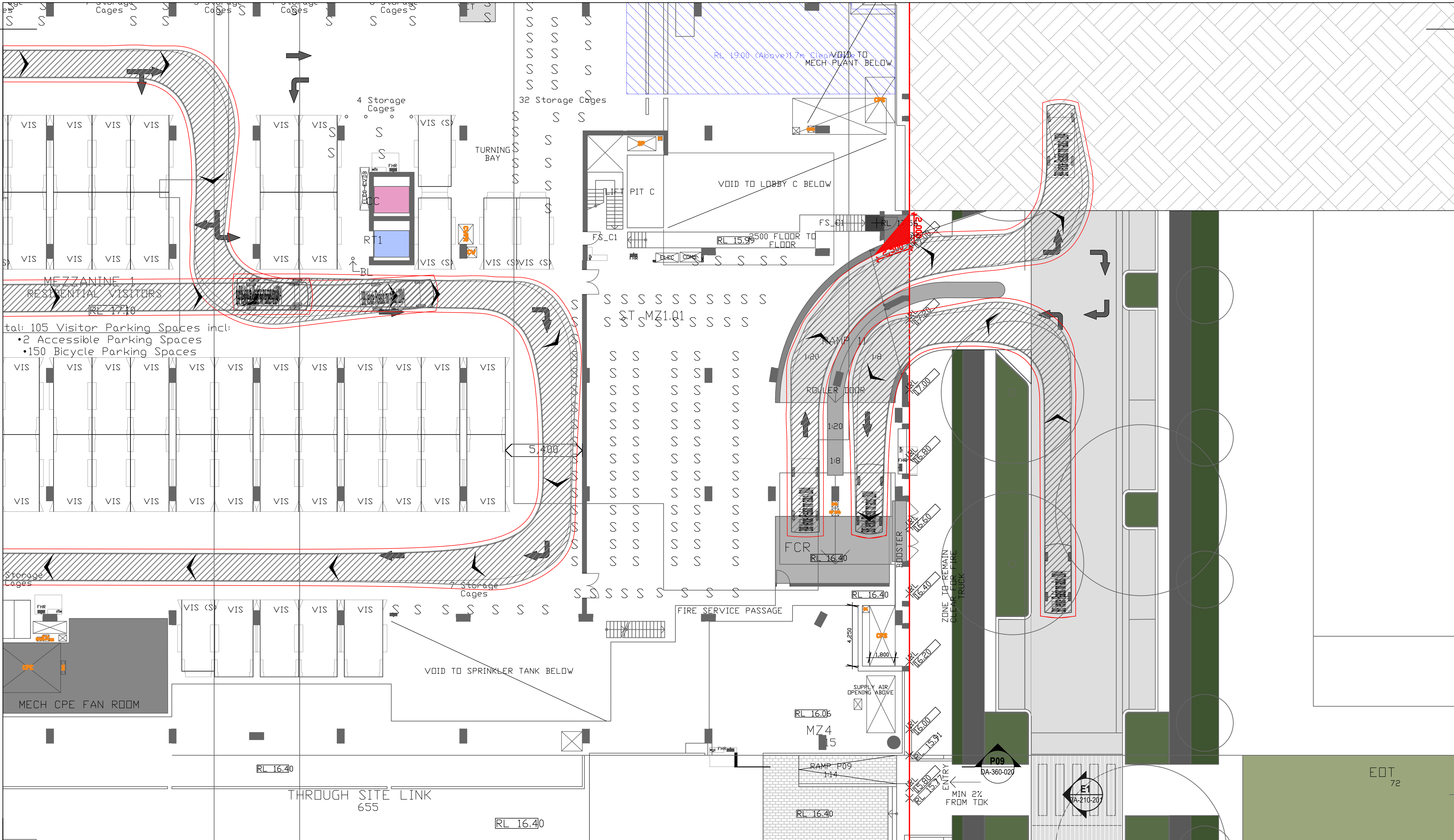
Vehicle type(s)



B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	2.200m
Min Body Ground Clearance	0.312m
Track Width	1.840m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	6.250m



Job Title

Melrose Park Town Centre

Client

Deicorp

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PO Box 99, Kingsford NSW 2032

Drawing Title

Turning Paths

Drawing No

2240_06

Date

02.06.22

Legend

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- 300mm Envelope
- Wheel Envelope

Job No

2240

Scale at A3

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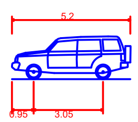
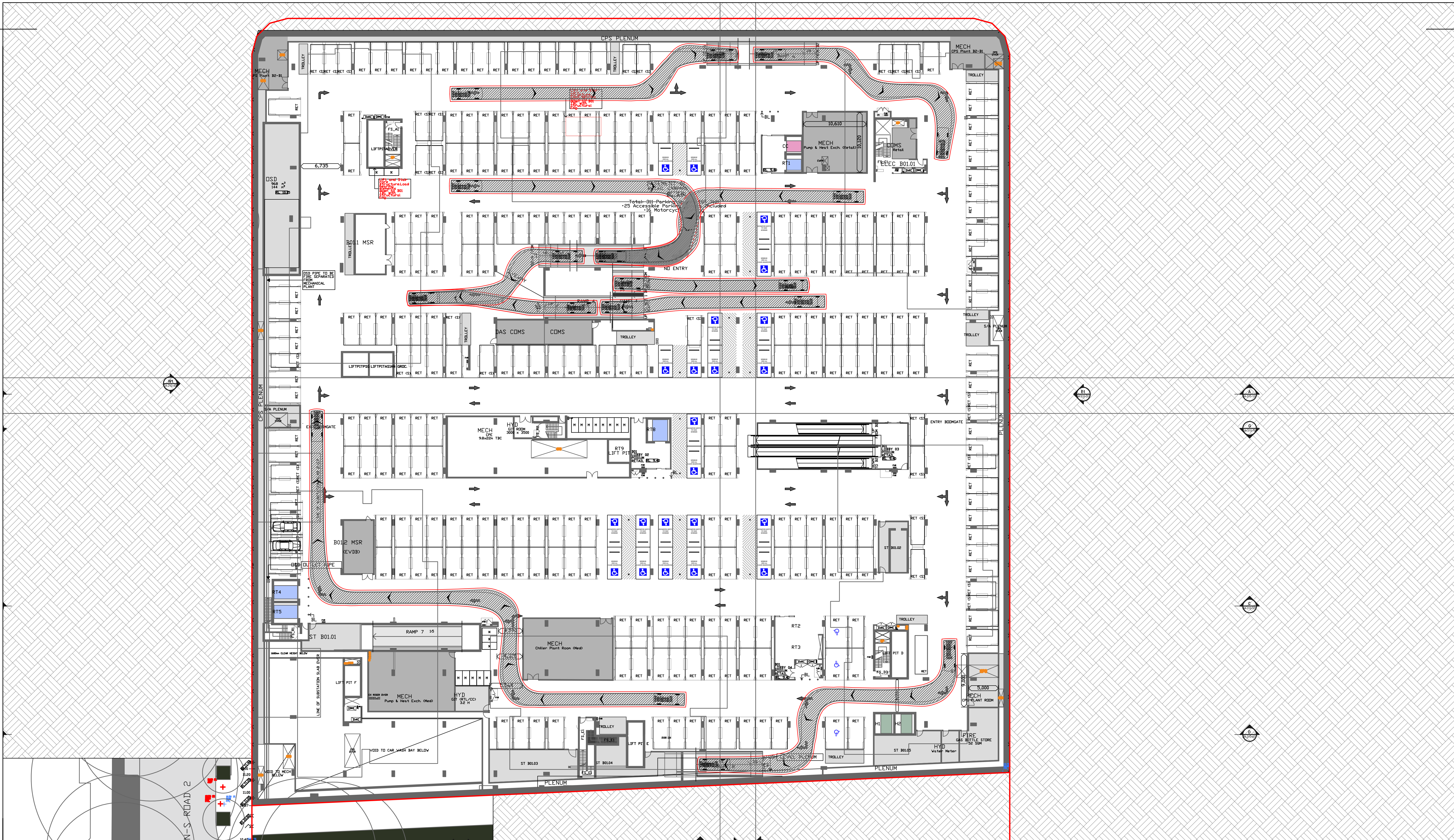
Vehicle type(s)



B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	1.878m
Min Body Ground Clearance	0.272m
Track Width	1.840m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.250m



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Job Title
Melrose Park Town Centre

Client
Deicorp

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Drawing Title
Turning Paths
Level B01

Drawing No
2240_04

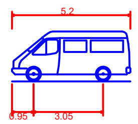
Date
12.07.23

Legend
Body Envelope
300mm Envelope
Wheel Envelope

Job No
2240

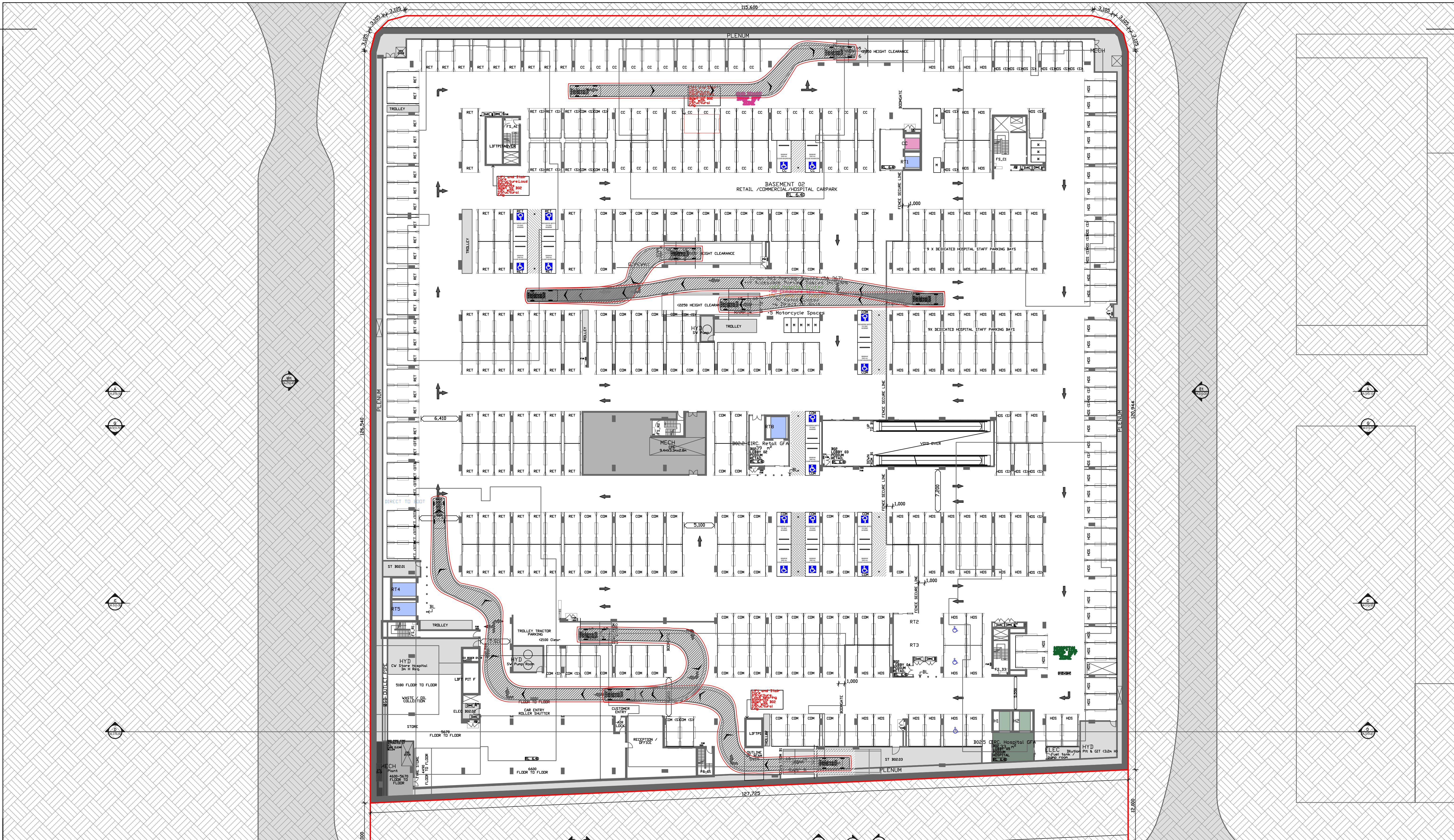
Scale at A3
1:600

Vehicle type(s)



B99 Vehicle (Realistic min radius) (2004)

Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	2.200m
Min Body Ground Clearance	0.312m
Track Width	1.840m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	6.250m



Job Title

Melrose Park Town Centre

Client

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Drawing Title

Turning Paths
Level B02

Drawing No

2240_05

Date

12.07.23

Legend

Body Envelope
300mm Envelope
Wheel Envelope

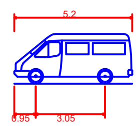
Job No

2240

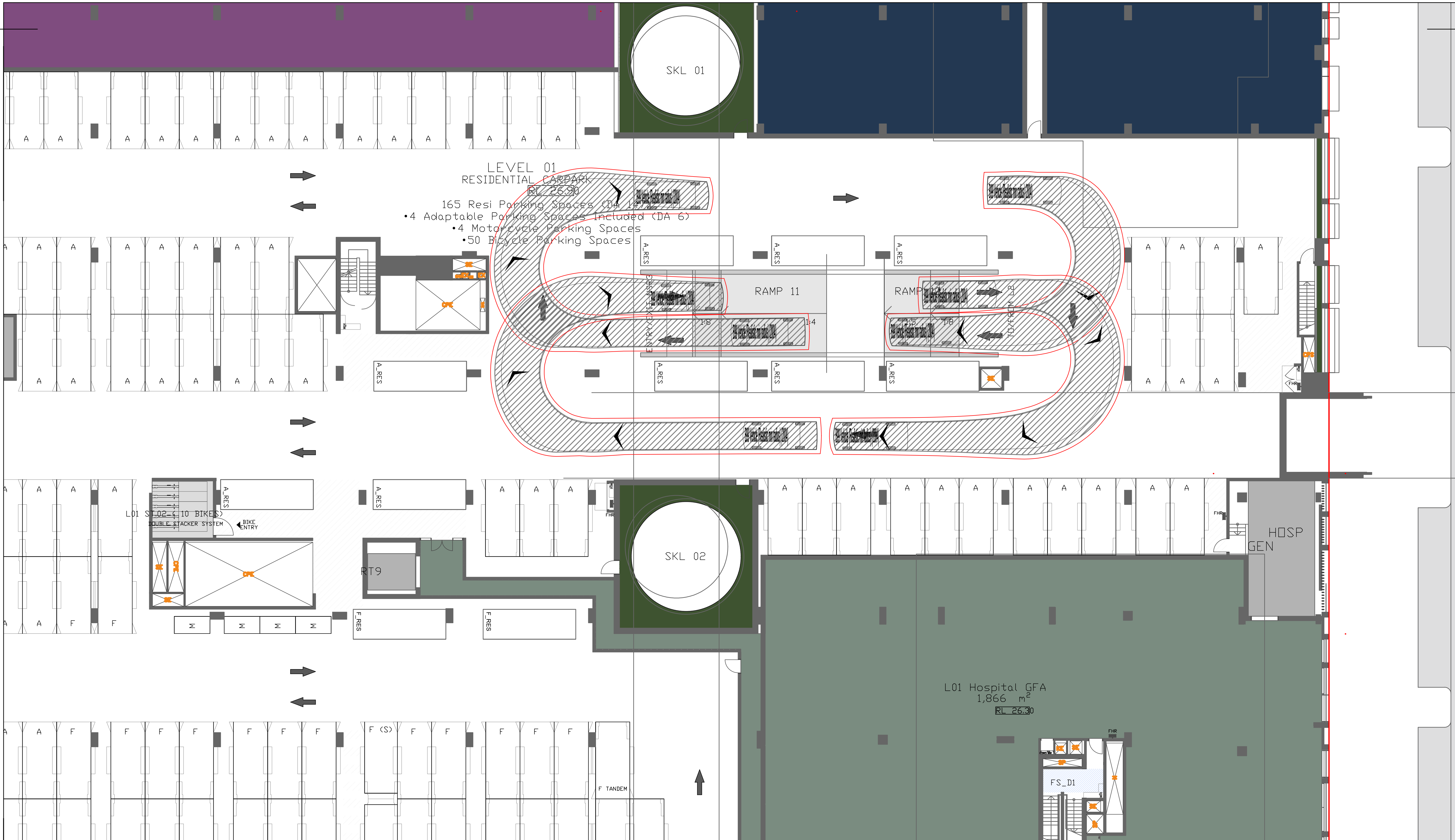
Scale at A3

1:600

Vehicle type(s)



B99 Vehicle (Realistic min radius) (2004)	
Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	2.200m
Min Body Ground Clearance	0.312m
Track Width	1.840m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	6.250m



Job Title

Melrose Park Town Centre

Client

Deicorp

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PO Box 99, Kingsford NSW 2032

Drawing Title

Turning Paths
Level 01

Drawing No

2240_03

Date

12.07.23

Legend

Body Envelope
300mm Envelope
Wheel Envelope

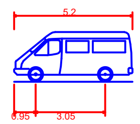
Job No

2240

Scale at A3

1:250

Vehicle type(s)



B99 Vehicle (Realistic min radius) (2004)	
Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	2.200m
Min Body Ground Clearance	0.312m
Track Width	1.840m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	6.250m

Appendix B: Traffic Modelling Outputs

MOVEMENT SUMMARY

Site: 3 [3 - NSR2 Hope 2036 Dev AM Turn Bay (Site Folder: General)]

Network: N101 [AM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 80 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NS Rd 2 S														
1	L2	11	3.0	11	3.0	0.257	42.2	LOS C	1.3	9.0	0.95	0.72	0.95	36.4
2	T1	44	3.0	44	3.0	* 0.257	36.6	LOS C	1.3	9.0	0.95	0.72	0.95	27.2
3	R2	5	3.0	5	3.0	0.026	40.5	LOS C	0.1	0.8	0.91	0.65	0.91	26.0
Approach		60	3.0	60	3.0	0.257	37.9	LOS C	1.3	9.0	0.95	0.71	0.95	29.3
East: Hope St E														
4	L2	22	3.0	22	3.0	* 0.272	28.6	LOS C	2.8	20.5	0.78	0.68	0.78	36.7
5	T1	147	3.0	147	3.0	0.272	23.0	LOS B	2.8	20.5	0.78	0.68	0.78	37.8
6	R2	6	0.0	6	0.0	* 0.045	44.3	LOS D	0.1	1.0	0.95	0.65	0.95	10.9
Approach		176	2.9	176	2.9	0.272	24.4	LOS B	2.8	20.5	0.78	0.68	0.78	36.8
NorthEast: Light Rail W														
26a	R1	11	100.0	11	100.0	* 0.189	48.3	LOS D	0.3	7.3	0.97	0.69	0.97	32.5
Approach		11	100.0	11	100.0	0.189	48.3	LOS D	0.3	7.3	0.97	0.69	0.97	32.5
North: NS Rd 2 N														
7	L2	6	3.0	6	3.0	0.026	33.5	LOS C	0.2	1.2	0.85	0.64	0.85	6.2
8	T1	2	3.0	2	3.0	0.026	29.8	LOS C	0.2	1.2	0.85	0.64	0.85	30.5
9	R2	2	3.0	2	3.0	0.010	38.2	LOS C	0.0	0.3	0.91	0.61	0.91	27.2
Approach		11	3.0	11	3.0	0.026	33.7	LOS C	0.2	1.2	0.86	0.63	0.86	18.9
NorthWest: Light Rail E														
27a	L1	11	100.0	11	100.0	0.189	48.5	LOS D	0.3	7.3	0.97	0.69	0.97	23.4
Approach		11	100.0	11	100.0	0.189	48.5	LOS D	0.3	7.3	0.97	0.69	0.97	23.4
West: Hope St W														
10	L2	143	3.0	143	3.0	0.274	18.3	LOS B	1.6	11.4	0.81	0.76	0.81	37.7
11	T1	213	3.0	213	3.0	* 0.635	34.5	LOS C	4.9	35.5	0.98	0.82	1.01	28.5
Approach		356	3.0	356	3.0	0.635	28.0	LOS B	4.9	35.5	0.91	0.79	0.93	31.6
All Vehicles		623	6.2	623	6.2	0.635	28.7	LOS C	4.9	35.5	0.88	0.75	0.89	32.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed

MOVEMENT SUMMARY

Site: E [E - NSR 3 EWR 6 2036 Dev AM (Site Folder: General)]

Network: N101 [AM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR3 S														
1	L2	27	3.0	27	3.0	0.150	3.9	LOS A	0.3	2.2	0.34	0.53	0.34	29.9
2	T1	111	3.0	111	3.0	0.150	4.0	LOS A	0.3	2.2	0.34	0.53	0.34	52.0
3	R2	28	3.0	28	3.0	0.150	7.9	LOS A	0.3	2.2	0.34	0.53	0.34	42.3
Approach		166	3.0	166	3.0	0.150	4.7	LOS A	0.3	2.2	0.34	0.53	0.34	49.8
East: EWR6 E														
4	L2	75	3.0	75	3.0	0.162	4.4	LOS A	0.4	2.6	0.14	0.46	0.14	40.6
5	T1	151	3.0	151	3.0	0.162	4.3	LOS A	0.4	2.6	0.14	0.46	0.14	40.6
6	R2	1	3.0	1	3.0	0.162	8.4	LOS A	0.4	2.6	0.14	0.46	0.14	52.7
Approach		226	3.0	226	3.0	0.162	4.4	LOS A	0.4	2.6	0.14	0.46	0.14	40.7
North: NSR3 N														
7	L2	23	3.0	23	3.0	0.042	4.7	LOS A	0.1	0.6	0.24	0.48	0.24	51.0
8	T1	25	3.0	25	3.0	0.042	4.6	LOS A	0.1	0.6	0.24	0.48	0.24	51.2
9	R2	1	3.0	1	3.0	0.042	8.7	LOS A	0.1	0.6	0.24	0.48	0.24	51.2
Approach		49	3.0	49	3.0	0.042	4.7	LOS A	0.1	0.6	0.24	0.48	0.24	51.1
West: EWR6 W														
10	L2	9	3.0	9	3.0	0.062	5.0	LOS A	0.1	0.9	0.32	0.49	0.32	50.5
11	T1	55	3.0	55	3.0	0.062	4.9	LOS A	0.1	0.9	0.32	0.49	0.32	45.1
12	R2	4	3.0	4	3.0	0.062	9.0	LOS A	0.1	0.9	0.32	0.49	0.32	38.1
Approach		68	3.0	68	3.0	0.062	5.2	LOS A	0.1	0.9	0.32	0.49	0.32	46.1
All Vehicles		511	3.0	511	3.0	0.162	4.6	LOS A	0.4	2.6	0.24	0.49	0.24	47.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 4 [4 - Waratah Hope 2036 Dev AM (Site Folder: General)]

Network: N101 [AM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated   Cycle Time = 70 seconds (Network Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Waratah S														
1	L2	44	3.0	44	3.0	0.324	37.1	LOS C	1.5	10.8	0.95	0.74	0.95	28.2
2	T1	31	3.0	31	3.0	* 0.324	31.5	LOS C	1.5	10.8	0.95	0.74	0.95	28.2
3	R2	18	3.0	18	3.0	0.106	39.1	LOS C	0.4	2.6	0.95	0.69	0.95	35.7
Approach		93	3.0	93	3.0	0.324	35.7	LOS C	1.5	10.8	0.95	0.73	0.95	30.3
SouthEast: LRT S														
22	T1	11	100.0	11	100.0	* 0.157	36.4	LOS C	0.2	6.3	0.95	0.67	0.95	37.6
Approach		11	100.0	11	100.0	0.157	36.4	LOS C	0.2	6.3	0.95	0.67	0.95	37.6
East: Hope St E														
4	L2	39	3.0	39	3.0	0.628	38.1	LOS C	3.6	25.6	0.99	0.82	1.05	37.9
5	T1	131	3.0	131	3.0	0.628	32.6	LOS C	3.6	25.6	0.99	0.82	1.05	28.7
6	R2	9	0.0	9	0.0	0.036	30.9	LOS C	0.2	1.2	0.90	0.65	0.90	29.9
Approach		179	2.8	179	2.8	0.628	33.7	LOS C	3.6	25.6	0.98	0.82	1.04	31.4
North: Waratah N														
7	L2	16	3.0	16	3.0	0.042	21.7	LOS B	0.3	2.3	0.72	0.64	0.72	35.8
8	T1	4	3.0	4	3.0	0.042	17.8	LOS B	0.3	2.3	0.72	0.64	0.72	37.0
9	R2	2	3.0	2	3.0	* 0.042	21.7	LOS B	0.3	2.3	0.72	0.64	0.72	9.5
Approach		22	3.0	22	3.0	0.042	21.0	LOS B	0.3	2.3	0.72	0.64	0.72	34.9
NorthWest: Light Rail E														
28	T1	11	100.0	11	100.0	0.157	36.4	LOS C	0.2	6.3	0.95	0.67	0.95	37.6
Approach		11	100.0	11	100.0	0.157	36.4	LOS C	0.2	6.3	0.95	0.67	0.95	37.6
West: Hope St W														
10	L2	5	3.0	5	3.0	0.764	40.8	LOS C	4.7	33.5	1.00	0.92	1.21	13.3
11	T1	203	3.0	203	3.0	* 0.764	35.3	LOS C	4.7	33.5	1.00	0.92	1.21	31.8
12	R2	15	3.0	15	3.0	* 0.095	39.2	LOS C	0.3	2.2	0.95	0.68	0.95	29.4
Approach		223	3.0	223	3.0	0.764	35.7	LOS C	4.7	33.5	1.00	0.90	1.20	31.4
All Vehicles		538	6.7	538	6.7	0.764	34.4	LOS C	4.7	33.5	0.97	0.82	1.07	31.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov	Dem.	Aver.	Level of	AVERAGE BACK OF	Prop.	Effective	Travel	Travel	Aver.

MOVEMENT SUMMARY

Site: 101 [NRS 2 - Speed Ramp Entry 2036 Dev AM (Site Folder: General)]

Network: N101 [AM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR 2 (South)														
2	T1	109	3.0	109	3.0	0.058	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	84	0.0	84	0.0	0.061	3.8	LOS A	0.1	0.6	0.10	0.54	0.10	50.8
Approach		194	1.7	194	1.7	0.061	1.6	NA	0.1	0.6	0.04	0.23	0.04	51.7
North: NSR 2 (North)														
7	L2	25	0.0	25	0.0	0.014	2.5	LOS A	0.0	0.0	0.00	0.51	0.00	53.0
8	T1	25	3.0	25	3.0	0.013	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		51	1.5	51	1.5	0.014	1.2	NA	0.0	0.0	0.00	0.25	0.00	53.3
All Vehicles		244	1.7	244	1.7	0.061	1.6	NA	0.1	0.6	0.03	0.24	0.03	52.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [NRS 2 - Loading Dock 2036 Dev AM (Site Folder: General)]

Network: N101 [AM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR 2 (South)														
2	T1	101	3.0	101	3.0	0.053	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	8	100.0	8	100.0	0.009	2.5	LOS A	0.0	0.2	0.09	0.44	0.09	45.3
Approach		109	10.5	109	10.5	0.053	0.2	NA	0.0	0.2	0.01	0.03	0.01	49.7
East: Loading Dock														
4	L2	8	100.0	8	100.0	0.013	12.4	LOS A	0.0	0.2	0.08	1.06	0.08	43.0
6	R2	1	100.0	1	100.0	0.013	14.1	LOS A	0.0	0.2	0.08	1.06	0.08	43.0
Approach		9	100.0	9	100.0	0.013	12.6	LOS A	0.0	0.2	0.08	1.06	0.08	43.0
North: NSR 2 (North)														
7	L2	1	100.0	1	100.0	0.001	3.4	LOS A	0.0	0.0	0.00	0.50	0.00	45.5
8	T1	17	3.0	17	3.0	0.009	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		18	8.7	18	8.7	0.009	0.2	NA	0.0	0.0	0.00	0.03	0.00	53.1
All Vehicles		137	16.4	137	16.4	0.053	1.0	NA	0.0	0.2	0.01	0.10	0.01	47.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [NRS 2 - Mez Access 2036 Dev AM (Site Folder: General)]

Network: N101 [AM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR 2 (South)														
2	T1	174	3.0	174	3.0	0.092	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	99	0.0	99	0.0	0.074	3.8	LOS A	0.1	0.9	0.18	0.52	0.18	51.2
Approach		273	1.9	273	1.9	0.092	1.4	NA	0.1	0.9	0.07	0.19	0.07	52.3
East: Mezzanine Access														
4	L2	12	0.0	12	0.0	0.010	8.2	LOS A	0.0	0.1	0.14	0.90	0.14	47.7
6	R2	102	0.0	102	0.0	0.163	11.1	LOS A	0.3	1.8	0.49	0.93	0.49	45.2
Approach		114	0.0	114	0.0	0.163	10.8	LOS A	0.3	1.8	0.46	0.93	0.46	45.4
North: NSR 2 (North)														
7	L2	25	0.0	25	0.0	0.014	4.1	LOS A	0.0	0.0	0.00	0.55	0.00	51.3
8	T1	53	3.0	53	3.0	0.028	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		78	2.0	78	2.0	0.028	1.3	NA	0.0	0.0	0.00	0.18	0.00	52.8
All Vehicles		464	1.5	464	1.5	0.163	3.7	NA	0.3	1.8	0.15	0.37	0.15	49.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [NRS 3 - Resi Access 2036 Dev AM (Site Folder: General)]

Network: N101 [AM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR 3 (South)														
1	L2	5	0.0	5	0.0	0.058	4.7	LOS A	0.0	0.0	0.00	0.03	0.00	56.8
2	T1	106	3.0	106	3.0	0.058	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	57.2
Approach		112	2.9	112	2.9	0.058	0.2	NA	0.0	0.0	0.00	0.03	0.00	57.1
North: NSR 3 (North)														
8	T1	83	3.0	83	3.0	0.057	0.1	LOS A	0.1	0.4	0.10	0.12	0.10	46.9
9	R2	21	0.0	21	0.0	0.057	4.5	LOS A	0.1	0.4	0.10	0.12	0.10	54.4
Approach		104	2.4	104	2.4	0.057	1.0	NA	0.1	0.4	0.10	0.12	0.10	51.7
West: Residential Access														
10	L2	83	0.0	83	0.0	0.086	8.4	LOS A	0.1	1.0	0.22	0.89	0.22	47.7
12	R2	21	0.0	21	0.0	0.086	8.5	LOS A	0.1	1.0	0.22	0.89	0.22	47.7
Approach		104	0.0	104	0.0	0.086	8.4	LOS A	0.1	1.0	0.22	0.89	0.22	47.7
All Vehicles		320	1.8	320	1.8	0.086	3.2	NA	0.1	1.0	0.10	0.34	0.10	49.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [NRS 3 - Retail Access 2036 Dev AM (Site Folder: General)]

Network: N101 [AM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR 3 (South)														
1	L2	21	0.0	21	0.0	0.024	3.9	LOS A	0.0	0.0	0.00	0.27	0.00	54.3
2	T1	24	3.0	24	3.0	0.024	0.0	LOS A	0.0	0.0	0.00	0.27	0.00	40.6
Approach		45	1.6	45	1.6	0.024	1.8	NA	0.0	0.0	0.00	0.27	0.00	52.2
North: NSR 3 (North)														
8	T1	54	3.0	54	3.0	0.076	0.1	LOS A	0.2	1.3	0.13	0.33	0.13	36.0
9	R2	82	0.0	82	0.0	0.076	4.8	LOS A	0.2	1.3	0.13	0.33	0.13	52.1
Approach		136	1.2	136	1.2	0.076	3.0	NA	0.2	1.3	0.13	0.33	0.13	50.2
West: Retail Access														
10	L2	91	0.0	91	0.0	0.064	8.1	LOS A	0.1	0.9	0.09	0.93	0.09	47.7
12	R2	23	0.0	23	0.0	0.023	8.1	LOS A	0.0	0.2	0.25	0.88	0.25	48.0
Approach		114	0.0	114	0.0	0.064	8.1	LOS A	0.1	0.9	0.12	0.92	0.12	47.7
All Vehicles		295	0.8	295	0.8	0.076	4.8	NA	0.2	1.3	0.11	0.55	0.11	49.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: F [F - NSR 2 EWR 6 2036 Dev AM (Site Folder: General)]

Network: N101 [AM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR2 S														
1	L2	180	3.0	180	3.0	0.252	4.0	LOS A	0.6	4.1	0.41	0.55	0.41	51.0
2	T1	84	3.0	84	3.0	0.252	4.2	LOS A	0.6	4.1	0.41	0.55	0.41	52.7
3	R2	12	3.0	12	3.0	0.252	8.0	LOS A	0.6	4.1	0.41	0.55	0.41	29.4
Approach		276	3.0	276	3.0	0.252	4.2	LOS A	0.6	4.1	0.41	0.55	0.41	51.3
East: EWR6 E														
4	L2	1	3.0	1	3.0	0.133	4.4	LOS A	0.3	1.9	0.14	0.46	0.14	39.9
5	T1	161	3.0	161	3.0	0.133	4.4	LOS A	0.3	1.9	0.14	0.46	0.14	52.7
6	R2	18	3.0	18	3.0	0.133	8.4	LOS A	0.3	1.9	0.14	0.46	0.14	52.3
Approach		180	3.0	180	3.0	0.133	4.8	LOS A	0.3	1.9	0.14	0.46	0.14	52.6
North: NSR2 N														
7	L2	52	3.0	52	3.0	0.062	4.3	LOS A	0.1	0.9	0.10	0.49	0.10	51.9
8	T1	28	3.0	28	3.0	0.062	4.3	LOS A	0.1	0.9	0.10	0.49	0.10	51.9
9	R2	5	3.0	5	3.0	0.062	8.3	LOS A	0.1	0.9	0.10	0.49	0.10	55.0
Approach		85	3.0	85	3.0	0.062	4.5	LOS A	0.1	0.9	0.10	0.49	0.10	52.2
West: EWR6 W														
10	L2	9	3.0	9	3.0	0.014	4.8	LOS A	0.0	0.2	0.28	0.49	0.28	53.6
11	T1	5	3.0	5	3.0	0.014	4.7	LOS A	0.0	0.2	0.28	0.49	0.28	50.8
12	R2	1	3.0	1	3.0	0.014	8.8	LOS A	0.0	0.2	0.28	0.49	0.28	50.8
Approach		16	3.0	16	3.0	0.014	5.0	LOS A	0.0	0.2	0.28	0.49	0.28	52.9
All Vehicles		557	3.0	557	3.0	0.252	4.5	LOS A	0.6	4.1	0.27	0.51	0.27	52.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 4 [4 - Waratah Hope 2036 Dev PM (Site Folder: General)]

Network: N101 [PM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated   Cycle Time = 80 seconds (Network Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Waratah S														
1	L2	17	3.0	17	3.0	0.231	42.3	LOS C	1.0	7.3	0.95	0.72	0.95	26.6
2	T1	27	3.0	27	3.0	* 0.231	36.7	LOS C	1.0	7.3	0.95	0.72	0.95	26.6
3	R2	11	3.0	11	3.0	0.070	43.5	LOS D	0.2	1.7	0.94	0.67	0.94	34.3
Approach		55	3.0	55	3.0	0.231	39.7	LOS C	1.0	7.3	0.95	0.71	0.95	28.7
SouthEast: LRT S														
22	T1	11	100.0	11	100.0	* 0.180	42.6	LOS D	0.3	7.3	0.97	0.68	0.97	35.3
Approach		11	100.0	11	100.0	0.180	42.6	LOS D	0.3	7.3	0.97	0.68	0.97	35.3
East: Hope St E														
4	L2	72	3.0	72	3.0	0.549	34.9	LOS C	5.1	36.5	0.92	0.78	0.92	39.0
5	T1	166	3.0	166	3.0	* 0.549	29.4	LOS C	5.1	36.5	0.92	0.78	0.92	30.0
6	R2	41	0.0	41	0.0	* 0.110	27.6	LOS B	0.7	5.1	0.82	0.72	0.82	31.6
Approach		279	2.6	279	2.6	0.549	30.5	LOS C	5.1	36.5	0.91	0.77	0.91	33.3
North: Waratah N														
7	L2	7	3.0	7	3.0	0.165	31.0	LOS C	1.3	9.1	0.84	0.66	0.84	31.8
8	T1	43	3.0	43	3.0	0.165	27.0	LOS B	1.3	9.1	0.84	0.66	0.84	32.7
9	R2	13	3.0	13	3.0	* 0.165	30.9	LOS C	1.3	9.1	0.84	0.66	0.84	7.4
Approach		63	3.0	63	3.0	0.165	28.3	LOS B	1.3	9.1	0.84	0.66	0.84	29.7
NorthWest: Light Rail E														
28	T1	11	100.0	11	100.0	0.180	42.6	LOS D	0.3	7.3	0.97	0.68	0.97	35.3
Approach		11	100.0	11	100.0	0.180	42.6	LOS D	0.3	7.3	0.97	0.68	0.97	35.3
West: Hope St W														
10	L2	8	3.0	8	3.0	0.369	41.6	LOS C	4.0	29.0	1.00	0.81	1.00	13.0
11	T1	159	3.0	159	3.0	0.369	36.0	LOS C	4.0	29.0	1.00	0.81	1.00	31.5
12	R2	14	3.0	14	3.0	0.100	47.2	LOS D	0.3	2.4	1.00	0.69	1.00	26.8
Approach		181	3.0	181	3.0	0.369	37.1	LOS C	4.0	29.0	1.00	0.80	1.00	30.5
All Vehicles		599	6.2	599	6.2	0.549	33.5	LOS C	5.1	36.5	0.93	0.76	0.93	31.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov	Dem.	Aver.	Level of	AVERAGE BACK OF	Prop.	Effective	Travel	Travel	Aver.

MOVEMENT SUMMARY

Site: E [E - NSR 3 EWR 6 2036 Dev PM (Site Folder: General)]

Network: N101 [PM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR3 S														
1	L2	32	3.0	32	3.0	0.140	4.5	LOS A	0.3	2.1	0.44	0.58	0.44	28.6
2	T1	85	3.0	85	3.0	0.140	4.5	LOS A	0.3	2.1	0.44	0.58	0.44	51.5
3	R2	24	3.0	24	3.0	0.140	8.4	LOS A	0.3	2.1	0.44	0.58	0.44	41.4
Approach		141	3.0	141	3.0	0.140	5.2	LOS A	0.3	2.1	0.44	0.58	0.44	48.6
East: EWR6 E														
4	L2	231	3.0	231	3.0	0.363	4.8	LOS A	1.0	6.9	0.32	0.51	0.32	38.0
5	T1	203	3.0	203	3.0	0.363	4.8	LOS A	1.0	6.9	0.32	0.51	0.32	38.0
6	R2	32	3.0	32	3.0	0.363	8.9	LOS A	1.0	6.9	0.32	0.51	0.32	51.6
Approach		465	3.0	465	3.0	0.363	5.1	LOS A	1.0	6.9	0.32	0.51	0.32	40.4
North: NSR3 N														
7	L2	4	3.0	4	3.0	0.074	4.4	LOS A	0.1	1.1	0.17	0.47	0.17	51.0
8	T1	79	3.0	79	3.0	0.074	4.4	LOS A	0.1	1.1	0.17	0.47	0.17	51.2
9	R2	11	3.0	11	3.0	0.074	8.5	LOS A	0.1	1.1	0.17	0.47	0.17	51.2
Approach		94	3.0	94	3.0	0.074	4.9	LOS A	0.1	1.1	0.17	0.47	0.17	51.2
West: EWR6 W														
10	L2	22	3.0	22	3.0	0.038	4.9	LOS A	0.1	0.5	0.31	0.51	0.31	50.6
11	T1	17	3.0	17	3.0	0.038	4.9	LOS A	0.1	0.5	0.31	0.51	0.31	45.1
12	R2	3	3.0	3	3.0	0.038	9.0	LOS A	0.1	0.5	0.31	0.51	0.31	38.0
Approach		42	3.0	42	3.0	0.038	5.2	LOS A	0.1	0.5	0.31	0.51	0.31	48.6
All Vehicles		742	3.0	742	3.0	0.363	5.1	LOS A	1.0	6.9	0.32	0.52	0.32	45.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3 [3 - NSR2 Hope 2036 Dev PM Turn Bay (Site Folder: General)]

Network: N101 [PM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated   Cycle Time = 80 seconds (Network Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NS Rd 2 S														
1	L2	1	3.0	1	3.0	0.093	41.1	LOS C	0.4	3.2	0.93	0.66	0.93	37.1
2	T1	19	3.0	19	3.0	0.093	35.5	LOS C	0.4	3.2	0.93	0.66	0.93	27.9
3	R2	1	3.0	1	3.0	0.005	38.8	LOS C	0.0	0.2	0.89	0.59	0.89	26.6
Approach		21	3.0	21	3.0	0.093	36.0	LOS C	0.4	3.2	0.92	0.65	0.92	28.5
East: Hope St E														
4	L2	39	3.0	39	3.0	* 0.296	33.4	LOS C	3.5	25.2	0.94	0.81	0.94	33.9
5	T1	140	3.0	140	3.0	0.296	27.8	LOS B	3.5	25.2	0.94	0.81	0.94	34.8
6	R2	18	0.0	18	0.0	* 0.128	47.1	LOS D	0.4	3.1	1.00	0.70	1.00	10.3
Approach		197	2.7	197	2.7	0.296	30.7	LOS C	3.5	25.2	0.95	0.80	0.95	32.8
NorthEast: Light Rail W														
26a	R1	11	100.0	11	100.0	* 0.189	48.3	LOS D	0.3	7.3	0.97	0.69	0.97	32.5
Approach		11	100.0	11	100.0	0.189	48.3	LOS D	0.3	7.3	0.97	0.69	0.97	32.5
North: NS Rd 2 N														
7	L2	1	3.0	1	3.0	0.166	38.9	LOS C	0.8	5.7	0.93	0.68	0.93	6.0
8	T1	35	3.0	35	3.0	* 0.166	35.1	LOS C	0.8	5.7	0.93	0.68	0.93	29.4
9	R2	23	3.0	23	3.0	0.102	38.2	LOS C	0.5	3.7	0.92	0.70	0.92	27.2
Approach		59	3.0	59	3.0	0.166	36.4	LOS C	0.8	5.7	0.92	0.69	0.92	28.3
NorthWest: Light Rail E														
27a	L1	11	100.0	11	100.0	0.189	48.5	LOS D	0.3	7.3	0.97	0.69	0.97	23.4
Approach		11	100.0	11	100.0	0.189	48.5	LOS D	0.3	7.3	0.97	0.69	0.97	23.4
West: Hope St W														
10	L2	66	3.0	66	3.0	0.127	17.6	LOS B	0.7	5.0	0.77	0.72	0.77	38.2
11	T1	178	3.0	178	3.0	* 0.572	34.6	LOS C	4.1	29.4	0.97	0.79	0.97	28.5
Approach		244	3.0	244	3.0	0.572	30.0	LOS C	4.1	29.4	0.92	0.77	0.92	30.6
All Vehicles		542	6.7	542	6.7	0.572	31.9	LOS C	4.1	29.4	0.93	0.77	0.93	31.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed

MOVEMENT SUMMARY

Site: 101 [NRS 2 - Speed Ramp Entry 2036 Dev PM (Site Folder: General)]

Network: N101 [PM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR 2 (South)														
2	T1	74	3.0	74	3.0	0.039	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	29	0.0	29	0.0	0.028	4.9	LOS A	0.0	0.3	0.27	0.58	0.27	49.5
Approach		103	2.1	103	2.1	0.039	1.4	NA	0.0	0.3	0.08	0.16	0.08	51.3
North: NSR 2 (North)														
7	L2	133	0.0	133	0.0	0.071	2.5	LOS A	0.0	0.0	0.00	0.51	0.00	53.0
8	T1	181	3.0	181	3.0	0.095	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
Approach		314	1.7	314	1.7	0.095	1.0	NA	0.0	0.0	0.00	0.21	0.00	53.4
All Vehicles		417	1.8	417	1.8	0.095	1.1	NA	0.0	0.3	0.02	0.20	0.02	52.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [NRS 2 - Loading Dock 2036 Dev PM (Site Folder: General)]

Network: N101 [PM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR 2 (South)														
2	T1	65	3.0	65	3.0	0.034	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	8	100.0	8	100.0	0.014	5.4	LOS A	0.0	0.3	0.46	0.56	0.46	42.5
Approach		74	14.1	74	14.1	0.034	0.6	NA	0.0	0.3	0.05	0.06	0.05	46.1
East: Loading Dock														
4	L2	8	100.0	8	100.0	0.022	16.2	LOS B	0.0	0.4	0.48	0.95	0.48	40.6
6	R2	1	100.0	1	100.0	0.022	21.0	LOS B	0.0	0.4	0.48	0.95	0.48	40.6
Approach		9	100.0	9	100.0	0.022	16.7	LOS B	0.0	0.4	0.48	0.95	0.48	40.6
North: NSR 2 (North)														
7	L2	1	100.0	1	100.0	0.001	3.4	LOS A	0.0	0.0	0.00	0.50	0.00	45.5
8	T1	305	3.0	305	3.0	0.160	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		306	3.3	306	3.3	0.160	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.2
All Vehicles		389	7.7	389	7.7	0.160	0.5	NA	0.0	0.4	0.02	0.04	0.02	51.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [NRS 2 - Mez Access 2036 Dev PM (Site Folder: General)]

Network: N101 [PM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR 2 (South)														
2	T1	60	3.0	60	3.0	0.032	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	15	0.0	15	0.0	0.014	4.8	LOS A	0.0	0.1	0.38	0.56	0.38	50.2
Approach		75	2.4	75	2.4	0.032	0.9	NA	0.0	0.1	0.07	0.11	0.07	52.6
East: Mezzanine Access														
4	L2	78	0.0	78	0.0	0.083	9.2	LOS A	0.1	0.9	0.34	0.89	0.34	47.0
6	R2	144	0.0	144	0.0	0.234	11.4	LOS A	0.4	2.7	0.52	0.95	0.52	44.9
Approach		222	0.0	222	0.0	0.234	10.7	LOS A	0.4	2.7	0.46	0.93	0.46	45.6
North: NSR 2 (North)														
7	L2	85	0.0	85	0.0	0.046	4.1	LOS A	0.0	0.0	0.00	0.55	0.00	51.3
8	T1	227	3.0	227	3.0	0.119	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		313	2.2	313	2.2	0.119	1.1	NA	0.0	0.0	0.00	0.15	0.00	53.1
All Vehicles		609	1.4	609	1.4	0.234	4.6	NA	0.4	2.7	0.18	0.43	0.18	48.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [NRS 3 - Resi Access 2036 Dev PM (Site Folder: General)]

Network: N101 [PM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR 3 (South)														
1	L2	62	0.0	62	0.0	0.121	4.7	LOS A	0.0	0.0	0.00	0.16	0.00	55.2
2	T1	168	3.0	168	3.0	0.121	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	47.3
Approach		231	2.2	231	2.2	0.121	1.3	NA	0.0	0.0	0.00	0.16	0.00	52.8
North: NSR 3 (North)														
8	T1	62	3.0	62	3.0	0.062	0.5	LOS A	0.1	0.7	0.26	0.24	0.26	37.5
9	R2	42	0.0	42	0.0	0.062	5.0	LOS A	0.1	0.7	0.26	0.24	0.26	52.5
Approach		104	1.8	104	1.8	0.062	2.3	NA	0.1	0.7	0.26	0.24	0.26	49.4
West: Residential Access														
10	L2	21	0.0	21	0.0	0.023	8.6	LOS A	0.0	0.2	0.28	0.87	0.28	47.5
12	R2	5	0.0	5	0.0	0.023	8.9	LOS A	0.0	0.2	0.28	0.87	0.28	47.5
Approach		26	0.0	26	0.0	0.023	8.7	LOS A	0.0	0.2	0.28	0.87	0.28	47.5
All Vehicles		361	1.9	361	1.9	0.121	2.1	NA	0.1	0.7	0.10	0.23	0.10	50.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [NRS 3 - Retail Access 2036 Dev PM (Site Folder: General)]

Network: N101 [PM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR 3 (South)														
1	L2	24	0.0	24	0.0	0.041	3.9	LOS A	0.0	0.0	0.00	0.18	0.00	55.2
2	T1	53	3.0	53	3.0	0.041	0.0	LOS A	0.0	0.0	0.00	0.18	0.00	45.2
Approach		77	2.1	77	2.1	0.041	1.2	NA	0.0	0.0	0.00	0.18	0.00	52.8
North: NSR 3 (North)														
8	T1	61	3.0	61	3.0	0.090	0.2	LOS A	0.2	1.5	0.18	0.33	0.18	35.1
9	R2	98	0.0	98	0.0	0.090	5.0	LOS A	0.2	1.5	0.18	0.33	0.18	51.8
Approach		159	1.2	159	1.2	0.090	3.1	NA	0.2	1.5	0.18	0.33	0.18	49.8
West: Retail Access														
10	L2	178	0.0	178	0.0	0.129	8.2	LOS A	0.3	1.9	0.15	0.90	0.15	47.7
12	R2	44	0.0	44	0.0	0.047	8.4	LOS A	0.1	0.4	0.29	0.88	0.29	47.7
Approach		222	0.0	222	0.0	0.129	8.3	LOS A	0.3	1.9	0.18	0.89	0.18	47.7
All Vehicles		458	0.7	458	0.7	0.129	5.3	NA	0.3	1.9	0.15	0.58	0.15	48.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: F [F - NSR 2 EWR 6 2036 Dev PM (Site Folder: General)]

Network: N101 [PM Dev 2036 (Network Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: NSR2 S														
1	L2	74	3.0	74	3.0	0.315	4.7	LOS A	0.8	5.5	0.52	0.61	0.52	50.1
2	T1	223	3.0	223	3.0	0.315	4.8	LOS A	0.8	5.5	0.52	0.61	0.52	51.7
3	R2	17	3.0	17	3.0	0.315	8.6	LOS A	0.8	5.5	0.52	0.61	0.52	28.0
Approach		314	3.0	314	3.0	0.315	5.0	LOS A	0.8	5.5	0.52	0.61	0.52	51.0
East: EWR6 E														
4	L2	1	3.0	1	3.0	0.205	5.0	LOS A	0.4	3.2	0.32	0.57	0.32	35.6
5	T1	129	3.0	129	3.0	0.205	5.0	LOS A	0.4	3.2	0.32	0.57	0.32	50.5
6	R2	109	3.0	109	3.0	0.205	9.0	LOS A	0.4	3.2	0.32	0.57	0.32	50.1
Approach		240	3.0	240	3.0	0.205	6.8	LOS A	0.4	3.2	0.32	0.57	0.32	50.3
North: NSR2 N														
7	L2	23	3.0	23	3.0	0.106	4.3	LOS A	0.2	1.7	0.11	0.49	0.11	51.2
8	T1	99	3.0	99	3.0	0.106	4.3	LOS A	0.2	1.7	0.11	0.49	0.11	51.2
9	R2	27	3.0	27	3.0	0.106	8.3	LOS A	0.2	1.7	0.11	0.49	0.11	54.5
Approach		149	3.0	149	3.0	0.106	5.0	LOS A	0.2	1.7	0.11	0.49	0.11	52.2
West: EWR6 W														
10	L2	7	3.0	7	3.0	0.010	6.0	LOS A	0.0	0.1	0.48	0.55	0.48	52.9
11	T1	1	3.0	1	3.0	0.010	6.0	LOS A	0.0	0.1	0.48	0.55	0.48	49.6
12	R2	1	3.0	1	3.0	0.010	10.0	LOS A	0.0	0.1	0.48	0.55	0.48	49.6
Approach		9	3.0	9	3.0	0.010	6.4	LOS A	0.0	0.1	0.48	0.55	0.48	52.5
All Vehicles		713	3.0	713	3.0	0.315	5.6	LOS A	0.8	5.5	0.37	0.57	0.37	51.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [AM Interim Intersection NSR3 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NSR3 (N)
Site Category: (None)
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	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waratah Street (S)															
1	L2	All MCs	44	5.0	44	5.0	0.078	4.7	LOS A	0.4	2.8	0.32	0.51	0.32	52.9
2	T1	All MCs	31	5.0	31	5.0	0.078	4.9	LOS A	0.4	2.8	0.32	0.51	0.32	53.3
3	R2	All MCs	18	5.0	18	5.0	0.078	9.5	LOS A	0.4	2.8	0.32	0.51	0.32	52.4
Approach			93	5.0	93	5.0	0.078	5.7	LOS A	0.4	2.8	0.32	0.51	0.32	53.0
East: Hope Street (E)															
4	L2	All MCs	39	5.0	39	5.0	0.125	4.1	LOS A	0.7	4.8	0.14	0.42	0.14	53.9
5	T1	All MCs	131	5.0	131	5.0	0.125	4.3	LOS A	0.7	4.8	0.14	0.42	0.14	54.3
6	R2	All MCs	9	5.0	9	5.0	0.125	8.9	LOS A	0.7	4.8	0.14	0.42	0.14	53.3
Approach			179	5.0	179	5.0	0.125	4.5	LOS A	0.7	4.8	0.14	0.42	0.14	54.2
North: NSR-3 (N)															
7	L2	All MCs	2	5.0	2	5.0	0.020	5.0	LOS A	0.1	0.7	0.38	0.58	0.38	51.1
8	T1	All MCs	4	5.0	4	5.0	0.020	5.2	LOS A	0.1	0.7	0.38	0.58	0.38	51.5
9	R2	All MCs	16	5.0	16	5.0	0.020	9.8	LOS A	0.1	0.7	0.38	0.58	0.38	50.6
Approach			22	5.0	22	5.0	0.020	8.5	LOS A	0.1	0.7	0.38	0.58	0.38	50.8
West: Hope Street (W)															
10	L2	All MCs	5	5.0	5	5.0	0.162	4.2	LOS A	0.9	6.5	0.20	0.42	0.20	53.6
11	T1	All MCs	203	5.0	203	5.0	0.162	4.4	LOS A	0.9	6.5	0.20	0.42	0.20	54.0
12	R2	All MCs	15	5.0	15	5.0	0.162	9.1	LOS A	0.9	6.5	0.20	0.42	0.20	53.0
Approach			223	5.0	223	5.0	0.162	4.7	LOS A	0.9	6.5	0.20	0.42	0.20	53.9
All Vehicles			517	5.0	517	5.0	0.162	5.0	LOS A	0.9	6.5	0.21	0.44	0.21	53.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [PM Interim Intersection NSR3 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NSR3 (N)
Site Category: (None)
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	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Waratah Street (S)															
1	L2	All MCs	17	5.0	17	5.0	0.048	4.9	LOS A	0.2	1.7	0.37	0.52	0.37	52.7
2	T1	All MCs	27	5.0	27	5.0	0.048	5.2	LOS A	0.2	1.7	0.37	0.52	0.37	53.0
3	R2	All MCs	11	5.0	11	5.0	0.048	9.8	LOS A	0.2	1.7	0.37	0.52	0.37	52.1
Approach			55	5.0	55	5.0	0.048	6.0	LOS A	0.2	1.7	0.37	0.52	0.37	52.8
East: Hope Street (E)															
4	L2	All MCs	72	5.0	72	5.0	0.202	4.2	LOS A	1.2	8.5	0.22	0.45	0.22	53.3
5	T1	All MCs	166	5.0	166	5.0	0.202	4.5	LOS A	1.2	8.5	0.22	0.45	0.22	53.7
6	R2	All MCs	41	5.0	41	5.0	0.202	9.1	LOS A	1.2	8.5	0.22	0.45	0.22	52.8
Approach			279	5.0	279	5.0	0.202	5.1	LOS A	1.2	8.5	0.22	0.45	0.22	53.5
North: NSR-3 (N)															
7	L2	All MCs	13	5.0	13	5.0	0.054	4.8	LOS A	0.3	2.0	0.34	0.49	0.34	52.9
8	T1	All MCs	43	5.0	43	5.0	0.054	5.0	LOS A	0.3	2.0	0.34	0.49	0.34	53.3
9	R2	All MCs	7	5.0	7	5.0	0.054	9.6	LOS A	0.3	2.0	0.34	0.49	0.34	52.4
Approach			63	5.0	63	5.0	0.054	5.5	LOS A	0.3	2.0	0.34	0.49	0.34	53.1
West: Hope Street (W)															
10	L2	All MCs	8	5.0	8	5.0	0.138	4.3	LOS A	0.7	5.3	0.23	0.43	0.23	53.4
11	T1	All MCs	159	5.0	159	5.0	0.138	4.5	LOS A	0.7	5.3	0.23	0.43	0.23	53.8
12	R2	All MCs	14	5.0	14	5.0	0.138	9.2	LOS A	0.7	5.3	0.23	0.43	0.23	52.9
Approach			181	5.0	181	5.0	0.138	4.9	LOS A	0.7	5.3	0.23	0.43	0.23	53.7
All Vehicles			578	5.0	578	5.0	0.202	5.2	LOS A	1.2	8.5	0.25	0.46	0.25	53.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101v [AM Interim Intersection NSR2 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NSR3 (N)
Site Category: (None)
Stop (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	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Hope Street (E)															
5	T1	All MCs	147	5.0	147	5.0	0.075	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	All MCs	6	5.0	6	5.0	0.005	6.9	LOS A	0.0	0.2	0.42	0.55	0.42	51.4
Approach			154	5.0	154	5.0	0.075	0.3	NA	0.0	0.2	0.02	0.02	0.02	59.6
North: NSR-2 (N)															
7	L2	All MCs	13	5.0	13	5.0	0.011	9.1	LOS A	0.0	0.3	0.31	0.85	0.31	50.7
9	R2	All MCs	2	5.0	2	5.0	0.004	11.5	LOS A	0.0	0.1	0.50	0.82	0.50	49.1
Approach			15	5.0	15	5.0	0.011	9.4	LOS A	0.0	0.3	0.34	0.85	0.34	50.5
West: Hope Street (W)															
10	L2	All MCs	143	5.0	143	5.0	0.186	5.6	LOS A	0.0	0.0	0.00	0.24	0.00	55.3
11	T1	All MCs	213	5.0	213	5.0	0.186	0.0	LOS A	0.0	0.0	0.00	0.24	0.00	57.8
Approach			356	5.0	356	5.0	0.186	2.3	NA	0.0	0.0	0.00	0.24	0.00	56.7
All Vehicles			524	5.0	524	5.0	0.186	1.9	NA	0.0	0.3	0.01	0.19	0.01	57.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101v [PM Intersection Intersection NSR2 (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

NSR3 (N)
Site Category: (None)
Stop (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	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Hope Street (E)															
5	T1	All MCs	140	5.0	140	5.0	0.072	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	All MCs	18	5.0	18	5.0	0.013	6.4	LOS A	0.1	0.4	0.34	0.55	0.34	51.7
Approach			158	5.0	158	5.0	0.072	0.8	NA	0.1	0.4	0.04	0.06	0.04	58.9
North: NSR-2 (N)															
7	L2	All MCs	49	5.0	49	5.0	0.042	9.0	LOS A	0.2	1.2	0.29	0.87	0.29	50.8
9	R2	All MCs	23	5.0	23	5.0	0.036	10.9	LOS A	0.1	1.0	0.47	0.89	0.47	49.5
Approach			73	5.0	73	5.0	0.042	9.6	LOS A	0.2	1.2	0.35	0.88	0.35	50.4
West: Hope Street (W)															
10	L2	All MCs	66	5.0	66	5.0	0.127	5.6	LOS A	0.0	0.0	0.00	0.16	0.00	55.9
11	T1	All MCs	178	5.0	178	5.0	0.127	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	58.5
Approach			244	5.0	244	5.0	0.127	1.5	NA	0.0	0.0	0.00	0.16	0.00	57.8
All Vehicles			475	5.0	475	5.0	0.127	2.5	NA	0.2	1.2	0.07	0.24	0.07	56.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 4 [4 - Waratah Hope 2036 Dev AM (NSR-2 Closed) (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated   Cycle Time = 90 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Waratah S															
1	L2	All MCs	44	3.0	44	3.0	0.231	35.6	LOS C	2.9	20.7	0.90	0.73	0.90	29.6
2	T1	All MCs	31	3.0	31	3.0	* 0.231	42.1	LOS C	2.9	20.7	0.90	0.73	0.90	28.2
3	R2	All MCs	18	3.0	18	3.0	0.076	42.3	LOS C	0.7	5.0	0.89	0.70	0.89	34.4
Approach			93	3.0	93	3.0	0.231	39.1	LOS C	2.9	20.7	0.90	0.72	0.90	30.4
SouthEast: LRT S															
22	T1	All MCs	11	100.0	11	100.0	* 0.202	48.8	LOS D	0.5	13.5	0.97	0.68	0.97	33.3
Approach			11	100.0	11	100.0	0.202	48.8	LOS D	0.5	13.5	0.97	0.68	0.97	33.3
East: Hope St E															
4	L2	All MCs	39	3.0	39	3.0	0.351	35.4	LOS C	6.2	44.3	0.86	0.73	0.86	38.6
5	T1	All MCs	131	3.0	131	3.0	0.351	29.9	LOS C	6.2	44.3	0.86	0.73	0.86	33.7
6	R2	All MCs	16	0.0	16	0.0	* 0.061	37.0	LOS C	0.6	4.0	0.88	0.69	0.88	27.5
Approach			185	2.7	185	2.7	0.351	31.6	LOS C	6.2	44.3	0.86	0.72	0.86	34.5
North: Waratah N															
7	L2	All MCs	22	3.0	22	3.0	0.062	23.7	LOS B	1.0	7.2	0.74	0.66	0.74	32.3
8	T1	All MCs	6	3.0	6	3.0	0.062	29.8	LOS C	1.0	7.2	0.74	0.66	0.74	33.8
9	R2	All MCs	4	3.0	4	3.0	* 0.062	33.9	LOS C	1.0	7.2	0.74	0.66	0.74	18.4
Approach			33	3.0	33	3.0	0.062	26.2	LOS B	1.0	7.2	0.74	0.66	0.74	31.3
NorthWest: Light Rail E															
28	T1	All MCs	11	100.0	11	100.0	0.202	48.8	LOS D	0.5	13.5	0.97	0.68	0.97	33.3
Approach			11	100.0	11	100.0	0.202	48.8	LOS D	0.5	13.5	0.97	0.68	0.97	33.3
West: Hope St W															
10	L2	All MCs	148	3.0	148	3.0	0.735	40.7	LOS C	14.9	106.8	0.98	0.88	1.03	9.4
11	T1	All MCs	203	3.0	203	3.0	* 0.735	35.1	LOS C	14.9	106.8	0.98	0.88	1.03	31.0
12	R2	All MCs	15	3.0	15	3.0	0.122	50.7	LOS D	0.6	4.6	0.97	0.69	0.97	25.6
Approach			366	3.0	366	3.0	0.735	38.0	LOS C	14.9	106.8	0.98	0.87	1.03	21.7
All Vehicles			698	5.9	698	5.9	0.735	36.2	LOS C	14.9	106.8	0.92	0.80	0.95	27.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity

Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Waratah S												
P1	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	193.1	200.0	1.04
SouthEast: LRT S												
P5	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	193.1	200.0	1.04
East: Hope St E												
P2	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	193.1	200.0	1.04
North: Waratah N												
P3	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	193.1	200.0	1.04
NorthWest: Light Rail E												
P7	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	193.1	200.0	1.04
West: Hope St W												
P4	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	193.1	200.0	1.04
All Pedestrians		300	316	39.3	LOS D	0.1	0.1	0.94	0.94	193.1	200.0	1.04

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4 [4 - Waratah Hope 2036 Dev PM (NSR-2 Closed) (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.1.200

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Practical Cycle Time)

Vehicle Movement Performance																
Mov ID	Turn	Mov Class	Demand Flows [Total	HV]	Arrival Flows [Total	HV]	Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue [Veh.	Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Waratah S																
1	L2	All MCs	17	3.0	17	3.0	0.150	33.8	LOS C	1.7	12.2	0.89	0.69	0.89	29.9
2	T1	All MCs	27	3.0	27	3.0	* 0.150	39.7	LOS C	1.7	12.2	0.89	0.69	0.89	28.6
3	R2	All MCs	11	3.0	11	3.0	0.058	45.4	LOS D	0.4	3.1	0.92	0.68	0.92	33.4
Approach			55	3.0	55	3.0	0.150	39.0	LOS C	1.7	12.2	0.90	0.69	0.90	30.2
SouthEast: LRT S																
22	T1	All MCs	11	100.0	11	100.0	* 0.202	48.8	LOS D	0.5	13.5	0.97	0.68	0.97	33.3
Approach			11	100.0	11	100.0	0.202	48.8	LOS D	0.5	13.5	0.97	0.68	0.97	33.3
East: Hope St E																
4	L2	All MCs	72	3.0	72	3.0	0.636	48.6	LOS D	9.8	70.3	0.96	0.81	0.97	36.1
5	T1	All MCs	166	3.0	166	3.0	* 0.636	43.0	LOS D	9.8	70.3	0.96	0.81	0.97	31.0
6	R2	All MCs	59	0.0	59	0.0	* 0.207	51.4	LOS D	2.2	15.3	0.90	0.74	0.90	27.5
Approach			297	2.4	297	2.4	0.636	46.0	LOS D	9.8	70.3	0.95	0.80	0.96	31.9
North: Waratah N																
7	L2	All MCs	36	3.0	36	3.0	0.332	21.4	LOS B	5.8	41.9	0.82	0.72	0.82	31.8
8	T1	All MCs	78	3.0	78	3.0	0.332	27.2	LOS B	5.8	41.9	0.82	0.72	0.82	33.2
9	R2	All MCs	57	3.0	57	3.0	* 0.332	31.3	LOS C	5.8	41.9	0.82	0.72	0.82	17.9
Approach			171	3.0	171	3.0	0.332	27.3	LOS B	5.8	41.9	0.82	0.72	0.82	28.9
NorthWest: Light Rail E																
28	T1	All MCs	11	100.0	11	100.0	0.202	48.8	LOS D	0.5	13.5	0.97	0.68	0.97	33.3
Approach			11	100.0	11	100.0	0.202	48.8	LOS D	0.5	13.5	0.97	0.68	0.97	33.3
West: Hope St W																
10	L2	All MCs	75	3.0	75	3.0	0.588	40.8	LOS C	9.5	68.0	0.95	0.80	0.95	9.5
11	T1	All MCs	159	3.0	159	3.0	0.588	35.3	LOS C	9.5	68.0	0.95	0.80	0.95	31.2
12	R2	All MCs	14	3.0	14	3.0	0.113	50.6	LOS D	0.6	4.3	0.97	0.68	0.97	25.6
Approach			247	3.0	247	3.0	0.588	37.8	LOS C	9.5	68.0	0.95	0.79	0.95	24.0
All Vehicles			791	5.4	791	5.4	0.636	39.0	LOS C	9.8	70.3	0.92	0.77	0.92	28.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
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HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
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* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE [Ped	Dist]	Prop. Que	Eff. Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		ped	m			sec	m	m/sec
South: Waratah S												
P1	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	193.1	200.0	1.04
SouthEast: LRT S												
P5	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	193.1	200.0	1.04
East: Hope St E												
P2	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	193.1	200.0	1.04
North: Waratah N												
P3	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	193.1	200.0	1.04
NorthWest: Light Rail E												
P7	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	193.1	200.0	1.04
West: Hope St W												
P4	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	193.1	200.0	1.04
All Pedestrians		300	316	39.3	LOS D	0.1	0.1	0.94	0.94	193.1	200.0	1.04

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Appendix C: Green Travel Plan

Melrose Park Town Centre

Green Travel Plan

Prepared for:

Deicorp

27 July 2023

PROJECT INFORMATION

Project Name:	Melrose Park Town Centre
Client:	Deicorp
Project Number:	2240
Prepared By:	JMT Consulting

DOCUMENT HISTORY

Document Title	Revision	Date issued	Author
Melrose Park Town Centre Green Travel Plan	Issue	27.07.23	JM

Table of Contents

Figures

Tables

1 Introduction

1.1 Background

JMT Consulting has prepared this Green Travel Plan (GTP) report on behalf of Deicorp for the proposed development of Melrose Park Town Centre, within the broader Melrose Park precinct. This GTP has been prepared in response to the Transport for NSW (TfNSW) letter dated 19 December 2022 as per Table 1. It is expected that this GTP will be submitted for their final approvals.

Table 1 TfNSW request

TfNSW Comments	Section covered
Identify and determine a course for the delivery of mode share targets and strategies that encourage the use of sustainable transport options that reduce the dependence on and proportion of single occupant car journeys to the site, based on credible data.	Section 0
Be prepared by a suitably qualified transport or traffic consultant.	As per this report author
Include specific tools and actions to help achieve the objectives and mode share targets.	Chapter 5
Include measures to promote and support the implementation of the plan.	Chapter 5
Identification of a responsible party (or Committee) for the ongoing implementation of the GTP.	Section 6.1
Confirmation of extent and nature of end of trip facilities and bicycle parking and how they will be promoted to staff, residents, patients and visitors.	Section 4.5 and 0
Consideration of car parking management strategies that may be required to encourage sustainable transport use / mode share targets.	Section 4.1
Include a draft Transport Access Guide (TAG) to provide information to staff, residents and visitors about the range of travel modes, access arrangements and supporting facilities that service the site.	Appendix A
Identification of a communications strategy for conveying GTP information to staff, residents, patients and visitors including for the TAG	Section 6.2

1.2 Melrose Park precinct

The Melrose Park Precinct is located on the eastern boundary of the Parramatta LGA, approximately 7km east of the Parramatta CBD. Approximately 55 hectares in size, the Melrose Park Precinct is divided into North and South Precincts. T

he Melrose Park North Precinct is bound by Victoria Road to the north, Wharf road to the east, Hope Street to the south and Hughes Avenue to the west. The Melrose Park South Precinct is approximately 20 ha in size and is bound by Hope Street to the north, Wharf Road to the east, Parramatta River to the south, and Atkins Road to the west.

The combined Precincts are referred to as Melrose Park, however it also incorporates a portion of Ermington along the western edge. Planning for the redevelopment of this precinct has been occurring since 2016 and has involved consultation between Council, landowners, applicants and various Government agencies.

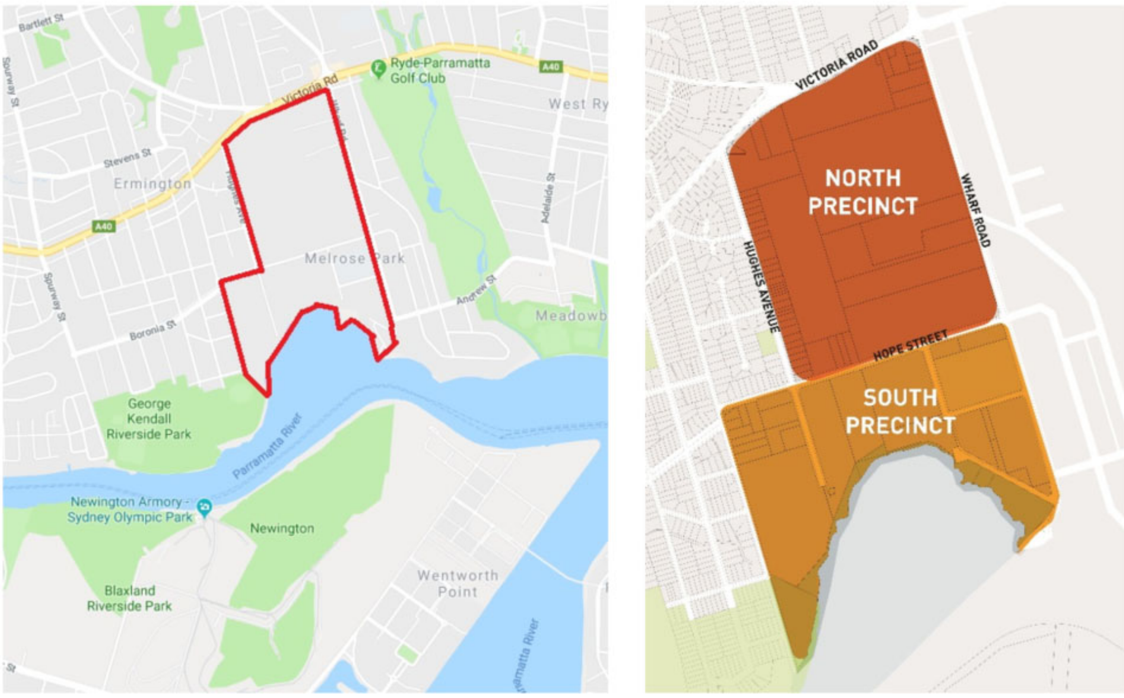


Figure 1 Melrose Park precinct context

Source: City of Parramatta Council

1.3 Melrose Park Town Centre

The Melrose Park Town Centre (MPTC) is located within the Melrose Park North Precinct as indicated in Figure 2 below.

Figure 2 Melrose Park Town Centre location

1.4 Green Travel Plan overview

The GTP will need to be tailored to the proposed development site to ensure appropriate measures are in place for the different land uses to promote a modal shift away from car usage. The key elements of the GTP are shown in the Travel Plan Pyramid in Figure 3 below.

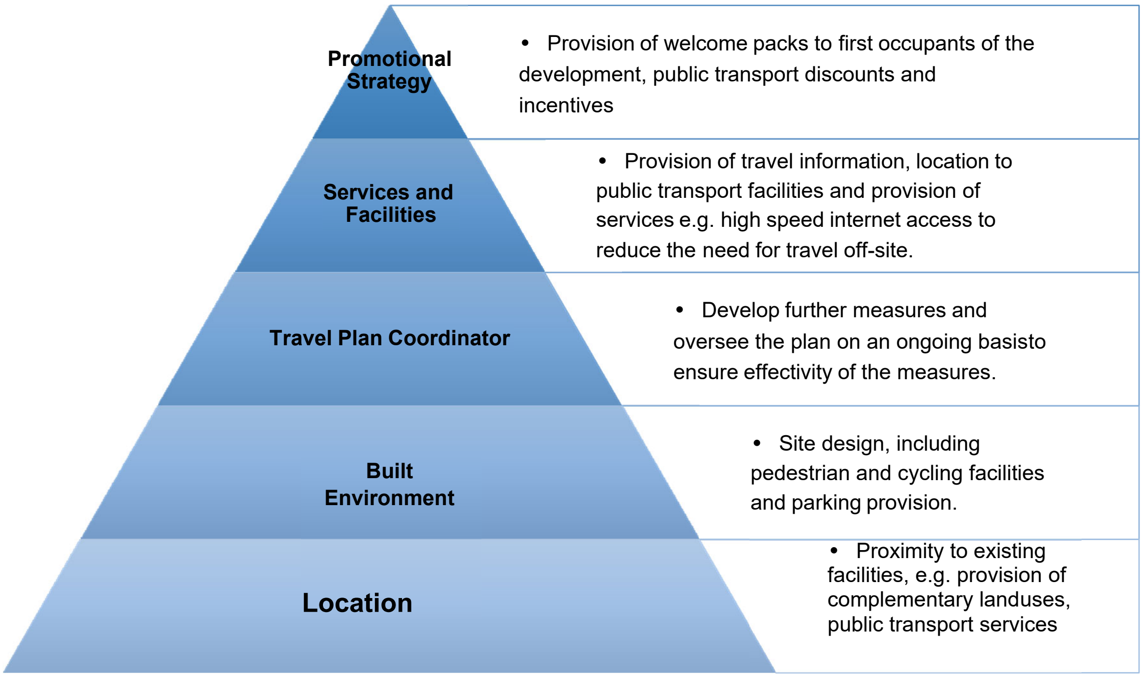


Figure 3 Travel plan pyramid

All elements in the Travel Plan Pyramid are critical to the success of the GTP, but Figure 3 illustrates that the key foundations to ensure the success of a GTP are:

Location – proximity to existing public transport services and proximity to mixed land uses, e.g. shops and services, such that walking or cycling becomes the natural choices, and

Built Environment – provision of high-quality pedestrian and cycling facilities, end-of-trip facilities and reduced car parking provision to encourage sustainable transport choices.

2 Transport and Access Service Strategy

2.1 Travel behaviours

Travel behaviours for residents and employees within the area surrounding the site been analysed using Travel to Work Census data. The data demonstrates a relatively high proportion of people using public transport before 2021, when it clearly shifts to a high proportion of Work from Home due to Covid conditions. The data reflects the strong availability and accessibility of public transport in this area, which will only improve following the completion of the Light Rail. A high proportion of residents do drive, but with the improvement of the active transport and public transport network this will likely decrease.

Table 2 Existing travel behaviours – Rydalmere and Ermington

Mode of travel	**Proportion of trips**			
	Residents travelling to work		*Employees travelling for work*	
	2016	*2021*	*2016*	*2021*
Car driver	62%	37%	76%	43%
Car passenger	4%	3%	4%	2%
Bus	5%	2%	3%	2%
Train	12%	2%	5%	2%
Walk	1%	1%	1%	1%
Bicycle	0%	0%	0%	0%
Other	4%	1%	2%	2%
Did not go / Work from Home	12%	54%	9%	48%
Total	**100%**	**100%**	**100%**	**100%**

2.2 Public transport accessibility

A key indicator of the level of public transport accessibility a site contains is the number of locations accessible within a 30 minute public transport catchment. A key objective of the Greater Sydney Commission's Greater Sydney Region Plan is to deliver a 30-minute city where jobs, services and quality public transport spaces are in easy reach of residences.

Accessibility to and from Melrose Park within 30 minutes by public and active transport is shown in Figure 4. Approximately 45,000 residents and 28,000 jobs are currently located within a 30-minute public transport journey of Melrose Park

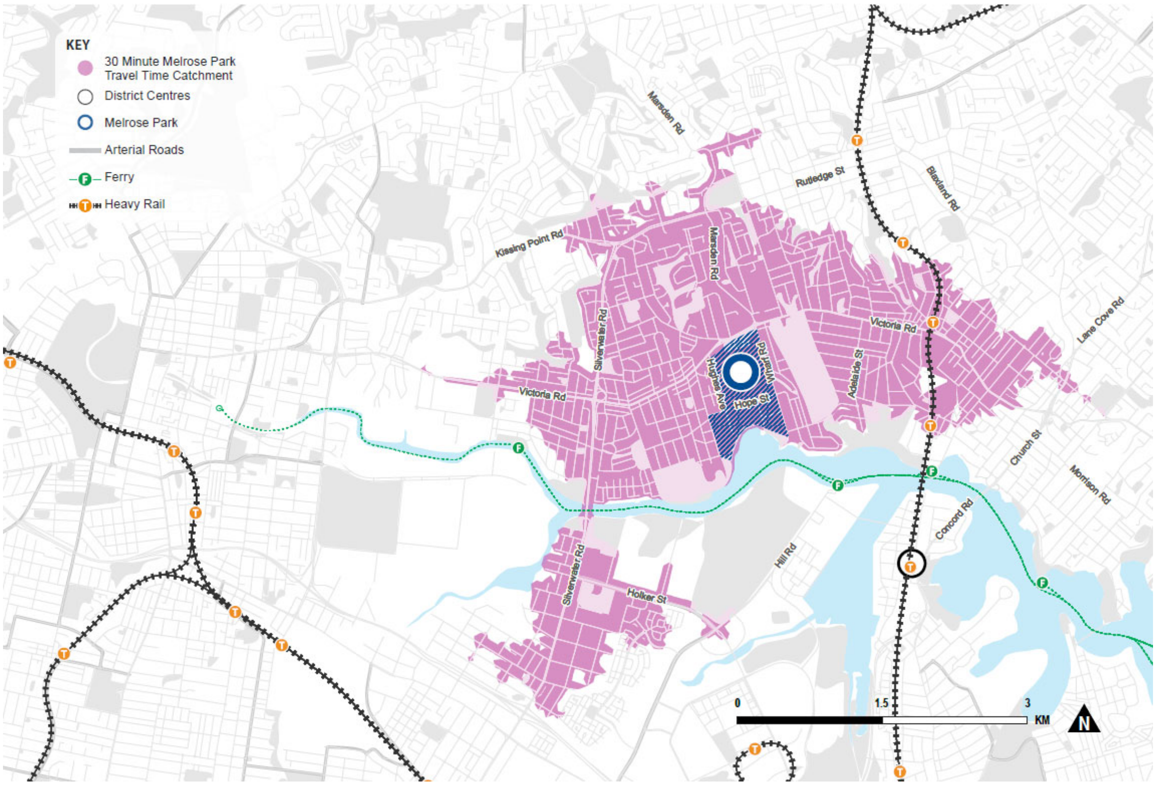


Figure 4 Existing 30-minute public transport catchment from Melrose Park

Source: Melrose Park Traffic Mobility Access Plan (TMAP) (Jacobs, January 2019)

2.3 Public transport services

2.3.1 Rail services

Melrose Park is located approximately 2km to the west of both West Ryde Station and Meadowbank Station, both of which are located on the T1 Northern Line of the Sydney Trains Network. The T1 Northern Line in turn provides direct access to key sub-regional and regional centres, and to major transport interchanges at Epping (for trips to Hornsby, Macquarie Park and Chatswood) and Strathfield (for trips to Parramatta, Westmead and Penrith).

T1 Northern Line services through both stations provide 5 trains per hour in the AM commuter peak, then 4 services per hour across the rest of the day.

To improve access by rail between Parramatta and the Sydney CBD the NSW Government has committed to the Sydney Metro West project, which will provide a direct connection between Parramatta and Sydney via key precincts including Sydney Olympic Park and the Bays Precinct.

Sydney Metro West will effectively double the capacity of existing T1 Western Line between Parramatta and the City, and in turn free up capacity across the rail network. Further the proposed Stage 2 of the Parramatta Light Rail line (PLR Stage 2) would run along Hope Street and Wharf Road within the Melrose Park precinct and provide an immediate connection south to the Sydney Metro West at Sydney Olympic Park.

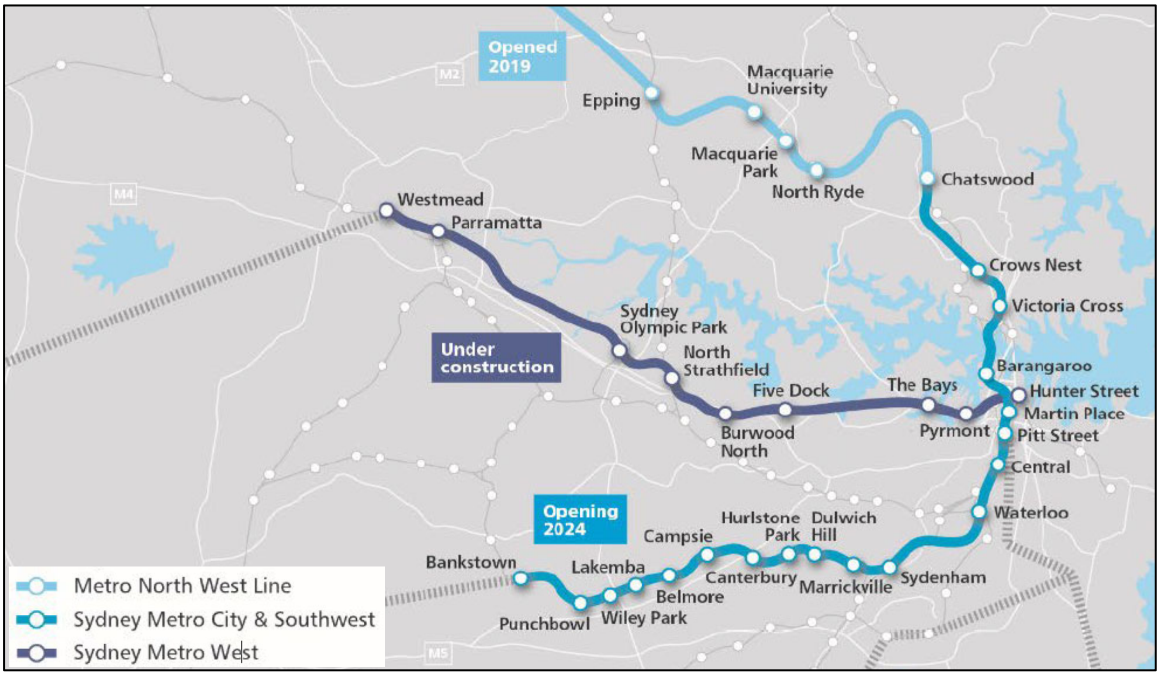


Figure 5 Future Sydney Metro West alignment

Source: Transport for NSW (2022)

2.3.2 Bus services

Primary bus services are provided in Victoria Road, including regional and sub-regional routes connecting Sydney (City) and Parramatta (with connections to rail and major centres). Key bus routes – the majority of which also connect to railway stations, transport interchanges and sub-regional and regional centres - are summarised in Table 3 below.

Table 3 Summary of existing bus services

Bus Route	Description	Frequency	
		Peak Periods	Off-Peak
520	Parramatta to Sydney City via Ryde	30 min	60 min
513	Carlingford to Meadowbank Ferry Wharf	30 min	60 min
523	Parramatta to West Ryde via Ermington	30 min	60 min
524	Parramatta to West Ryde via Melrose Park	30 min	60 min
544	Auburn to Macquarie Park	30 min	60 min

Sydney's Bus Future specifically identifies Victoria Road as a Rapid Bus Route (between Parramatta and the Sydney CBD via Ryde) running directly past Melrose Park and is forecast to provide 40 additional bus services every weekday, or the ability to carry more than 2,000 additional customers per day. In addition, key bus prioritisation initiatives are forecast to significantly reduce travel times. The future Victoria Road Rapid Bus Corridor is shown in Figure 6 below.

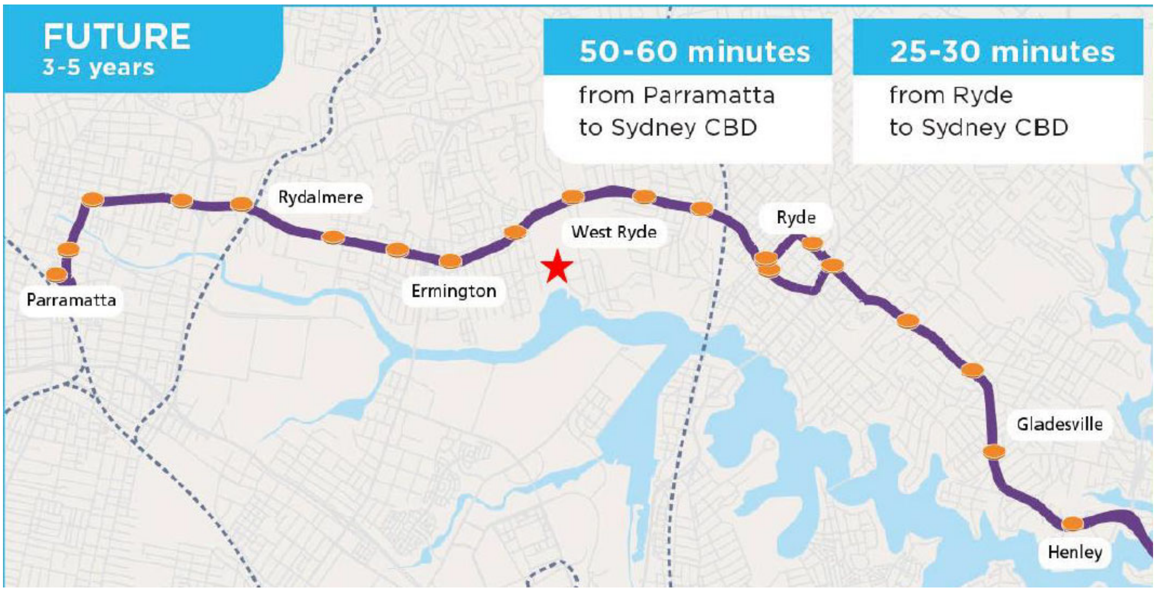


Figure 6 Parramatta to CBD Rapid Bus Improvements

Source: Transport for NSW

2.3.3 Ferry network

The existing ferry network is shown in Figure 7. Ferries currently run between Meadowbank Ferry Wharf and Circular Quay around twice per hour during the day. The trip takes approximately 50 minutes. Ferries currently run between Meadowbank Ferry Wharf and Parramatta once per hour and the trip takes 33 minutes.

Sydney's Ferry Future reports increases in ferry patronage over the past 10 years, with key demand for trips to/from the Sydney CBD, as well as forecast population growth in areas services by the Parramatta River wharves, and particularly those at Sydney Olympic Park, Meadowbank and Cabarita. Notwithstanding, there remains spare capacity over most of the ferry network to accommodate additional growth.

While a future ferry wharf at Melrose Park has previously been examined, the TMAP determined that a new wharf was not an essential component of the Melrose Park transport network, and that the broader suite of proposed public and active transport services and infrastructure can accommodate the future trip demands without ferry services.

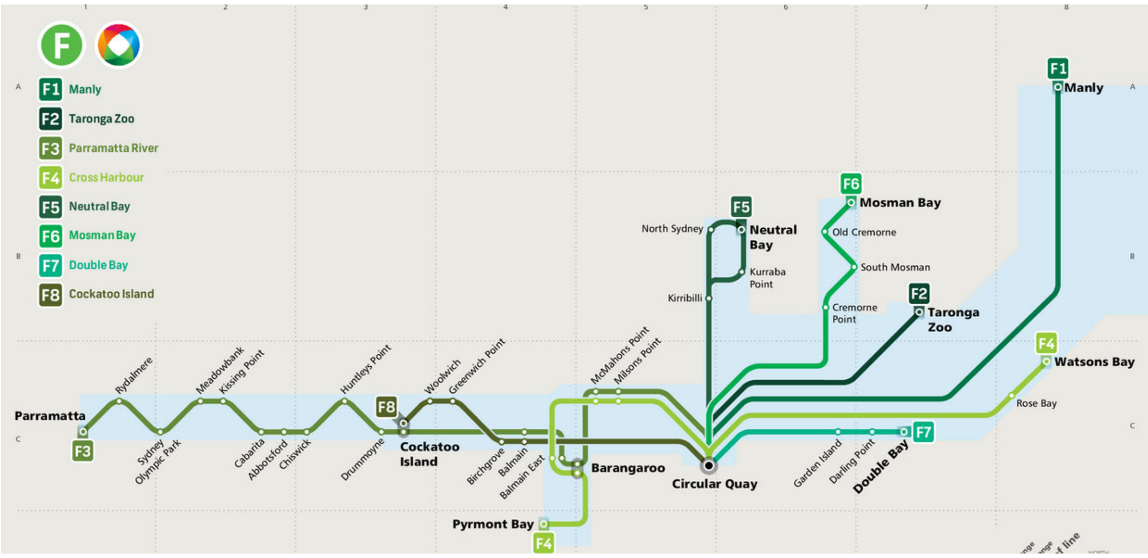


Figure 7 Existing ferry network

2.3.4 Light rail network

There is currently no light rail access in the vicinity of Melrose Park. Parramatta Light Rail (PLR) Stage 1 will be introduced through the Parramatta CBD connecting the major educational and health facilities of Westmead and Rydalmere. Stage 2 of the Parramatta Light Rail will connect the Parramatta CBD to Ermington, Melrose Park, Wentworth Point and Sydney Olympic Park. It will also connect to Sydney Metro West, the heavy rail in Parramatta and Sydney Olympic Park, and ferry services at Rydalmere and Sydney Olympic Park.

As part of PLR Stage 2 a light rail station within the Melrose Park precinct – directly adjacent to the Melrose Park Town Centre – will be delivered, offering an excellent public transport opportunity for future workers and residents by:

- Better integrating Parramatta CBD with Rydalmere, Melrose Park, Wentworth Point and Sydney Olympic Park;
- Providing an attractive and accessible service and the potential to reduce the need for car trips and car-parking use at Melrose Park; and
- Facilitating the development of higher density housing through better urban design and urban form at future light rail stops on Hope Street and Wharf Road.

The PLR Stage 1 and Stage 2 routes are shown in Figure 8 below.

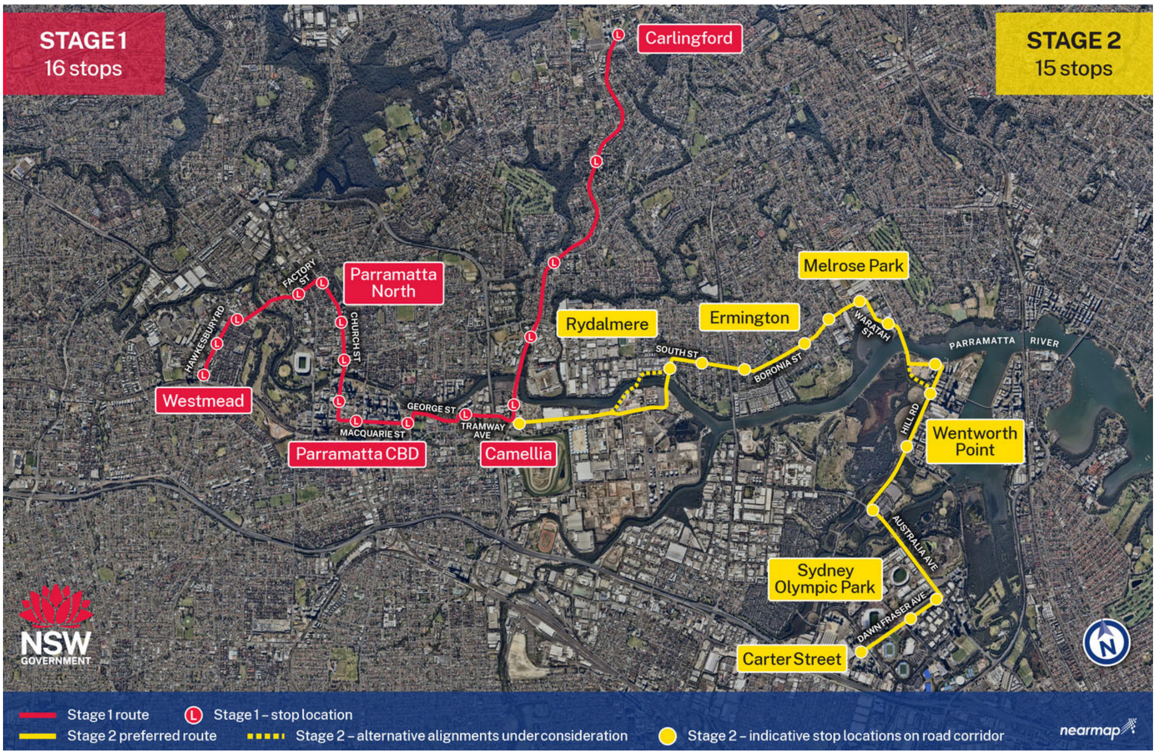


Figure 8 Parramatta Light Rail

Source: Transport for NSW

2.4 Walking and cycling network

Although limited active transport connections are currently provided within the Melrose Park precinct, this will be resolved through the future delivery of a legible and accessible street network to be provided as part of future development. Pedestrian crossing points are available intermittently along Parramatta Road at signalised intersections.

There are a number of good quality cycling routes that exist in the area, including:

- Parramatta River Foreshore Pathway active transport shared path which provides a recreational and commuter cyclist connection to Meadowbank ferry wharf
- Local cycling connection on Andrew Street and Adelaide Street connecting the southern precinct of Melrose Park to Victoria Road (West Ryde)
- Active transport shared path connections to southern side of Parramatta River and to Foreshore Pathway on southern side of river, including bridges across the Parramatta River at Silverwater Road and Concord Road.

2.5 Melrose Bridge

The most significant piece of major infrastructure identified in the area as being essential to the transport network to accommodate the development of Melrose Park is an active and public transport bridge over the Parramatta River to Wentworth Point. The previous TMAP determined that the Melrose Bridge will be required by 2028, by which time some 6,700 dwellings would be occupied within Melrose Park based on projections available at the time of the traffic modelling.

The Melrose Bridge provides the essential active and public transport connection to the broader Sydney Metropolitan transport network, including:

- A direct link to the Sydney Metro West station at Sydney Olympic Park;
- New bus services between Top Ryde and Concord Hospital via Melrose Park;
- Direct access to the emerging Sydney Olympic Park and Rhodes regional centres; and
- Provisions for the introduction of PLR Stage 2 in the future.

The previous TMAP concluded that the Melrose Bridge – and moreover the active and public transport opportunities it creates – will reduce the private vehicle trip generation of Melrose Park to such a level that it can (further of course to other road network upgrades and transport strategies) appropriately accommodate the future trip demands of Melrose Park.

3 Green Travel Plan Objectives and Targets

3.1 Purpose and objectives of the Green Travel Plan

A GTP is a package of measures aimed at promoting and encouraging sustainable travel and reducing reliance on the private car. The GTP for the Melrose Park Town Centre will assist in reducing car reliance by promoting alternative, sustainable modes of travel. The GTP aims to encourage and support the broader use of sustainable travel options by the community in carrying out their daily activities. GTPs can provide both:

- Measures which discourage or disincentivises car use;
- Measures which support, encourage or incentivise sustainable travel (including public transport), reduce the need to travel or make travel more efficient.

Sustainable travel options include active transport (including travel by foot, bicycle and other non-motorised vehicles) and public transport.

The GTP focuses on minimising the impact of events on the local and wider transport network and encourages those accessing the site to do so by sustainable modes of transport, thereby reducing car dependency for residents, staff and visitors travelling to the site.

The key objectives of the GTP are to:

- Achieve a high modal share for public transport, cycling and walking journeys for residents, staff and visitors of the site;
- Reduce private vehicle dependency as a means of access to the site;
- Ensure adequate facilities are provided at the site to enable users to travel by sustainable transport modes; and
- Raise awareness of, and actively encourage the use of, sustainable transport amongst users.

3.2 Mode share targets

The aim of the GTP is to encourage a modal shift away from private vehicles by implementing measures that influence the travel patterns of residents living at the site. The implementation of the GTP would be regularly monitored to ensure that the GTP is having the desired effect. The success of the GTP is measured by setting modal share targets and identifying the measures and actions that have the greatest impact.

The mode share targets have been set based on the site's location near the Parramatta CBD and Sydney Olympic Park, and its access to future public transport infrastructure such as the future light rail stops. The target mode share for employees also reflects the limited on-site parking available for the retail and commercial uses. Bicycle parking will be provided for building staff, with complementary end of trip facilities, and therefore this mode of transport is expected to increase compared to current conditions. All residents will also be provided with secure bicycle parking facilities.

The overall mode share targets for the site are summarised in Table 4 below. It is assumed that car driver mode shares could match 2021 Covid conditions with the expected improvement of cycling and light rail, with a potential for Work from Home to be somewhat reduced when workers start hybrid working conditions.

Table 4 Mode share targets

Mode of travel	**Existing Mode Share**		**Target Mode Share**	
	Residents	*Employees*	*Residents*	*Employees*
Car driver	62%	76%	35%	40%
Car passenger	4%	4%	4%	4%
Bus / Light Rail	5%	3%	15%	14%
Train / Metro	12%	5%	12%	5%
Walk / Bicycle	1%	1%	5%	5%
Other	4%	2%	4%	2%
Did not go / Work from Home	12%	9%	25%	30%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**

4 Design Measures to Support Travel Plan

4.1 Car parking strategy

Car parking for the Melrose Park Town Centre has been provided in accordance with the maximum parking rates noted in the site specific DCP, which separately references the parking rates contained in Table 3.6.2.3 of the Parramatta DCP. Generally the Parramatta DCP parking rates have been adopted as per the site specific DCP with the following exceptions:

4.2 Pedestrian access

The proposal provides for two through-site links which will significantly enhance the public domain in this location as shown in Figure 9. The through-site links improve permeability and provide connections to the bus stops and future adjacent light rail stop on Hope Street.

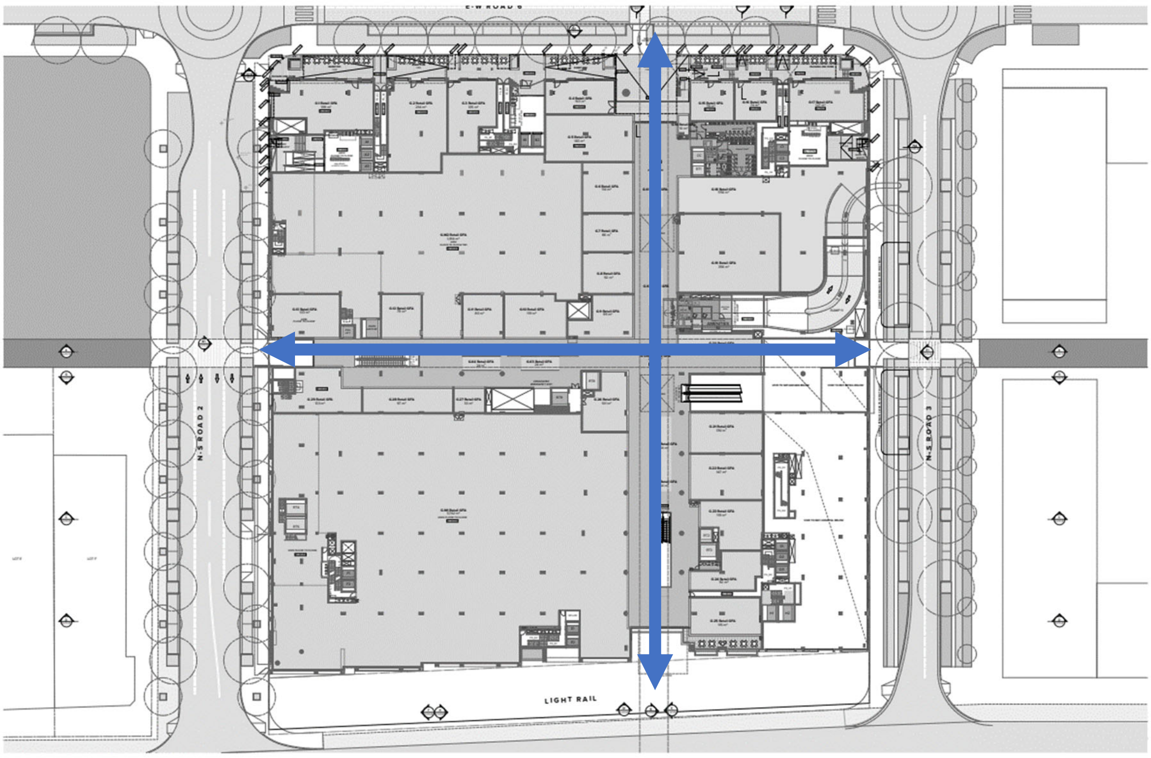


Figure 9 Through-site links

4.3 Car share

2 car share spaces are provided for residential and commercial uses – meeting Council's requirements of 2 spaces (1 each for the residential and commercial uses) as noted in Control C.1 of Section 3.6.1 Sustainable Transport of the Parramatta DCP 2011. Engagement with car share operators (e.g. Go Get) will take place closer to the initial occupancy of the development to confirm there is market demand for these spaces.

4.4 Car parking

The proposed car parking provision for the MPTC is lower than the **maximum** permissible car parking number based on the parking rates outlined in the Parramatta DCP. This reduction of approximately 10% in on-site parking compared to the maximum permissible allowance will assist in managing the road network impacts of the proposal.

4.5 Motorcycle parking

The site specific DCP requires that, at a minimum, one motorcycle parking space be provided for every 50 car parking spaces provided (or part thereof). Based on the 1,412 car parking spaces provided 30 motorcycle parking spaces would be required at this rate. The proposal provides for 35 motorcycle parking spaces in total, comprising of 28 spaces within the retail car park and a further 7 spaces in the mezzanine car parking area. This motorcycle parking provision complies with the site specific DCP requirements and is therefore considered suitable to accommodate future demands.

4.6 End of trip facilities

End of trip facilities are to be provided on Ground Level of the building which will support cycling as a mode of transport to the site. These end of trip facilities, as shown in Figure 10 will be located on Mezzanine 1. This includes 9 shower and change cubicles and 204 lockers for the use of building staff.

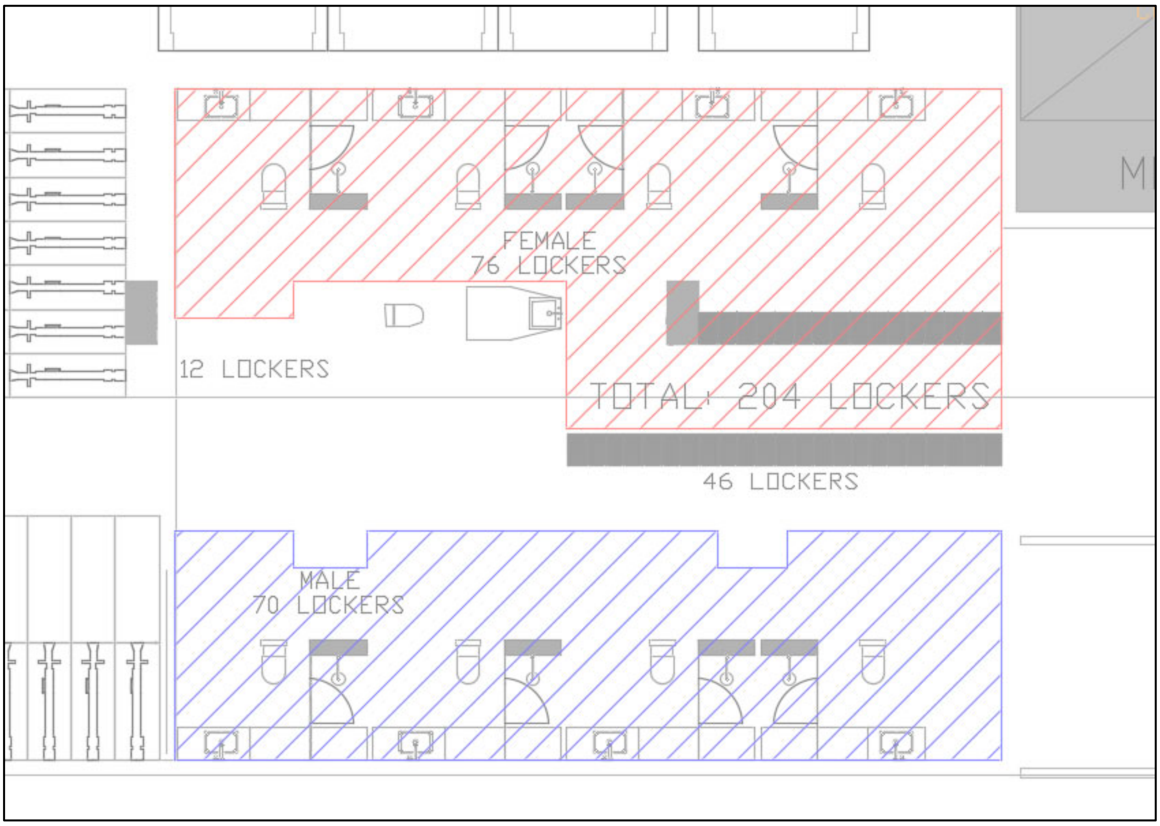


Figure 10 End of trip facilities

4.7 Bicycle parking

Bicycle parking is to be provided for the Melrose Park Town Centre in accordance with the rates outlined in the Parramatta DCP as summarised in Table 5.

Table 5 Proposed Melrose Park Town Centre bicycle parking

Use	Quantum	Units	Bicycle parking rate	Required bicycle parking	Proposed bicycle parking
Retail	18,295	m^2 GFA	1 per 200m2 GFA	91	91
Commercial	4,276	m^2 GFA	1 per 200m2 GFA	21	21
Medical Suites	735	m^2 GFA	1 per 200m2 GFA	4	4
Day Hospital	4,396	m^2 GFA	1 per 200m2 GFA	22	22
Childcare	2,299	m^2 GFA	1 per 200m2 GFA	11	11
Residential	494	Dwellings	1 per 2 dwellings	247	247
Total				**396**	**396**

150 bicycle parking spaces for building staff are provided which is consistent with Council's minimum requirements. End of trip facilities (lockers, showers and change areas) are also provided in accordance with Council requirements and are located in close proximity to North-South Road 2. In addition to the above allocation 30 visitor bicycle parking spaces will be provided within the public domain in close proximity to site access points.

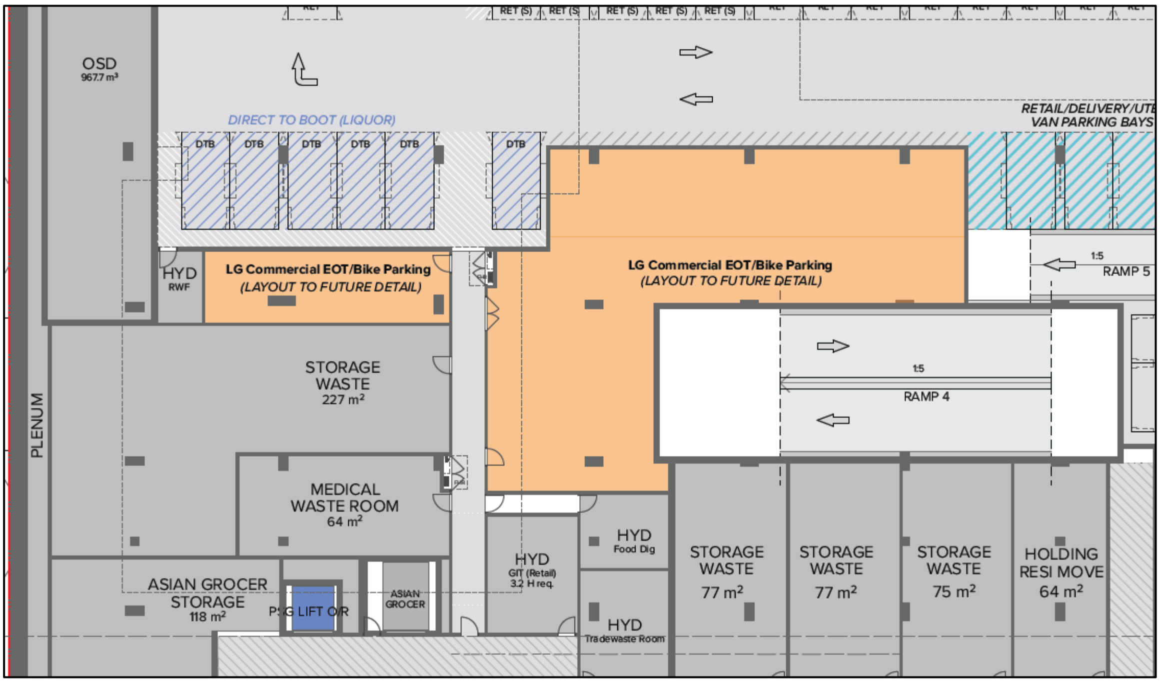


Figure 11 Bicycle parking and end of trip area

5 Green Travel Plan Strategies

A suite of potential measures is described in Table 6 to be implemented as part of the GTP, which can be developed further prior to the initial occupation of the building.

Table 6 List of potential GTP measures

Potential Green Travel Plan Measure	Responsibility
Cycling	
Provide sufficient cycle parking to meet needs, which is easily accessible and secure	Developer
Provide adequate cycle parking facilities for visitors	Developer
Ensure cycle parking is clearly visible or provide signage to direct people to cycle bays	Building manager
Produce a map showing cycle routes and bike stands in the area	Building manager
Provide cycle training courses to staff / promote courses offered by Council to encourage those who wouldn't previously consider cycle as a mode choice to do so.	Building manager Relevant Employer
Influencing Travel Behaviour	
Provision of sustainable travel packs to residents – provides information on walking and cycling routes, and travel by public transport	Developer
Allowing staff the flexibility to commute outside peak periods to reduce overall congestion and travel time	Employer
Provide the option to work remotely to reduce the number of vehicles on the road and encourage teleconferencing rather than travelling to meetings.	Employer
Walking	
Produce a map showing safe walking routes to and from the site with times, distances to local facilities, such as shops and bus stops	Building manager
Public Transport	
Develop a map showing public transport routes in the area	Building manager
Put up a noticeboard with leaflets and maps showing the main public transport routes to and from the site	Building manager
Restraining Parking	
Restrain parking requirements for the site (no greater than Council's controls) to account for the availability of other travel options	Developer
Carshare / Carpooling	
Put a poster on the noticeboard where residents would register their interest in carpooling by indicating their work location	Building manager
Develop a map showing car-share spots in the area	Building manager

Potential Green Travel Plan Measure	Responsibility
General actions	
Promotion including: • An events calendar. Best in conjunction with statewide events such as National Bike Week and Bike2Work Day, National Walk to Work Day. • Display boards in prominent locations to show public transport maps and timetables.	Building manager

The information provided within the GTP will be provided to residents staff and visitors in the form of a package of easy to understand travel information known as a Transport Access Guide (TAG).

TAGs provide customised travel information for people travelling to and from a particular site using sustainable forms of transport – walking, cycling and public transport. It provides a simple quick visual look at a location making it easy to see the relationship of site to train stations, light rail stations, bus stops and walking and cycling routes. Such TAGs encourage the use of non-vehicle mode transport and can reduce associated greenhouse gas emissions and traffic congestion while improving health through active transport choices.

They can take many forms from a map printed on the back of business cards or brochures. Best practice suggests that the information should be as concise, simple and site centred as possible and where possible provided on a single side/sheet. If instructions are too complex, people are likely to ignore them.

A TAG has been prepared for the site in the form of a brochure and is provided in Appendix A. Residents and staff will be provided with a copy of the TAG when they move into the building or commence work as part of their induction process.

6 Management and Monitoring

There is no standard methodology for the implementation and management of a GTP. However, the GTP will be monitored to ensure that it is achieving the desired benefits. The mode share targets set out in this document are used in this regard to ensure there is an overall goal in the management of the GTP.

The Plan is a 'living' document, so measures excluded at this time could be reconsidered or reintroduced at any time in the future. It is recognised that travel needs, and patterns will change, and new measures will become available. The Plan will be periodically reviewed to ensure that the objectives are being met.

An implementation plan has been developed that includes all of the proposed actions within the GTP and how these will be monitored and evaluated for five years post occupancy.

6.1 Management of the GTP

The body corporate will appoint a Travel Plan Coordinator (with support from the body corporate committee) will be responsible for the implementation and management of the plan, including:

- Communicating the travel plan to stakeholders;
- Promote awareness of the plan and associated initiatives;
- Providing travel information for residents, staff and visitors;
- Developing and disseminating appropriate travel plan marketing information, and to ensure that all relevant and up to date material is provided;
- To liaise with other venues and Government agencies to develop a collaborative approach to Travel Plan initiatives;
- To evaluate the benefit of the proposed measures to identify any changes required to the Travel Plan; and
- Overseeing the implementation and effectiveness of the Plan

The monitoring of the GTP would require travel surveys to be undertaken with a focus to establish travel patterns including mode share of trips to and from the site. It is anticipated that the first set of surveys would be undertaken within six months of first occupation to obtain the baseline mode shares for the site. Sample travel surveys for staff and residents of the building have been developed and are provided in Appendix B and C respectively.

Utilisation of bicycle parking and end of trip facilities will also provide a measure for monitoring the effectiveness of the plan – and enhance these facilities should monitoring determine that demand is exceeding supply. Additionally staff and visitor feedback on the bicycle parking and end of trip facilities should be gathered on an ongoing basis (e.g. through staff meetings) to understand any concern with the provision of bicycle facilities, with enhancements made based on the outcomes of this feedback and subsequent investigations.

6.2 Communications strategy

In order to secure a successful Travel Plan, the Travel Plan Coordinator will continue to engage with key transport agencies and stakeholders such as Transport for NSW and City of Parramatta Council. It will also be necessary to provide feedback to residents, staff and visitors to ensure that they can see the benefits of sustainable transport. Indeed, there are several keys to the development and implementation of a successful GTP. These include:

- **Communications** – Good communications are an essential part of the GTP. It will be necessary to explain the reason for adopting the plan to promote the benefits of sustainable transport options.
- **Commitment** – GTPs involve changing established habits or providing the impetus for people in new developments to choose a travel mode other than car use. To achieve co-operation, it is essential to promote positively the wider objectives and benefits of the plan. This commitment includes the provision of the necessary resources to implement the plan, beginning with the introduction of the 'carrots' or incentives for changing travel modes upon occupation.
- **Building Consensus** – It will be necessary to obtain broad support for the introduction of the plan from the residents, staff and visitors.

Once the plan has been adopted, it is essential to maintain interest in the scheme. Each new initiative in the plan will need to be publicised and marketing of the project as a whole will be important. A continuous review will take place to identify remedial actions should the modal share targets not be achieved.

Appendix A: Transport Access Guide

Appendix B: Sample Travel Survey – Staff

Hello and welcome to the travel survey for Melrose Park Town Centre! No matter whether you walk, cycle, drive or catch the bus to work – and even if you didn't come to work today – we need you to complete this!

It won't take more than 5 minutes, promise. We'll send through the results soon.

This survey will be updated annually (or when future upgrades to the transport network come online) and forms part of our wider suite of Green Travel Plan initiatives including on-site bicycle parking, flexible working arrangements and improved wayfinding. Please talk to a representative from Human Resources for further information.

1. What is your age in years?

	18 – 24		45 – 54
	25 – 34		55 – 64
	35 – 44		Over 65

2. In a typical week how many times do you travel to work?

	Every day		2 days per week
	4 days per week		1 day per week
	3 days per week		Less than 1 day per week

3. What postcode do you typically commute to work from?

4. What is your normal shift time?

	7am to 3pm		3pm to 11pm
	9am to 5pm		Other

5. What is your main mode of transport when travelling to and from Melrose Park?

	Walk or run		Ferry
	Bicycle		Car (as driver/sole occupancy)
	Bus		Car (as driver with passengers)
	Train		Car (as passenger)
	Metro		Taxi / Uber

6. Significant improvements are being made across the transport network in Sydney. These changes may have an impact on your journey to work. To improve your journey, how likely is it that you will choose another mode to travel to work, e.g. switching from driving to public transport or from public transport to walking or cycling?

	Very likely		Unlikely
	Likely		Very unlikely
	Neutral		Not possible

7. Do you have any general comments on how you currently travel or how you would like to travel?

Appendix C: Sample Travel Survey – Residents

Hello and welcome to the travel survey for Melrose Park Town Centre! No matter whether you walk, cycle, drive or catch the bus to work – and even if you didn't come to work today – we need you to complete this!

It won't take more than 5 minutes, promise. We'll send through the results soon.

This survey will be updated annually (or when future upgrades to the transport network come online) and forms part of our wider suite of Green Travel Plan initiatives including on-site bicycle parking, flexible working arrangements and improved wayfinding. Please talk to a representative from building management for further information.

1. What is your age in years?

	18 – 24		45 – 54
	25 – 34		55 – 64
	35 – 44		Over 65

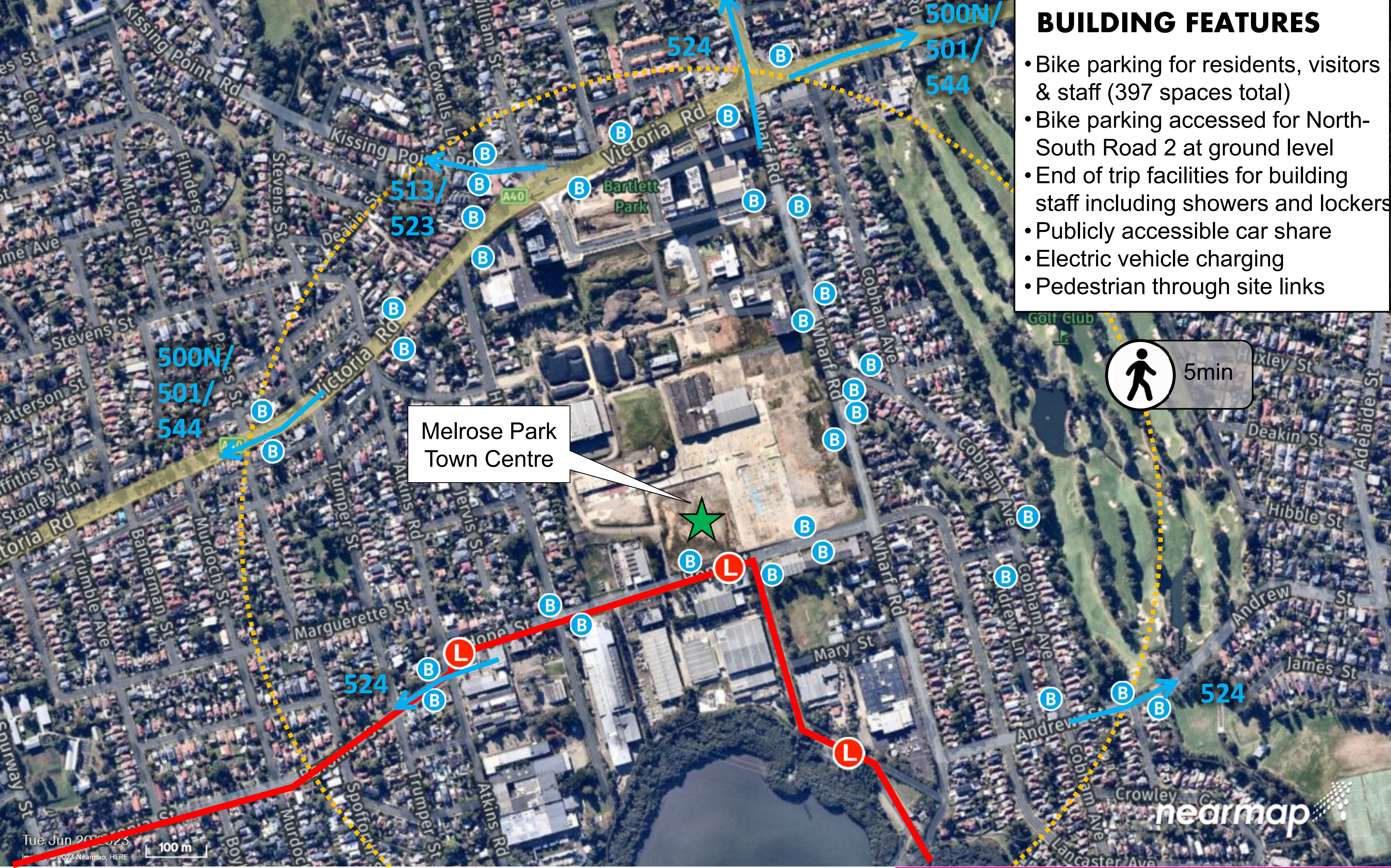
2. What is your main mode of transport when travelling to Melrose Park?

	Walk or run		Ferry
	Bicycle		Car (as driver/sole occupancy)
	Bus		Car (as driver with passengers)
	Train		Car (as passenger)
	Metro		Taxi / Uber

3. Significant improvements are being made across the transport network in Sydney. These changes may have an impact on your journey to work. To improve your journey, how likely is it that you will choose another mode to travel to work, e.g. switching from driving to public transport or from public transport to walking or cycling?

	Very likely		Unlikely
	Likely		Very unlikely
	Neutral		Not possible

4. Do you have any general comments on how you currently travel or how you would like to travel?



BUILDING FEATURES

- Bike parking for residents, visitors & staff (397 spaces total)
- Bike parking accessed for North-South Road 2 at ground level
- End of trip facilities for building staff including showers and lockers
- Publicly accessible car share
- Electric vehicle charging
- Pedestrian through site links

TRANSPORT ACCESS GUIDE – MELROSE PARK TC

L Future Light Rail

B Bus stops

524 Bus routes

For more information

transportnsw.info

Appendix F Email Correspondence with Council

Michael Partadinata

From: Maria Mulholland
Sent: Tuesday, 28 January 2025 3:48 PM
To: Michael Partadinata
Subject: FW: Melrose Park Schools - On-Street Accessible K&R

From: Maria Mulholland
Sent: Monday, 13 January 2025 5:09 PM
To: 'Behzad Saleh' <BSaleh@cityofparramatta.nsw.gov.au>
Subject: RE: Melrose Park Schools - On-Street Accessible K&R

Hi Behzad,

Happy New Year!
Following our conversations regarding the Wharf Road / Hope Street / Lancaster Ave intersection, I'm reviewing the traffic modelling scenarios and wanted to clarify the need to complete new traffic counts, see below:

1. As Melrose Park precinct is undergoing significant redevelopment, I'm hesitant that new traffic counts are the correct approach given the level of assumptions required to confirm future year background traffic.
    a. Existing traffic counts will capture some of the Melrose Park Precinct completed development, but not all given a large portion is in construction
    b. Existing traffic counts will also capture existing construction vehicle and worker vehicle trips which will become redundant once construction of Melrose Park North is completed
    c. Stage 1 of the school is intended to be completed in 2027– this involves assuming some of the Melrose Park North Precinct is completed by 2027? – Guidance from Council on what will be completed by 2027
    d. Stage 2 of the school is intended to be completed in 2036 – this involves assuming full development of Melrose Park Precinct is completed, (minus construction traffic and development traffic captured in the existing traffic counts, this will be difficult to determine)

    How do Council propose we assess existing + development? Noting existing counts will capture some completed development within the Melrose Park Precinct and also construction vehicles?
    In addition, there is a risk once updated background traffic modelling is completed (excluding the proposed school traffic) the Wharf Rd / Hope St intersection will not operate at a satisfactory level of service – this is not the responsibility of SINSW to upgrade if there is already an existing issue.

2. The TMAP has been endorsed by TfNSW and is required to be used as a supporting technical document for all Planning Proposals within the precinct. Council have also approved traffic modelling for the Melrose Park North Precinct. I therefore feel utilising the traffic volumes in the TMAP 2036 volumes as background traffic and applying these for both Stage 1 and Stage 2 scenarios is the most appropriate methodology.
3. It seems incorrect to have to complete an updated assessment of the background traffic with new assumptions, noting that the TMAPS objective was to provide a consolidated detailed traffic and transport study which has been endorsed by TfNSW

If you could please review the above and provide a response as soon as possible that would be greatly appreciated.

Kind regards,
Maria

From: Behzad Saleh <BSaleh@cityofparramatta.nsw.gov.au>
Sent: Monday, 6 January 2025 10:56 AM
To: Maria Mulholland <Maria.Mulholland@ttw.com.au>
Subject: RE: Melrose Park Schools - On-Street Accessible K&R

[External Email]: Do not click links or open attachments unless you recognize the sender and know the content is safe.

Thanks Maria

Behzad Saleh
Traffic and Transport Executive Engineer | Traffic and Transport
02 9806 8410

City of Parramatta
9 Wentworth Street, Parramatta NSW 2150 Australia
PO Box 32, Parramatta, NSW 2124
cityofparramatta.nsw.gov.au

CITY OF PARRAMATTA

Council acknowledges the Traditional Owners of the land, the Dharug Peoples and pays respect to their Elders past and present.

From: Maria Mulholland <Maria.Mulholland@ttw.com.au>
Sent: Friday, 20 December 2024 11:32 AM
To: Behzad Saleh <BSaleh@cityofparramatta.nsw.gov.au>
Cc: Michael Kolos <MKolos@cityofparramatta.nsw.gov.au>; DeAngelis, Joshua <Joshua.DeAngelis@colliers.com>; Martin, Nathan <Nathan.Martin@colliers.com>
Subject: RE: Melrose Park Schools - On-Street Accessible K&R

*****[EXTERNAL EMAIL]** Stop and think before opening attachments, clicking on links or responding***

Hi Behzad,

Thanks for your responseWe will take your comments into consideration

On another note, we discussed the proposed on-street accessible kiss & ride (K&R) spaces on NSR-4 and you mentioned you required additional information to their location, please see below further details:

The 2 accessible K&R spaces have been located in the most convenient location possibleOur justification for providing them on-street from a traffic and parking perspective is detailed below:

- The 2 accessible K&R spaces proposed on-street, are located as close as possible to the main access and the SLU building to provide ease of access to the site and in turn reducing student travel distance / times
- The accessible K&R spaces will be sign posted as accessible K&R and will be time restricted to school pick-up & drop-off times
- Locating the 2 accessible K&R spaces on-site would increase the travel distance by approximately 50-60 metresIn addition, this would result in an extension of the on-site car park, resulting in a loss of play space given the site is extremely constrained
- 2 accessible K&R spaces have been proposed based on the number of SLU students and SINSW experience on previous school projects to ensure adequate provision is provided

It is therefore recommended the most appropriate location for the 2 accessible PUDO spaces is within the indented parking bays along NSR-4

Kind regards,
Maria

Maria Mulholland | Senior Traffic Engineer
+61 2 9439 7288 | +61 2 8437 7209 | Maria.Mulholland@ttw.com.au
TTW Engineers | Sydney
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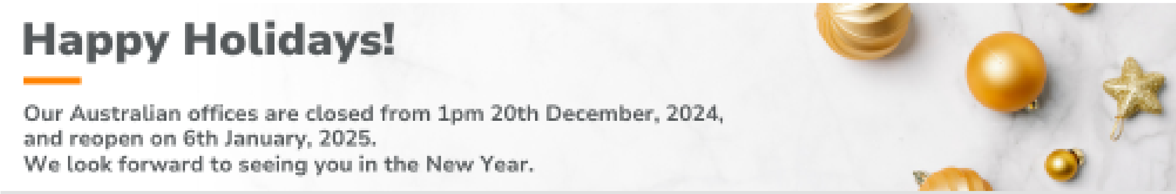

From: Behzad Saleh <BSaleh@cityofparramatta.nsw.gov.au>
Sent: Thursday, 19 December 2024 10:53 AM
To: Maria Mulholland <Maria.Mulholland@ttw.com.au>
Cc: Michael Kolos <MKolos@cityofparramatta.nsw.gov.au>
Subject: RE: Melrose Park Schools - Proposed Traffic Modelling Methodology

[External Email]: Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Maria,

Relying on the TMAP and the two other recent DAs for Melrose Park is not going to provide reliable modelling output for the school as it is apparent that the existing base case traffic volumes for Hope Street were significantly underestimated.

Having said that, the only intersection of concern from a Traffic perspective to Council surrounding the school is Hope Street and Wharf Road as Sekisui is required to construct a roundabout at the intersection of Waratah and Hope. Council's position on the matter is that a roundabout should be constructed here as well. This is because a combined raised pedestrian and cyclist crossing will be required in Hope Street at Wharf Road and at Wharf Road just north of Hope Street (other crossing facilities may be required subject to further assessment as part of the EIS). These crossing facilities are however likely to create issues with road safety and traffic flow at the Hope/Wharf intersection such as vehicles queuing in Wharf Road either blocking the intersection or obstructing sight lines for vehicles in Hope Street that are either continuing straight through or turning right. Should the crossing be relocated further north in Wharf Road, there is a concern that it will be away from the pedestrian desire lines and therefore, may not be used.

With regards to Traffic Generation, you have to consider that a school peak is not evenly spread across the whole hour, but is heavily concentrated over a 15min period

Let me know if I missed anything and am happy to discuss further

Kind Regards,

Behzad Saleh
Traffic and Transport Executive Engineer | Traffic and Transport
02 9806 8410

City of Parramatta
9 Wentworth Street, Parramatta NSW 2150 Australia
PO Box 32, Parramatta, NSW 2124
cityofparramatta.nsw.gov.au

CITY OF PARRAMATTA

From: Maria Mulholland <Maria.Mulholland@ttw.com.au>
Sent: Thursday, 19 December 2024 9:55 AM
To: Behzad Saleh <BSaleh@cityofparramatta.nsw.gov.au>
Cc: Michael Kolos <MKolos@cityofparramatta.nsw.gov.au>
Subject: RE: Melrose Park Schools - Proposed Traffic Modelling Methodology

[EXTERNAL EMAIL]** Stop and think before opening attachments, clicking on links or responding

Hi Behzad,

Just following up on my below emailIt would be great to get a response / chat before the Christmas holidays
I am working all day today and until 1pm tomorrow

Kind regards,
Maria

Maria Mulholland | Senior Traffic Engineer
+61 2 9439 7288 | +61 2 8437 7209 | Maria.Mulholland@ttw.com.au
TTW Engineers | Sydney
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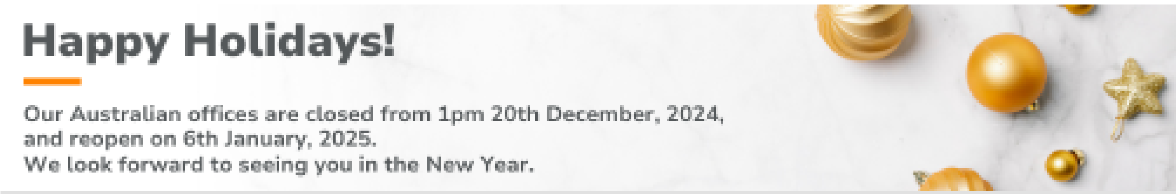

From: Maria Mulholland
Sent: Friday, 13 December 2024 10:40 AM
To: Behzad Saleh <BSaleh@cityofparramatta.nsw.gov.au>
Cc: Michael Kolos <MKolos@cityofparramatta.nsw.gov.au>
Subject: Melrose Park Schools - Proposed Traffic Modelling Methodology

Hi Bahzed,

Thanks for your comments on Wednesday during the TWG, from a traffic modelling perspective I wanted to clarify a few things for both Melrose Park High School and Melrose Park Public Schools

As you're aware, given the significant development of Melrose Park and the increase in background traffic between now and by opening year of the schools, completing a comparison of existing traffic volumes + proposed development will not fully capture the background traffic on the surrounding road network. We have therefore relied upon the following approved documents which have completed traffic modelling for 2036 full development:

- TMAP, 2019
- Melrose Park North Precinct (DA 1100/202)
- Melrose Park Town Centre (DA/764/2022)

The below provides our proposed traffic methodology for each of the schools:

Melrose Park High School

- Opening year, 2026 – 560 students
- Stage 2, 2036 – 1,000 students

As mentioned, updated SIDRA traffic modelling was completed as part of the Melrose Park North Precinct (DA 1100/202) and Melrose Park Town Centre (DA/764/2022) which has incorporated:

- An 800-student school on the MPHS site, generating 213 vehicles during the peak hour
- All intersections operate at a LOS A-C surrounding the site
- Based on our assessment, as an absolute worst case scenario (i.e. applying baseline travel modes to 1,000 students & 79 staff) MPHS will generate 259 vehicles during the peak hour
- MPHS will generate an **additional 46 vehicles during the peak hour**

This increase is considered minimal and can be accommodated within the surrounding road network - Intention to rely on the SIDRA traffic modelling which has previously been completed further detailed analysis including trip distribution will be included as part of our TIA report for REF submission.

Melrose Park Public School

- Opening year, 2027 – 780 students
- Stage 2, 2036 – ~1,000 students

Traffic modelling to be completed for proposed redevelopment of MPPS, the following intersections and scenarios have been considered:

1. Wharf Road / Mary Street
2. Hope Street / Wharf Road / Lancaster Ave
3. Hope Street / Waratah Street / NSR-3

Scenarios

1. 2027 – opening year baseline (TMAP existing traffic volumes + town centre development) **Note updated existing traffic counts can be completed, to provide a more accurate assessment if requested by Council**

2. 2027 – opening year baseline + MPPS Stage 1 (Hope Street / Waratah Street / NSR-3 modelled as roundabout)
3. 2027 – opening year baseline + MPPS + MPHS Stage 1 (Hope Street / Waratah Street / NSR-3 modelled as roundabout)
4. 2036 – Full development (Existing background traffic + town centre development + Melrose Park North Precinct)
5. 2036 – Full development + MPPS Stage 2 (Hope Street / Waratah Street / NSR-3 modelled as signals)
6. 2036 – Full development + MPPS + MPHS Stage 2 (Hope Street / Waratah Street / NSR-3 modelled as signals)

Once reviewed, feel free to give me a call to discuss further.

Kind regards,
Maria

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Michael Partadinata

From: Maria Mulholland
Sent: Tuesday, 28 January 2025 3:47 PM
To: Michael Partadinata
Subject: FW: Melrose Park HS modeshare
Attachments: Sample Mode Share Survey Results in High Schools.docx

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From: Maria Mulholland <maria.mulholland@ttw.com.au>
Sent: Monday, 16 December 2024 12:12 PM
To: Jed Coppa <Jed.Coppa@transport.nsw.gov.au>
Cc: John Broady <John.Broady@transport.nsw.gov.au>; Behzad Saleh <bsaleh@cityofparramatta.nsw.gov.au>; Joanna Hole <Joanna.Hole@det.nsw.edu.au>; Angelo Parissis <Angelo.Parissis3@det.nsw.edu.au>; Kamoru Adetunmbi <kamoru.adetunmbi2@det.nsw.edu.au>
Subject: RE: Melrose Park HS modeshare

Hi Jed,

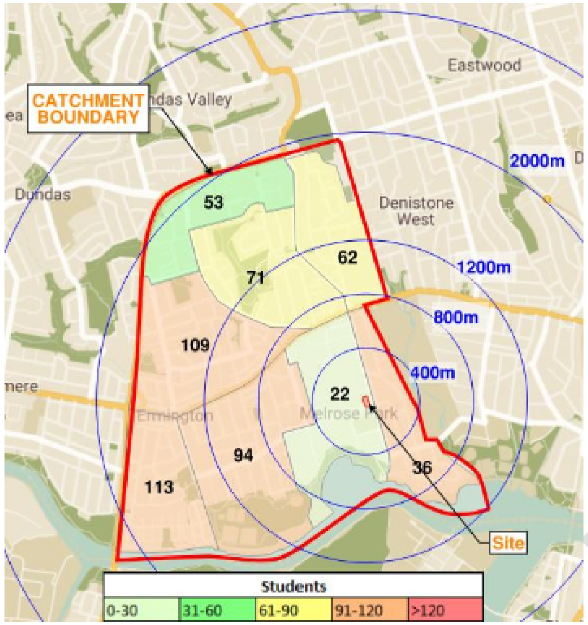
Thanks for your comments. I understand your rational and points. However, based on our analysis we feel the below travel mode targets are considered reasonable. For background last week's TWG was more of a quick recap on items that had already been discussed at the previous TWG in September, therefore I didn't go into too much detail on the analysis and rational of the mode shares. In summary, the travel mode targets have been set based on forecasted student locations and aiming to align with the objectives set out in the TMAP to reduce private vehicle usage. I understand your concerns with high public transport travel modes, however these targets have been assumed taking the below points into consideration:

- Additional bus services will be provided to the Melrose Park Precinct / Town Centre development / PLR2 bridge connection (From previous conversations with TfNSW bus planning team it was too early to provide any details of updated / additional bus routes at this stage)
- Previous conversations with TfNSW and Council on setting a precedence at the new school of high uptake in active and public transport from day 1 term 1.
- Utilising the details from the student location analysis and being realistic with the travel mode targets i.e. students are unlikely to walk if the live more than 1.2km from the school, based on other school data we typically do not see more than 10% uptake in cycling (however we have made allowances if the travel mode exceeds 10% i.e. additional space set aside for more on-site bicycle parking), based on other SINSW high schools (even when students aren't eligible for SSTS) survey results show relatively high public transport mode shares over car travel for students that live outside walking / cycling distance - I have also attached some sample mode share data from other high schools throughout Sydney

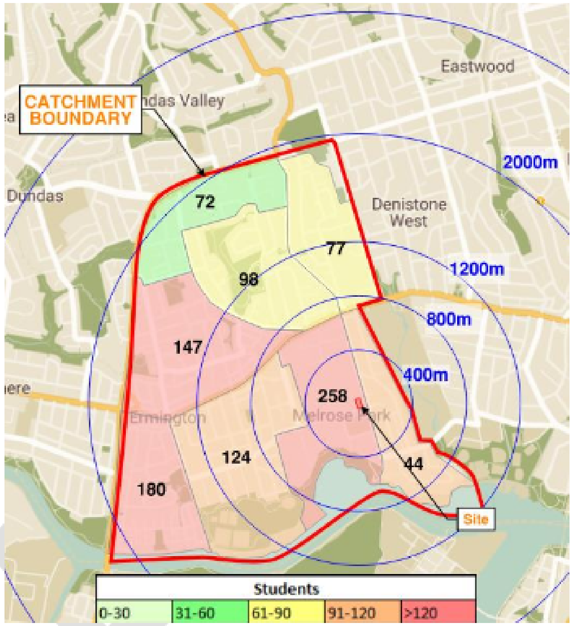
I also wanted to reiterate, it is difficult to complete an accurate assessment given so many uncertainties i.e. specific student locations, and additional public transport services, given the site is for a new school in a new precinct. The travel mode targets will be reviewed annually as part of the School Transport Plan and will be updated accordingly following more accurate data.

I've provided a few more details below, we have also completed a thorough analysis as part of the Traffic Impact Assessment report which will be included as part of the REF submission.
See below forecasted student locations for opening year 2026 and Stage 2 2036

2026



2036



2026

2036

Table 15: Student Location Distribution within the School Catchment

Distance	Actual Walking Distance (2026)		Actual Walking Distance (2036)	
	%	Students	%	Students
0 – 400m (5min walk)	3%	15	10%	100
400 – 800m (10min walk)	8%	43	17%	170
800 – 1,200m (15min walk)	13%	72	13%	130
1,200 – 2,000m	48%	268	37%	370
2,000 – 2,900m	28%	162	23%	230
Total	**100%**	**560**	**100%**	**1,000**

As shown above, the key findings derived from this walking distance analysis include the following:

- There will be a movement of students living in closer proximity to the school by 2036 once the Melrose Park North Precinct is fully developed
- Approximately 24% of students will live within a 15-minute walk of the site in 2026. However, as Melrose Park develops, 40% of students will live within a 15-minute walk of the site in 2036.
- Approximately 76% of students are located outside 1.2km walk of the site, showing a large portion of students live outside typical walking distance from the school in 2026. However, this decreases to 60% in 2036 once Melrose Park Precinct becomes fully developed.
- No students live more than 2.9km actual walking distance and are not eligible for free public transport in accordance with the School Student Transport Scheme (SSTS)

Travel mode scenarios

Baseline – Based on average travel mode splits other comparable schools (Pendle Hill HS, Cumberland HS, Marsden HS, Concord HS)
Moderate Targets – Opening Year
Reach Targets – Stage 2 2036

Table 16: MPHS Students & Staff Mode Share Scenarios

Travel mode	Students			Staff		
	Baseline	Moderate	Reach	Baseline	Moderate	Reach
Walk	20%	20%	35%	3%	5%	5%
Bicycle	1%	5%	8%	0%	3%	5%
Bus	41%	48%	30%	3%	15%	5%
Train	9%	0%	0%	5%	5%	5%
Light rail	0%	0%	12%	0%	0%	20%
Car, passenger	27%	25%	15%	2%	7%	10%
Car, driver	2%	2%	0%	87%	65%	50%
Total	100%	100%	100%	100%	100%	100%

Table 17: Students Travel Demand Projection

Students	Stage 1			Stage 2		
Travel mode	**Baseline**	**Moderate**	**Reach**	**Baseline**	**Moderate**	**Reach**
Walk	112	112	196	200	200	350
Bicycle	6	28	45	10	50	80
Bus	230	269	168	410	480	300
Train	50	0	0	90	0	0
Light rail	0	0	67	0	0	120
Car, passenger	151	140	84	270	250	150
Car, driver	11	11	0	20	20	0
Total	**560**	**560**	**560**	**1,000**	**1,000**	**1,000**

Based on the student location analysis and the objectives set out in the TMAP which aim to achieve higher active and public transport mode shares, forecasted travel mode targets have been provided in the table above.

Moderate Targets 2026

- Walk - Based on student location analysis 24% of students will live within 15min walk of the school. Therefore, a target of 20% of students was assumed
- Bicycle – Based on student location analysis 48% of students will live between 1.2km-2km of the school, these students are unlikely to walk but may cycle to school. However, we have been conservative and assumed only 5% of students will cycle to school based on low cycling uptake on the majority of SINSW high schools
- Bus - Following previous discussions with TfNSW and the understanding additional bus services will be provided to the Melrose Park Precinct / Town Centre development / PLR2 bridge connection, we have assumed 48% of students will travel to the school by bus in 2026 (equates to 269 students which equates to ~5 buses).
- Car–We have assumed 25% car passenger and 2% car driver. We understand this may be slightly higher in the first few years, depending on available public transport infrastructure, however based on other school data we tend to see public transport uptake much higher than car travel.

Reach Targets 2036

- Walk - Based on student location analysis 40% of students will live within 15min walk of the school. Therefore, a target of 35% of students was assumed

- Bicycle – Based on student location analysis 37% of students will live between 1.2km-2km of the school, these students are unlikely to walk but may cycle to school. However, we have been conservative and assumed only 8% of students will cycle to school based on low cycling uptake on the majority of SINSW high schools. We have provided an on-site provision of 10% bicycle spaces for students, plus will provide additional space on-site to add additional bicycle storage if travel mode targets exceed this level.
- Bus – This has reduced to 30% in 2036 with an understanding PLR2 will replace some bus services. – However, if there is a higher uptake in cycling this mode share may reduce
- Car– This has reduced to 15% based on more students living closer to the school and additional public transport infrastructure i.e. PLR2

It is noteworthy to mention, the traffic assessment considers the travel mode scenario which results in the largest travel demand as the most conservative approach. i.e. applying the baseline travel modes for car travel rather than the targets. And applying the maximum 'reach' for students that live within a 15min walking distance to the school for walking travel mode. Hopefully this answers some of your questions, and further details will be included within our TIA Report. Feel free to reach out if you have any further comments.

Kind regards,
Maria

From: Jed Coppa <Jed.Coppa@transport.nsw.gov.au>
Sent: Wednesday, 11 December 2024 2:25 PM
To: Maria Mulholland <maria.mulholland@ttw.com.au>; Kamoru Adetunmbi <kamoru.adetunmbi2@det.nsw.edu.au>
Cc: John Broady <John.Broady@transport.nsw.gov.au>; Behzad Saleh <bsaleh@cityofparramatta.nsw.gov.au>
Subject: Melrose Park HS modeshare

Hi Maria and Kamoru,

I wanted to follow up on our conversation from the call this morning. I appreciate that bus participation at other high schools is high, however this is a new school and represents a chance to embed active transport habits that reduce the requirement for motor vehicle travel, congestion or school bus provision.

Melrose Park is being built out as an active transport focused town centre. In this it is fundamentally different to other high schools that are in areas that are less walkable. The catchment size and shape is also quite different.

Concord High School catchment is 29 square kilometres
Liverpool High School catchment is 9 square kilometres
I have roughly drawn up the proposed Melrose Park HS catchment and it is about 5 square kilometres.

Additionally, the majority of students will be coming from the inner ring, less than 1km walk if they are in the town centre redevelopment.

Further, the public transport network is fundamentally different. The 524 is the only bus that serves the school site at the moment, although as discussed previously the 523 may be able to have a bus diverted to align with bell times. This contrasts with Liverpool HS which is located at a major transport hub.

Providing a bus service students who live within a 2km walk of the school will not be a high priority for school bus service provision. Unless specific funding is made available, it is unlikely there will be a bus service to carry anywhere near 50% of the student population to Melrose Park HS. Once the town centre and PLRS2 are built out, the public transport network will look different, although it is unlikely there will be significantly different bus service from the school to the NW part of the catchment compared to what exists today.

Based on this, I consider the baseline 41% bus modeshare to be overstated. Additionally, the 47% PT reach target (bus + light rail) would require almost every kid that lives outside ~1km walk from the school to take the bus. This is unlikely to be the case, noting the good provision of AT infrastructure and the relatively poor provision of bus service from the school to the catchment.

I suspect you will find that the walking uptake is higher than that which you have modelled. To confirm this, perhaps you could consider modeshare at similar schools *surveying only those students that live within a catchment of similar size and population density to this school*, and accounting for the active transport environment.

This very high PT modeshare may be why your modelling is showing a low number of students crossing Victoria Road on foot from the NW.

Hopefully this info is helpful in your travel planning.

Cheers,
Jed

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Transport for NSW

I recognise and acknowledge that modern New South Wales is an overlay on Aboriginal land and that many of the transport routes of today follow songlines Aboriginal people have followed for tens of thousands of years. I pay my respects to the Aboriginal people of NSW and Elders past and present.

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