Transport Engineering Report

Proposed Multiple Dwelling Development

330 MacArthur Avenue, Hamilton

(on part of Lot 5 on SP337697)

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Revision Record

No.	Author	Reviewed/Approved	Description	Date
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3.				
4.				

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1. Introduction

1.1. Purpose

Colliers International Engineering & Design (TTMC) Pty Limited (Colliers) has been engaged by Silverstone to prepare a Transport Engineering Report investigating a proposed Multiple Dwelling Development located at 330 MacArthur Avenue (on part of Lot 5 on SP337697), Hamilton. It is understood this report will accompany a Development Application to be lodged with Economic Development Queensland (EDQ), given the site is located within the Northshore Hamilton Priority Development Area (PDA).

Whilst the application will be submitted to the EDQ, it is noted that many of the provisions of the Northshore Hamilton PDA Development scheme revert to the respective requirements of the Brisbane City Council Brisbane City Plan 2014.

1.2. Scope

The scope of the transport aspects investigated includes:

- Reviewing the prevailing traffic and transport conditions surrounding the site.
- Identifying parking supply required to cater for development demands.
- Assessing the parking layout to provide efficient and safe internal circulation and manoeuvring.
- Assessing the access configuration to provide efficient and safe manoeuvring between the site and the public road network for cars, service vehicles, cyclists and pedestrians.
- Identifying the service vehicle needs for the site.
- Assessing the internal service vehicle layouts to provide efficiency and safety for on-site service vehicle operation.
- Reviewing access to a suitable level of public and active transport provisions.
- Identification of likely traffic impacts of development on the surrounding road network.

The development plans have been assessed against the following guidelines and planning documents:

- Northshore Hamilton PDA Development Scheme
- Northshore Hamilton PDA Infrastructure Plan Background Report (IPBR)
- Brisbane City Council Brisbane City Plan 2014 (City Plan 2014), specifically:
  - *Transport, Access, Parking and Servicing Code (TAPS Code)*
  - *Transport, Access, Parking and Servicing Planning Scheme Policy (TAPS PSP)*
  - *Infrastructure Design Planning Scheme Policy (Infrastructure PSP)*
  - *Local Government Infrastructure Plan (LGIP)*
  - *Refuse Planning Scheme Policy (Refuse PSP)*

  - *Streetscape Design Overlay Code*
  - *Road Hierarchy Overlay Code*
  - *Bicycle Network Overlay Code*
- Australian Standards for Parking Facilities, specifically:
  - *Part 1: Off-street car parking (AS2890.1:2004)*
  - *Part 2: Off-street commercial vehicle facilities (AS2890.2:2018)*
  - *Part 3: Bicycle parking (AS2890.3:2015)*
  - *Part 5: On-street parking (AS2890.5:2020)*
  - *Part 6: Off-street parking for people with disabilities (AS2890.6:2022).*
- Roads and Traffic Authority *Guide to Traffic Generating Developments 2002* (RTA GTGD).
- Austroads 'Guide to Traffic Management' (GTM)

2. Site Context and Travel Environment

2.1. Site Location

The site is identified as 330 MacArthur Avenue (on part of Lot 5 on SP337697), Hamilton, as is shown in Figure 2-1 and Figure 2-2. The property has a total site area of 7,466 m² and is currently vacant.

The subject site is currently zoned as "Mixed-use Medium Density" under the Northshore Hamilton PDA and has frontage on MacArthur Avenue to the north and Karakul Road to the south.

Figure 2-1: Site location (Surrounding Context) - Source: Google Maps

Figure 2-2: Site Location (Immediate Context) - Source: Nearmap 2024

2.2. The Road Network

2.2.1. Road Hierarchy

The hierarchy and characteristics of roads in the immediate vicinity of the site are shown in Table 2-1. The road classification is based on the Northshore Hamilton PDA IPBR.

Table 2-1: Local Road Hierarchy

Road	Speed Limit	Road Configuration			Classification
		Reserve Width	Carriageway Width	Lane Configuration	
MacArthur Avenue North/ MacArthur Avenue South	60km/h	28m	20m	2 traffic lanes (divided) Formal kerbside parking on both sides On-street bicycle lane provisions.	District Road
Karakul Road	50km/h*	20m	6m	2 traffic lanes (undivided) Formal kerbside parking on both sides	Local Road
Barcham Road	50km/h*	20m	6m	2 traffic lanes (undivided) Formal kerbside parking on both sides	Neighbourhood Road
Angora Road	50km/h*	20m	6m	2 traffic lanes (undivided) Formal kerbside parking on both sides	Neighbourhood Road
Theodore Street	60km/h	35m	14m	2 traffic lanes (undivided)	Suburban Road

*Default speed limit on unsigned roads in built-up areas in Queensland.

MacArthur Avenue is also classified as Primary freight access under the BCC City Plan – Road Hierarchy Overlay.

2.2.2. Intersections

All intersections in the immediate vicinity of the site are priority controlled, with all movements permitted. The key exception being the intersection of Macarthur Avenue North / Barcham Road which is configured as left-in/left-out movements only.

2.2.3. On-Street Parking

There are no on-street parking restrictions surrounding the development site. The site frontages (MacArthur Avenue and Karakul Road) provide formal indented parking zones on, allowing for parking on both sides of the road.

2.3. Public and Active Transport Facilities

2.3.1. Public Transport

Bus Services

There are bus stops on the surrounding roads within a 400m walk of the site. A map showing existing bus stops within a 400m radius of the subject site is shown in Figure 2-3.

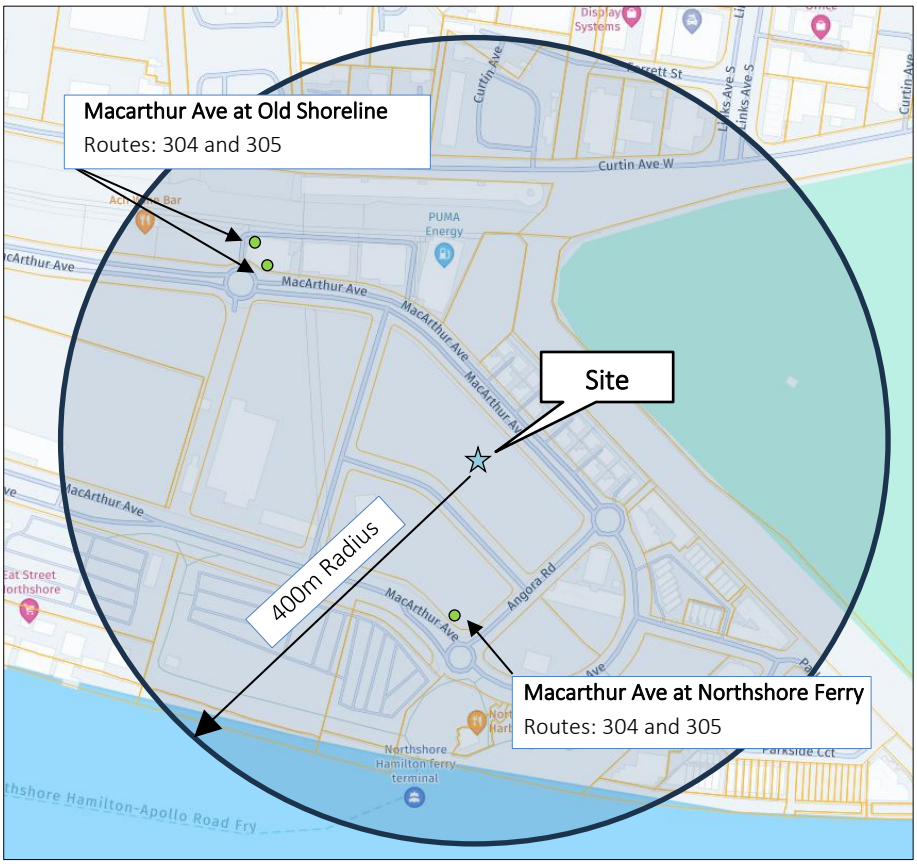


Figure 2-3: Surrounding Public Transport Provisions – Source: Nearmap 2024

The following is a summary of the bus routes currently serviced by these stops:

- Route 304: This service connects the Northshore Hamilton Ferry Terminal to Portside Wharf and Ascot, traveling via MacArthur Avenue, Remora Road, Nudgee Road, and Racecourse Road. It operates Monday to Friday between 9:00am and 4:20pm, with a frequency of every 30 minutes.
- Route 305: This service connects Northshore Hamilton Ferry Terminal to Brisbane City, travelling via Ascot, Hamilton, Newstead, and Fortitude Valley. It operates Monday to Friday, with inbound trips from 6:25am to 8:25am and outbound trips from 4:25pm to 6:35pm, at 15-minute intervals during these times.

There are additional bus services accessible via stops in the wider surrounding area, which includes:

- Route 302: Stops for this route are located on Theodore Street, approximately 800 meters west of the site. It connects Eagle Farm to the City and operates Monday to Friday, with morning services from 6:00am to 7:15am (City to Eagle Farm) and afternoon services from 3:50pm to 4:45pm (Eagle Farm to the City), at 20-minute intervals.

Train Services

The closest train station to the site is Doomben, situated approximately 2.3 km to the northwest. This station services the following lines:

- Doomben – Brisbane City
- Doomben – Beenleigh
- Doomben – Cleveland

The average departure frequency is every 30 minutes on weekdays from 5:45am to 8:00pm, and every 60 minutes on weekends from 7:45am to 8:00pm.

Ferry Services

The Northshore Hamilton Ferry Terminal is located approximately 350m from the site, providing connections from Northshore to UQ St Lucia, with stops along the river at Bulimba, Teneriffe, New Farm Park, QUT Gardens Point, Southbank, Toowong, and West End. Services operate Monday to Friday from 5:30am to 10:15pm, with departures approximately every 15 minutes. On weekends and public holidays, services run from 6:00am to 10:15pm, with a 15-minute frequency.

Figure 2-4 illustrates the estimated area accessible via public transportation within a 30-minute travel time from the development site. The Northshore Hamilton Ferry Terminal is located within a 350m walk from the subject site. It connects Northshore to UQ St Lucia with stops along the river including Bulimba, Teneriffe, New Farm Park, QUT Gardens Point, Southbank, Toowong and West End.

Figure 2-4: Public Transport Trip Catchment – 30 Minute Journey

Overall, the quality of public transportation can be considered satisfactory in facilitating access to/from the site.

2.3.2. Cycle Routes

An extract of existing cycle routes surrounding the subject site is shown in Figure 2-5.

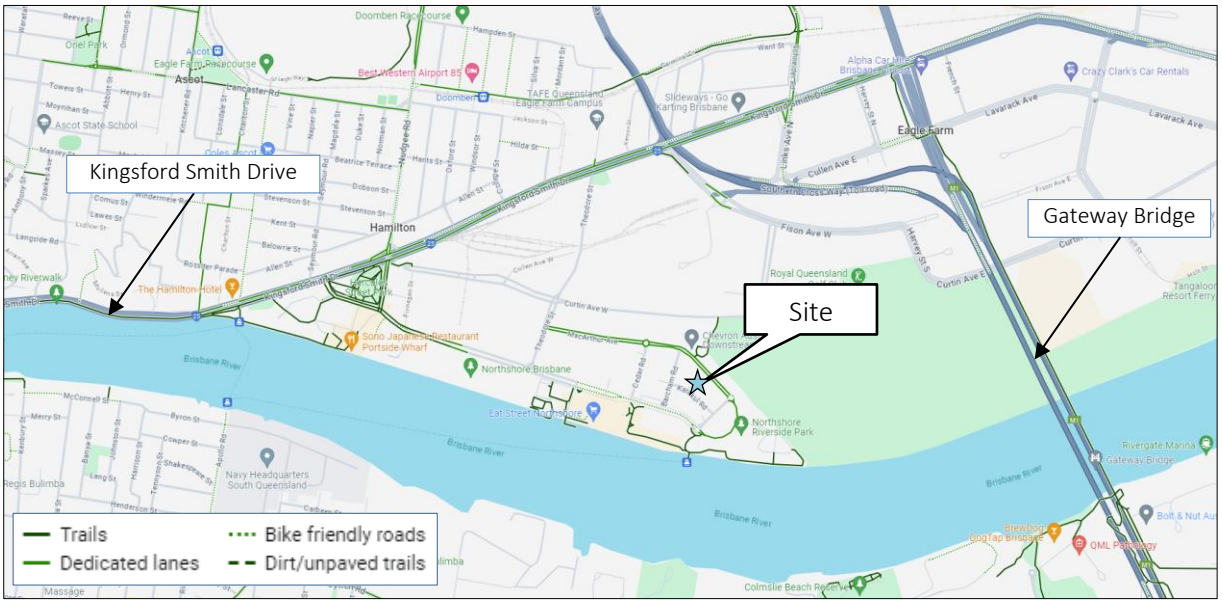


Figure 2-5: Existing Cycle Routes - Map Source: Google Maps

A comprehensive network of bicycle infrastructure within the Northshore Hamilton PDA area is continuing to be delivered as part of the ongoing internal road upgrade works. This will include a mixture of dedicated offroad cycle paths/tracks, shared paths (such as along the river front) and on-road cycle provisions. The proposed ultimate bicycle network hierarchy for the Northshore Hamilton PDA area, as identified in the Cardno Transport Masterplan (discussed further in Section 2.4, is shown in Figure 2-6. Once this is delivered, internal movement within the PDA area by bicycle will be very convenient and therefore an attractive travel mode.

Figure 2-6: Proposed PDA Cycle Network and External Connections - Source: Cardno Transport Masterplan Report

It is also noted that the subject site is well located proximate to other external bicycle routes connecting with the wider Brisbane network. Key external cycle routes include:

- Kingsford Smith Drive, which includes on-road bicycle lanes east of Racecourse Road and a dedicated off-road separated pedestrian/cycle path west towards the Brisbane CBD.
- The Gateway Bridge Bikeway, which features a dedicated pedestrian and bicycle path, linking Hamilton Northshore to Brisbane's southern suburbs.

Figure 2-7 Illustrates the locations that can be reached by a 20-minute bike ride from the development.

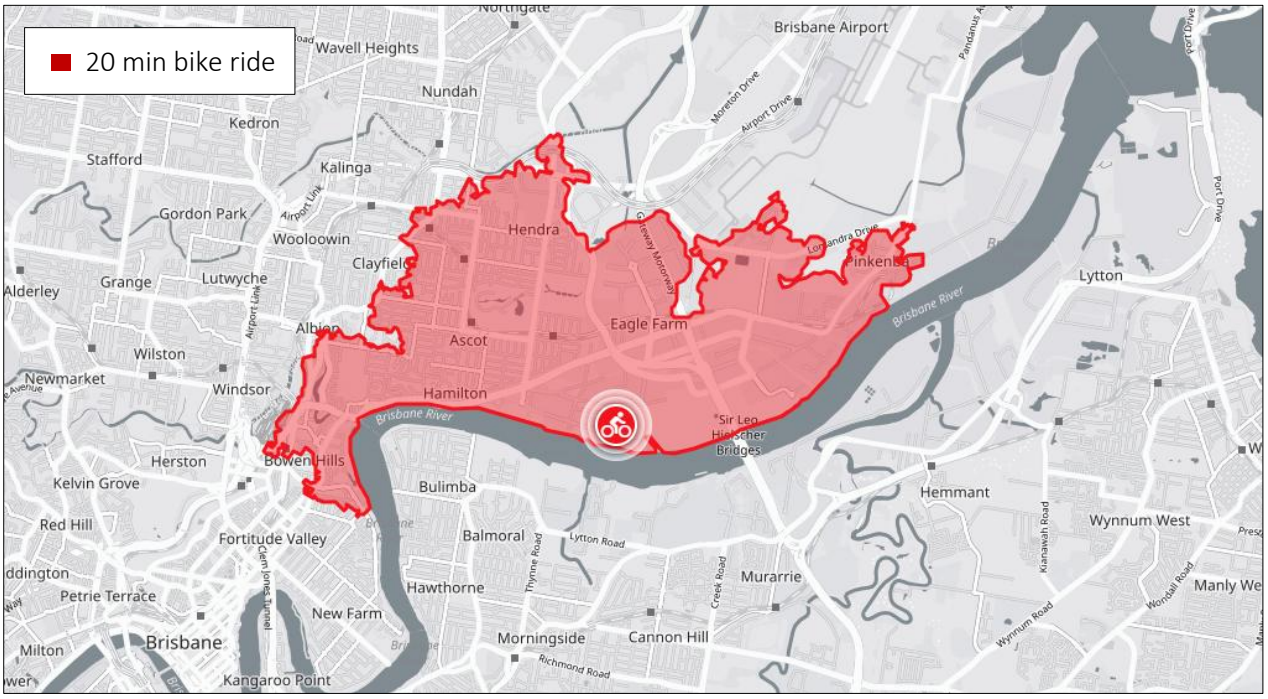


Figure 2-7: Cycle Catchment – 20 Minute Journey

Overall, the site is considered to be well located with good access to established bicycle routes and infrastructure (which is proposed to continue to improve).

2.3.3. Pedestrians

Formal pedestrian footpaths are located on both sides of the roads in the immediate vicinity of the site. Kerb ramps and informal crossings are provided at all surrounding intersections. An existing mid-block crossing on MacArthur Avenue, at the site frontage, links to Old Shoreline Park and a pathway north to Curtin Avenue West.

There is also a proposed new cross-block link between MacArthur Avenue and Karakul Road, located on the western side of the subject site. This aligns with the existing pedestrian link to the north and proposed future links though southern properties to provide a continuous north-south pedestrian route (which is also shown in Figure 2-9).

2.4. Transport Planning

Northshore Hamilton PDA

The PDA Development Scheme and Infrastructure Plan Background Report (IPBR) proposes a new network of internal roads to service the redevelopment of the area. Improvements to public and active transport provisions are also proposed.

Figure 2-8 and Figure 2-9 show extracts of the various PDA planning documents identifying the ultimate roads, public transport, and active transport provisions.

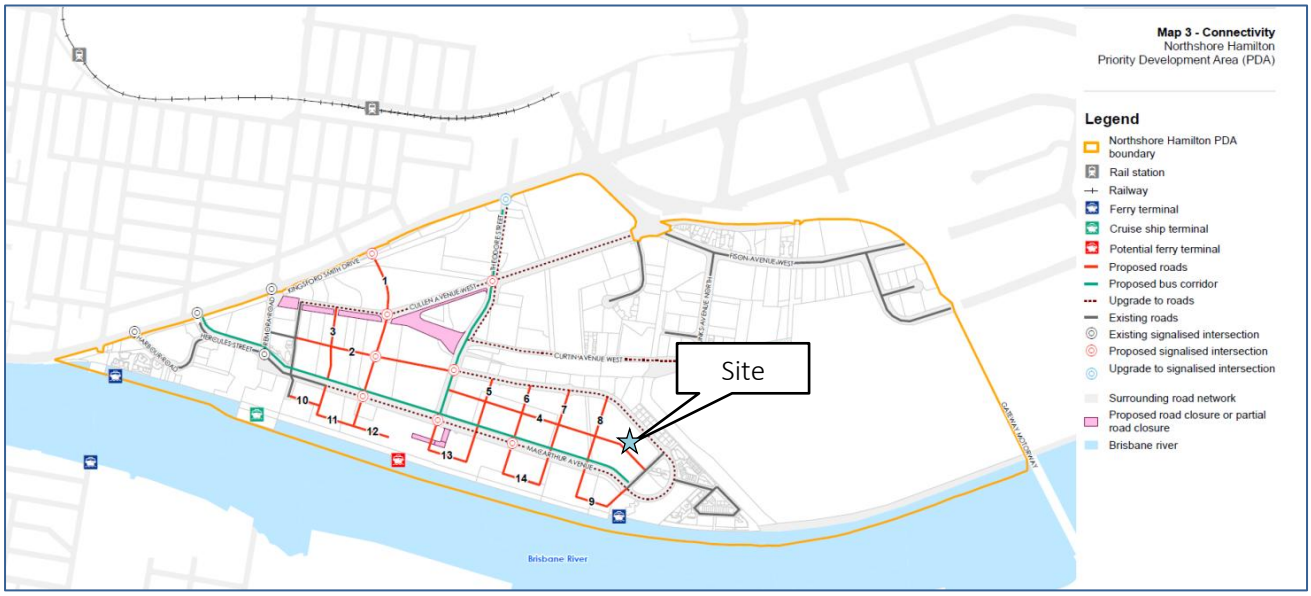


Figure 2-8: PDA Internal Transport Network Upgrades – Roads and Public Transport - Source: PDA Development Scheme

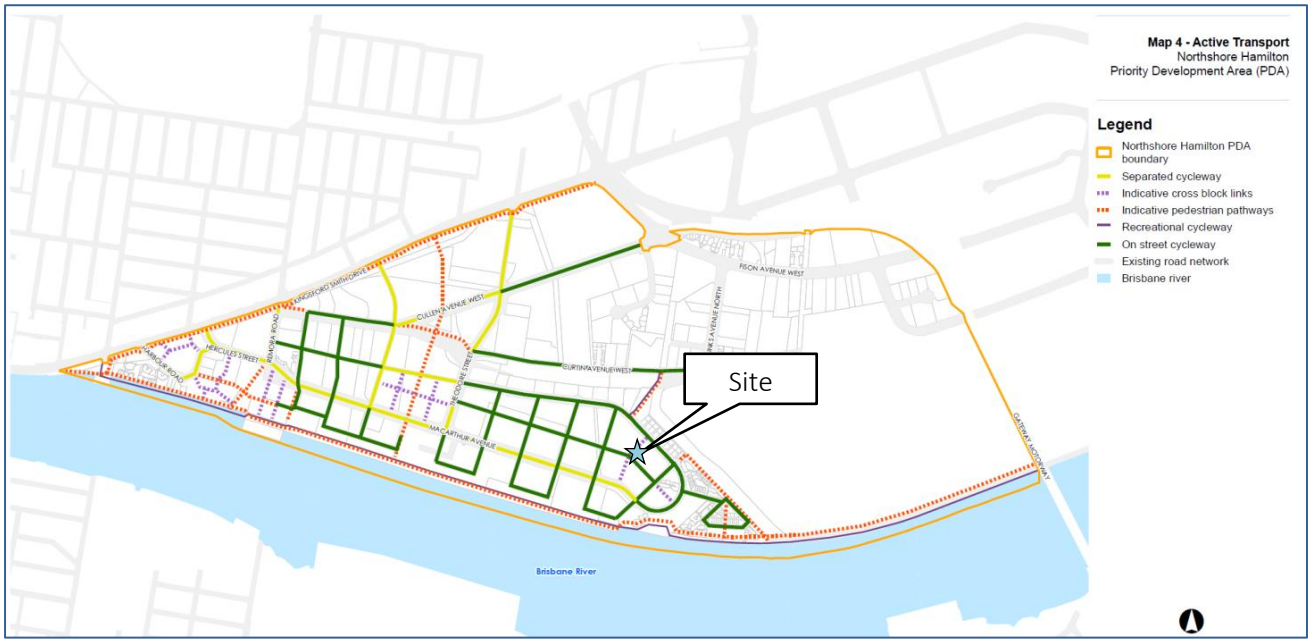


Figure 2-9: PDA Internal Transport Network Upgrades – Active Transport - Source: PDA Development Scheme

Public Transport Provisions

Cardno Transport Masterplan

TTM has reviewed the 2021 Transport Masterplan Report prepared by Cardno which helped inform the Northshore Hamilton PDA. This report assessed existing public transport accessibility for the PDA and future improvements to service the redevelopment. This report generally identified the following:

- No upgrade/extension to existing train services on the Doomben Line.
- A potential additional ferry terminal (mid-way between the Bretts Wharf and Hamilton Northshore terminals) to provide more proximate access from central redevelopment zones. Potential additional services also suggested if demand dictates.
- New/extended bus services into the internal roads, looping through the PDA via MacArthur Avenue and joining with Kingsford Smith Drive for access to the Brisbane CBD and other high-priority destinations. It has been suggested this take the form of a high-frequency service (5–10-minute peak hour frequencies).

Gold City Glider

It is understood that Brisbane City Council has recently submitted a business case to Translink for a new Gold CityGlider route to complement the existing Blue and Maroon routes. The proposed new Gold route would run from Woolloongabba to Hamilton Northshore via Brisbane City, Fortitude Valley and Newstead. The indicative route map suggests this would terminate at the western end of the Northshore Hamilton PDA (near the Hercules Street Park). This would be approximately 1.5km walk from the subject site to the west. This is anticipated to provide a service span and frequency similar to existing routes, which would be at least every 10 minutes in peak hours and 15-mintutes off peak periods. Implementation of this route is subject to a joint funding agreement between Translink and Council, and so there is no indicative timeframe for establishment of this route.

Should this route proceed, it is strongly suggested that it is extended further east into the wider Northshore Hamilton PDA area; in effect becoming the high-frequency bus service as recommended in the Cardno Transport Masterplan Report. If this were done, this extended route would potentially have stops much closer to the subject site making this a more convenient public transport option.

3. The Proposed Development

3.1. Development Profile

The proposed development consists of a 6-storey and 8-storey building (2 buildings), providing one, two and three-bedroom apartments. The proposed development scheme is summarised in Table 3-1.

Table 3-1: Proposed Development Mix

Land Use	Number
Multiple Dwellings • 1 Bedroom unit • 2 Bedroom units • 3 Bedroom units	115 units (total) 15 units 83 units 17 units

A copy of the architectural plans, prepared by Carr, is included in Appendix A.

3.2. Parking

The development scheme provides a total of 193 car parking spaces across a single basement level, including:

- 172 resident car parking spaces
- 18 visitor car parking spaces.
- 3 Persons with Disabilities (PWD) spaces, which may be shared between residents and visitors.

A total of 144 bicycle spaces are also provided, including:

- 115 resident bicycle spaces on the basement level.
- 29 visitor bicycle spaces, split between the ground floor and basement.

Further details regarding the proposed car and bicycle parking provisions are included in Section 4.

3.3. Access

The development plan includes the following access arrangements:

- A 7.0m wide Type B1 crossover to Karakul Road on the eastern side of the site frontage. This access will accommodate all vehicles with all movements permitted.
- Pedestrian access to/from the development from MacArthur Avenue, Karakul Road and public easement on the western side of the property.
- Direct access to visitor bicycle racks from the footpath and resident access via Karakul Road crossover (to basement bicycle parking) or building lifts.

Further details regarding the proposed access arrangements are included in Section 5.

3.4. Servicing

The proposed development access for vehicles up to the size of a 10.24m rear-loading Refuse Collection Vehicle (RCV). A dedicated loading bay is provided on the basement level, accessed from the main vehicular access to Karakul Road.

Further details regarding the proposed servicing arrangements are included in Section 6.

4. Parking Arrangements

4.1. Parking Supply

4.1.1. Car parking

The minimum requirements for car parking supply under the Northshore Hamilton PDA and the proposed provisions for the development scheme are summarised in Table 4-1 below.

Table 4-1: Northshore Hamilton PDA Car Parking Supply Requirement

Land Use / Component	PDA Requirement	Extent	Requirements	Provision
Multiple Dwelling (Resident) • Minimum • Maximum	 0.75 space per unit 2 spaces per unit	 115 units (total)	 87 spaces (min) 230 spaces (max)	 172 spaces
Multiple Dwelling (Visitor)	0.15 spaces per unit	115 units	18 spaces	18 spaces
PWD Parking	0.02 spaces per unit	115 units	3 spaces	3 spaces
Total			**108 spaces (minimum)**	**193 spaces**

As seen in Table 4-1, the development scheme proposes a total of 193 car parking spaces which achieves compliance within the specified range of parking as per the Northshore Hamilton PDA. Therefore, the proposed car parking supply is deemed fit for purpose.

4.1.2. PWD Parking

The Northshore Hamilton PDA indicates that PWD parking should be provided at a rate of 0.02 spaces per dwelling, with a minimum of 1 parking space. This parking supply is also separate from the residential/visitor parking rates. For 115 units, this equates to a requirement of 3 PWD spaces.

The development plans make allowance for a total of 3 PWD spaces, which can be shared between use by either residents or visitors. This meets the requirements of the Northshore Hamilton PDA. One space is situated within the visitor parking area, while the remaining two are positioned near the southern lift lobby.

Overall, the PWD parking provisions for the development meet the requirements of the Northshore Hamilton PDA.

4.1.3. Bicycle Parking

The Northshore Hamilton PDA refers back to the TAPS PSP rates with regards to the bicycle provisions. Therefore, the bicycle parking supply requirements for the proposed development have been determined in line with Table 21 of the TAPS PSP. Table 4-2 provides a summary of the bicycle parking supply requirements in line with the TAPS PSP, and the proposed provisions, for the development scheme.

Table 4-2: TAPS PSP Bicycle Parking Supply Requirement

Land Use / Component	TAPS PSP Requirement	Extent	Requirement	Provision
Multiple Dwelling (Residents)	1 space per unit	115 units	115 spaces	115 spaces
Multiple Dwelling (Visitors)	1 space per 4 units	115 units	29 spaces	29 spaces
Total			**144 spaces**	**144 spaces**

As seen in Table 4-2, the development scheme proposes a total of 144 bicycle parking spaces, which meets the TAPS PSP minimum requirements.

The bicycle parking arrangements, including location, quantum, rack form and access provisions, for the development generally entail the following:

Resident Bicycle Parking

- A total of 115 bicycle racks will be located on the basement level, distributed across multiple secure areas positioned behind the security line. The proposed basement level bicycle racks are Cora E3DT-GP Rack Series, which comply with AS2890.3:2015, providing 400mm spacing between post centres and the edges of walls or other obstructions. Access to the bicycle parking will be via the vehicle driveway on Karakul Road, or via the building lifts.

Visitor Bicycle Parking

- A total of 29 bicycle parking spaces will be provided across the ground and basement levels of the development. Of these, 19 spaces will be located in the basement, positioned outside the security line. The remaining 10 spaces will be situated at ground level within the easement along the western site frontage, placed near the building's pedestrian access point.

Further details on the bicycle parking layouts and design compliance are included in Section 4.2.

Overall, the bicycle parking supply for the development is considered acceptable.

4.2. Parking Layout

The Northshore Hamilton PDA does not specify the requirements for a car parking design layout. Therefore, the proposed development car parking layout has been assessed against the Council TAPS PSP provisions.

The development scheme provides one level of parking on Basement 1. Table 4-3 identifies the characteristics of the proposed parking layouts with respect to the TAPS PSP design provisions. The last column identifies the compliance of each design aspect. Where compliance with the TAPS PSP is not achieved, further information is provided below.

Table 4-3: TAPS PSP Parking Design Requirements

Design Aspect	TAPS PSP Provision	Proposed Provision	Compliance
Car Parking			
Parking space length: • Standard space (Class 3) • PWD space (Class 5) • Tandem space	 5.4m (min) 5.4m (min) 10.8m (min)	 5.4m (min 5.4m (min) 10.8m (min)	 TAPS PSP Compliant TAPS PSP Compliant TAPS PSP Compliant
Parking space width: • Standard space (Class 3) • PWD space (Class 5)	 2.6m (min) 2.4m + 2.4m 'Shared Area.'	 2.6m (min) 2.4m + 2.4m 'Shared Area.'	 TAPS PSP Compliant TAPS PSP Compliant
Aisle Width: • Parking aisle • Circulation road/ramp (two-way)[1]	 6.2m (min) 6.2m (min) + clearance to walls	 6.2m (min) 6.0m + clearance to walls	 TAPS PSP Compliant Performance Solution
Parking envelope clearance	Located as per Figure m of TAPS PSP	Located as per Figure 5.2 of AS2890.1:2004	Performance Solution
Maximum Gradient: • PWD parking • Parking aisle • Ramps	 1:40 (2.5%) 1:20 (5.0%) 1:6 (16.7%)	 Flat Flat 1:6 (20.0%)	 TAPS PSP Compliant TAPS PSP Compliant TAPS PSP Compliant
Maximum Gradient Transitions[2]	1:8 (12.5%) summit 1:6.67 (15.0%) sag	~1:13 (7.5%) 1:12 (8.3%)	TAPS PSP Compliant TAPS PSP Compliant
Blind Aisle Extension	2m beyond the last bay or 8.0m aisle width	1.0m aisle extension	Performance Solution
Height Clearance: • General Minimum • Absolute Minimum • Over PWD space	 2.3m (min) 2.1m (min) 2.5m (min)	 2.3m (min) 2.3m (min) 2.5m (min)	 TAPS PSP Compliant
Tandem car bay allocation	2 spaces are provided for 1 dwelling	2 spaces are provided for 1 dwelling	TAPS PSP Compliant
Security Provisions			TAPS PSP Compliant
Bicycle Parking[2]			
Rack length (standard) Rack length (dynamic)	1.8m (min) 1.8m (min)	1.8m 1.860m	AS2890.3 Compliant
Rack spacing (standard) Rack spacing (dynamic)	0.5m (min) 0.4m (min)	0.5m 0.4m	AS2890.3 Compliant AS2890.3 Compliant
Maneuvering/Access Paths	1.5m (min)	1.5m (min)	AS2890.3 Compliant
Height Clearance - Wall/Ground Racks	 2.2m (min)	 2.2m (min)	 AS2890.3 Compliant

[1] Where accommodating two-way traffic demands between 25-100vph

[2] TAPS PSP is silent with regard to this matter, so revert to AS2890 requirements as per Section 1.2 of the TAPS PSP.

The development parking layouts are generally consistent with the provisions of the TAPS PSP. Further details in relation to deemed compliance of required provisions or justification for design aspects resolved with performance solutions are provided following.

Ramp Width

The TAPS PSP recommends that straight ramp widths are 6.8m wide (6.5m between kerbs plus 0.15m clearance to walls). The proposed ramp from Ground level to Basement is 6.6m wide (6.3m wide plus 0.15m clearance to walls). This is compliant with AS2890.1:2004 and is considered appropriate from a traffic engineering perspective. This requirement is primarily for 2-way service vehicle operation. As the ramp will only be used by occasional trucks, limiting truck operation to one way at any given time, a reduced ramp width is considered suitable. Where limited to cars only, the volume of vehicles utilising this ramp would suitably be catered for by a 6.2m wide aisle, plus clearances, which is achieved by the proposal.

Parking envelope clearance (column/walls) intrusion

The development plans make allowance for structure/walls within the allowable envelopes adjacent to car spaces as per Figure 5.2 of AS2890.1:2004. This differs slightly from the provision of Figure m of the TAPS PSP. Notably, there is only a 0.05m difference in the acceptable location of columns closest to the parking aisle and allowance for additional columns to be located adjacent to bays towards the front/end of the parking space. These differences, however, are not expected to have any adverse impacts on the ability of vehicles to manoeuvre into/out of the car spaces or open the doors (the two key considerations driving these design envelopes around car spaces). The provisions of AS2890.1:2004 are based on extensive research for the particular needs for both front and rear door opening, regardless of whether the vehicles are parked frontwards or rearwards in the parking bays.

Blind aisle extension

The TAPS PSP details that at the end of terminating/blind parking aisles, either 2.0m aisle extensions or widened 8.0m aisles need to be provided to facilitate appropriate manoeuvring from the final parking space/s. The proposed development generally provides a minimum of 1.0m aisle extensions beyond the final parking spaces on each of the dead-end parking aisles, which meets the minimum requirements of AS2890.1:2004. TTM's experience shows that manoeuvring for a standard car from a dead-end space with a 6.2m wide aisle, 2.6m wide parking bay and 1.0m aisle extension can be completed comfortably.

5. Access Arrangements

5.1. Vehicular Access

The development scheme proposes to provide vehicular access to Karakul Road, which is located on the eastern side of the site frontage. This access will be configured as a 6.6m wide Type B1 driveway and accommodate vehicles up to the size of an RCV. The access will be priority controlled, with all movements permitted.

The proposed location of the vehicular access is currently configured to provide an indented parking zone with capacity for two on-street space. Therefore, the new access will require the removal of two existing on-street parking spaces. This outcome is generally unavoidable, as all frontages for the subject site are fully occupied by existing intended parking zones and existing services.

In terms of design requirements, the Northshore Hamilton PDA nominates that driveway crossovers be located and designed in accordance with TAPS PSP. The design provisions of the Karakul Road access and the requirements of the TAPS PSP are detailed in Table 5-1.

Table 5-1: Karakul Road Access Arrangements

Design Aspect	TAPS PSP Provision	Proposed Provision	Compliance
Width / Crossover Type to accommodate: • Cars[12] • Service vehicles[13]	 6.0-9.0m / Type B2 7.0m (min) / Type B2	 7.0m / Type B1	 Performance Solution
Distance from: • minor intersection[1] • adjacent driveway[1]	 10m (min) 3m (min)	 100m – Angora Road Intersection >3m	 TAPS PSP Compliant TAPS PSP Compliant
Sight Distance[12]	90m (desirable) 70m (minimum)	West: 70m – to the intersection East: 100m – to the intersection	TAPS PSP Compliant
Visibility Sight Splays	2.0m wide x 5.0m deep (on each side)	2.0m wide x 2.5m deep (on both sides)	Performance Solution
Minimum Queuing Provisions [2]	6 vehicles / 36m	6 vehicles / 36m (min)	TAPS PSP Compliant
Maximum Driveway grade	1:20 (5%) maximum within first 6m	1:20 (5%) maximum within first 6m	TAPS PSP Compliant.

[1] Based on Karakul Road being classed as a 'minor road' and speed limit of 50km/h.

[2] Based on the access servicing ~189 low turnover car parking spaces.

[3] Based on the access servicing service vehicles up to the size of a RCV.

Further details in relation to the vehicular access design aspects resolved with performance solutions are provided as follows.

Crossover Width / Type

A performance solution has been proposed for the driveway design, incorporating Type B1 design. Although a Type B2 crossover is typically required to support RCV access, the presence of a parking lane on the northern side of Karakul Road results in a wide verge, allowing for a reduction in flare width. The swept path analysis conducted by TTM (**Appendix B**) confirms that Type B1 flares adequately facilitate RCV ingress and egress.

Visibility Sight Splays

The development plan includes a minimum 2.0m wide by 2.5m deep sight splay on both sides of the driveway, in accordance with AS2890.1:2004 standards. It is noted that the sight splay on the exit side of the driveway extends partially within the verge rather than being contained at the property boundary. TTM recommends implementing a treatment in this portion of the pedestrian sight splay that encroaches the verge, such as landscaping or a bollard, to redirect pedestrian movement outside this area, as illustrated in Figure 5-1.

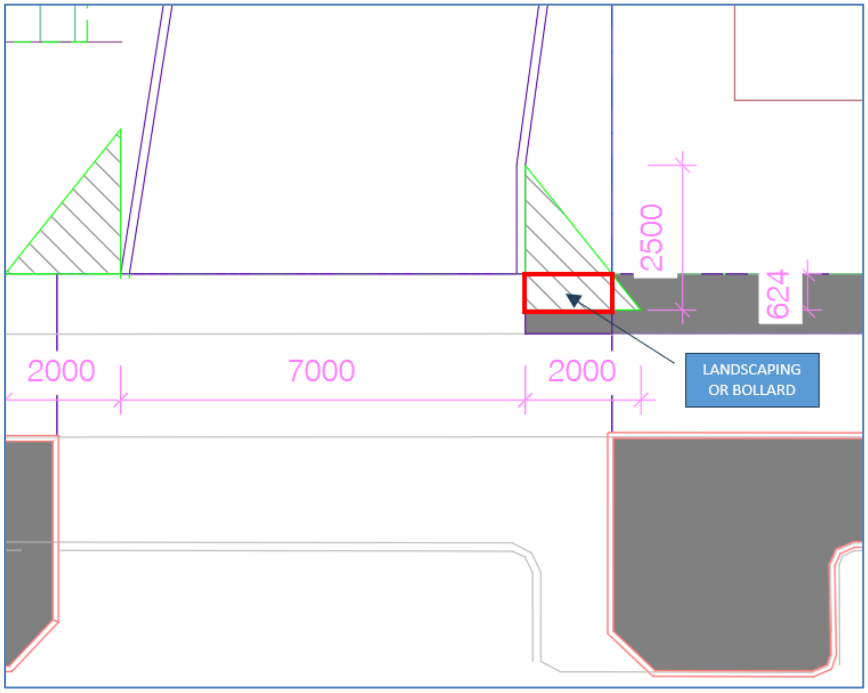


Figure 5-1: Visibility Sight Splay Treatment

Overall, the proposed access arrangements are considered suitable for the proposed development and 'fit for purpose'.

5.2. Active Transport Access

Pedestrian access to the development is available from both the MacArthur Avenue and Karakul Road footpaths.

Cyclist access to the development is provided via multiple means, including:

- Ride up access to the basement bicycle parking also via the Karakul Road vehicular access.
- Use of the pedestrian access points and internal building lifts to access bicycle parking on the basement level.
- Direct access to visitor bicycle racks from the footpaths on Karakul Road and easement along the western site frontage.

6. Service Vehicle Arrangements

6.1. PDA Requirements

Similar to other transport related elements, the Hamilton Northshore PDA Development Scheme refers to the TAPS PSP for the service vehicle needs for the development.

Section 3 of the TAPS PSP indicates that a Multiple Dwelling land uses requires “Occasional Access” for a Large Rigid Vehicle (LRV) and “Regular Access” for a Refuse Collection Vehicle (RCV).

6.2. Proposed Loading Provisions

6.2.1. Design Vehicle

The primary servicing demand generated by a Multiple Dwelling development involves furniture delivery vehicles and general delivery vehicles (mail and groceries). TTM notes that requiring occasional access for a Large Rigid Vehicle (LRV), typically representing furniture vehicles, is considered overly onerous for this scale of development, particularly where the significant majority of units are 1 or 2 bedrooms. Based on TTM’s experience, a Medium Rigid Vehicle (MRV) is deemed more suitable for these purposes.

A standing area/service bay measuring 10.5m by 3.5m is provided in the basement level. The primary purpose of this area is to facilitate refuse collection vehicles. The area is therefore also suitable to accommodate the smaller 8.8m long Medium Rigid Vehicle (MRV) with a maximum height clearance of 3.6m. While this 3.6m is less than that required under TAPS PSP (4.5m height clearance for MRV), it is considered appropriate based on the following information.

Suitability for Smaller Vehicles

The majority of moving and general delivery trucks associated with multiple dwelling developments, particularly for 2-bedroom units, are typically smaller MRVs, which can be accommodated within a 3.6m height clearance. In particular, where residents primarily move their own contents into a home, the largest vehicle that can be rented on an open car licence is equivalent to an SRV. As such, except in instances where professional moving companies are involved, this is the largest likely vehicle to access the site for this purpose.

Infrequent Large Service Vehicle Demand

The need for service vehicles exceeding a 3.6m clearance height is expected to be rare, given the nature of deliveries and moving requirements for smaller units.

Alternative Provision for Large Vehicles:

In the infrequent event that a larger vehicle does require access, there is sufficient driveway (hardstand) area to accommodate it temporarily. This area allows for safe parking while still permitting other vehicles to pass, minimizing disruption to site operations and ensuring continued access.

6.2.2. Refuse Collection

Refuse collection is to occur by a rear loading RCV which is up to 10.3m long. Swept paths for a 10.3m RCV are shown in in **Appendix B** which shows a forward in/forward out movement. The on-site standing area has a maximum grade of 1:20 and provides a height clearance of 3.6m (as per Table 3 of the Refuse Planning Scheme Policy), which is sufficient for a BCC rear loading RCV.

Height and ground clearance assessments have been conducted to verify that the proposed ramp, leading from ground level to the basement, can support RCV ingress and egress (refer to **Appendix B**). These evaluations confirm that the ramp grades and transitions are appropriately designed to accommodate the RCV effectively.

Overall, TTM consider the service vehicle and refuse collection arrangements to be suitable for the proposed development.

7. Potential Development Traffic Impacts

It is noted that the 2021 Transport Master Plan report prepared by Cardno included detailed modelling of the full development potential of the Northshore Hamilton PDA to inform road upgrade requirements. It is understood the outcomes of this report fed into the PDA IPBR. Therefore, in terms of quantifying the potential impacts of the proposed development TTM considers the primary aim is to compare the traffic generation potential to what would have been assumed under the original modelling for the subject site. The following process was adopted to complete this exercise:

1. The preliminary approval for the site assumes a total development allowance of 11,200m^2 GFA for the subject site (generally site area x allowable plot ratio).
2. Table 2 in Appendix B of the IPBR identifies the assumed breakdown in GFA to different land uses based on the site's zoning. Conversion of GFA for residential uses into number of dwellings is also based on a 90m^2 GFA per dwelling average size. For the subject site, which is included in the "Mixed Use Medium Density" zoning, the breakdown of contemplated land uses would be as shown in Table 7-1.

Table 7-1: Subject Site – Assumed Development Potential/Breakdown under IPBR Yield Scenario

Land use	% GFA Allocated	GFA Distribution	Equivalent Unit Yield (90m² per unit)	
Residential	95%	10,640m^2	Small 35%	41 units
			Medium 45%	53 units
			Large 20%	24 units
Total				**118 units**
Commercial	4%	448m^2		
Retail	1%	112m^2		

3. The peak hour traffic generation potential for the assumed land uses/extent has been adopted as follows:
   a. Small units = 0.29 vehicles per hour (vph) per unit (Source: RTA GTGD "High Density" rate)
   b. Medium units = 0.5vph per unit (Source: RTA GTGD "Medium Density", small/medium unit rate)
   c. Large units = 0.65vph per unit (Source: RTA GTGD "Medium Density", large unit rate)
   d. Commercial = 2.0vph per 100m² GFA (Source: RTA GTGD)
   e. Retail = 5.0vph per 100m² GFA (Source: RTA GTGD, 'Restaurant' rate).
4. Based on the IPBR assumed yield as demonstrated in the Table 7-1 and assumed generation rates above, TTM estimates the assumed peak hour traffic generation for the site contemplated under the IBPR is 70vph, as shown in Table 7-2.

Table 7-2: Subject Site – Assumed Peak Hour Traffic Generation Potential under IBPR Yield Scenario

Land Use	Yield / GFA	Traffic Generation Rate	Total Potential Traffic Gen.
Small Units	41 units	0.29vph / unit	12vph
Medium Units	53 units	0.5vph / unit	27vph
Large Units	24 units	0.65vph / unit	16vph
Commercial	448 m^2 GFA	2vph / 100m^2 GFA	9vph
Retail	112 m^2 GFA	5vph / 100m^2 GFA	6vph
Total			**70vph**

5. The development proposes 115 units, which is more than the 118 units anticipated by the IPBR Yield Scenario. However, the development scheme does not propose any commercial/retail space. Therefore, the traffic generation potential on-balance may not be significantly different. To quantify this, the peak hour traffic generation of the proposed development scheme has been estimated, adopting the same generation rates as above. Table 7-3 provides a summary of the assumed traffic generation potential of the development scheme

Table 7-3: Subject Site – Assumed Peak Hour Traffic Generation Potential for Development Scheme

Land Use	Yield / GFA	Traffic Generation	Total Potential Traffic Gen.
Small Units	15 units	0.29vph / unit	5vph
Medium Units	83 units	0.5vph / unit	42vph
Large Units	17 units	0.65vph / unit	11vph
Commercial	0 m^2 GFA	2vph / 100m^2 GFA	0vph
Retail	0 m^2 GFA	5vph / 100m^2 GFA	0vph
Total			**58vph**

As demonstrated, the proposed development scheme is projected to generate 52vph during peak periods, compared to the 70vph anticipated under the IPBR Yield Scenario. This represents a decrease of 18 vehicles per hour.

In summary, TTM considers that the proposed development will not result in a higher traffic generation potential compared to that previous contemplated for the subject site in previous PDA transport modelling. On this basis, no further assessment of the potential traffic impacts of the development is considered necessary.

8. Summary and Conclusions

8.1. Parking Arrangements

The development plan provides a total of 193 car parking spaces. This includes 172 resident car spaces, 18 visitor car spaces and 3 PWD spaces (shared visitor and resident). These provisions meet or exceed the requirements of the PDA Development scheme.

Parking is provided in a single consolidated basement level across the wider footprint of the site. The car parking layout generally complies with the TAPS PSP requirements, aside from performance solutions for the parking envelopes, ramp width and blind aisle, which are deemed fit for purpose.

Overall, TTM considers the car parking arrangements for the development to be acceptable

8.2. Access Arrangements

Access for the development is provided via a 7.0m wide Type B1 crossover to Karakul Road. This new driveway crossover will result in the loss of 2 on-street parking spaces, which is generally unavoidable given the recent construction of the surrounding roads provided on street parking along all frontage space and did not consider allowance for vehicular access to the subject site.

The location and design of the site access generally meets the requirements of the TAPS PSP, aside from a performance solution for the driveway flare type and pedestrian sight splay, which is deemed fit for purpose.

Overall, TTM considers the access arrangements for the development to be acceptable.

8.3. Service Vehicle Arrangements

The development scheme makes allowance for service vehicles up to the size of a 10.3m long RCV. The development generally provides for service vehicles up to 3.6m in height, which is expected to meet the primary needs for furniture and general deliveries. In the rare instance that a larger vehicle is required, the driveway offers sufficient space for temporary accommodation without impacting site access.

The development plan makes allowance for a dedicated loading bay on basement level. The spatial allowances for the loading bay meet the requirements of the TAPS PSP.

Overall, the proposed service vehicle arrangements for the development are acceptable.

8.4. Public and Active Transport

The site is located proximate to public and active transport infrastructure that will encourage alternative transport options for residents. This will continue to improve as the Northshore Hamilton PDA develops and new provisions are brought online.

The development provides 144 bicycle parking spaces meeting the requirements of the TAPS PSP. Bicycle parking is spread throughout the basement and ground level (visitor parking close to building entries).

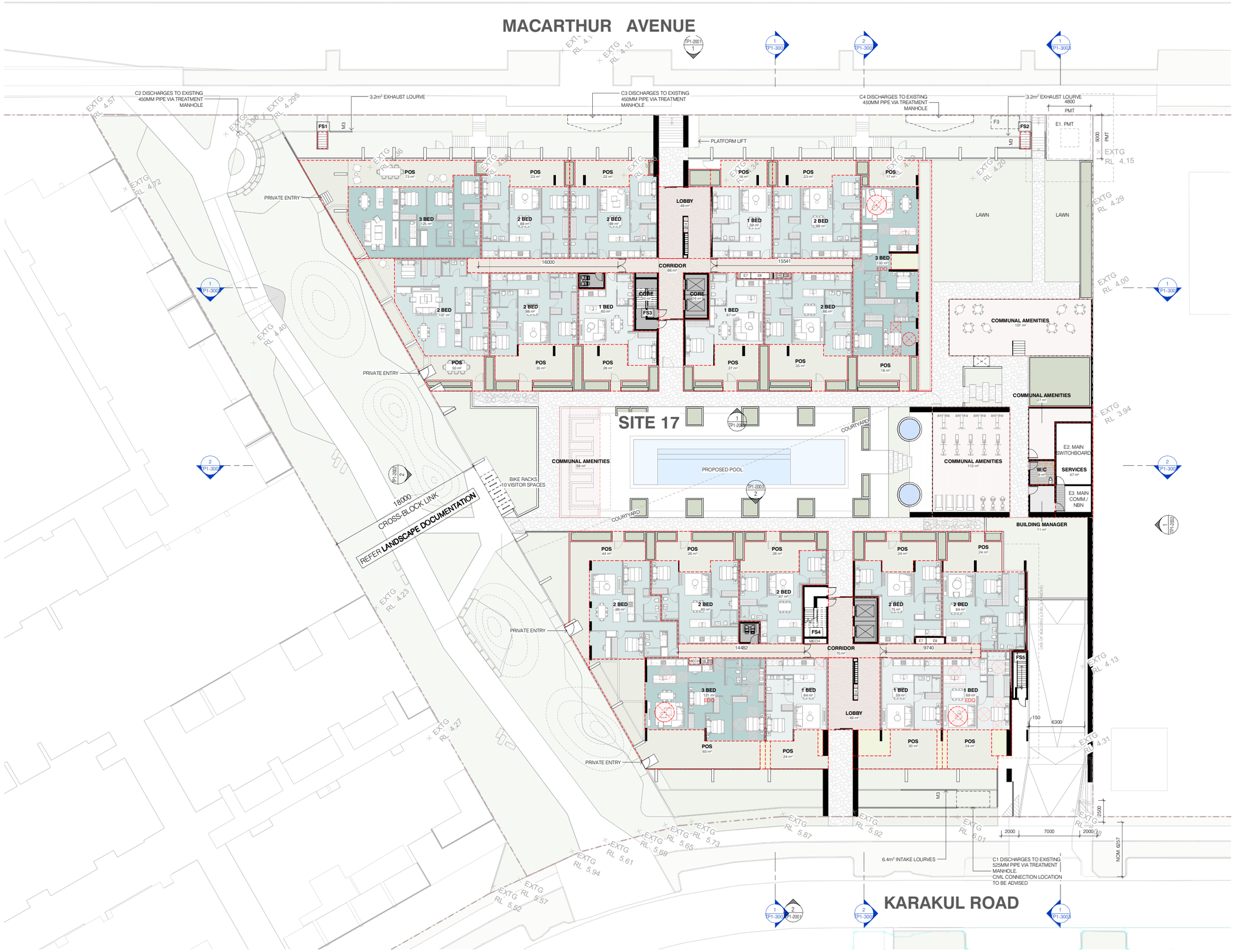
8.5. Potential Traffic Impacts

The proposed development is expected to generate approximately 85vph in peak hours, which is less than that contemplated for the subject site based on the IBPR Yield assumptions which fed into the original PDA traffic modelling. Therefore, no further assessment of the potential impacts of the development is considered necessary.

8.6. Conclusion

Based on the assessment contained within this report, TTM sees no traffic engineering reason why the relevant approvals should not be granted.

Appendix A Development Plans



Builders / Contractors shall verify all dimensions before any work commences. Dimensions shown are nominal. Figured dimensions shall take precedence over scaled dimensions. Any discrepancies are to be made known to the Architects / Designers studio prior to any works commencing on site. All shop drawings shall be submitted for review and manufacture shall not commence prior to the return of stamped shop drawings.

GENERAL NOTES

18	02/12/2024		ISSUE FOR INFORMATION
17	28/11/2024		ISSUE FOR INFORMATION
16	27/11/2024		DRAFT TOWN PLANNING ISSUE
15	26/11/2024		ISSUE FOR INFORMATION
14	22/11/2024		DRAFT TOWN PLANNING ISSUE
13	20/11/2024		ISSUE FOR INFORMATION
12	19/11/2024		ISSUE FOR INFORMATION
11	15/11/2024		ISSUE FOR INFORMATION
10	13/11/2024		ISSUE FOR INFORMATION
9	23/10/2024		ISSUE FOR INFORMATION
8	16/10/2024		ISSUE FOR INFORMATION
7	14/10/2024		ISSUE FOR INFORMATION
6	11/10/2024		ISSUE FOR INFORMATION
5	12/09/2024		ISSUE FOR INFORMATION
4	10/09/2024		ISSUE FOR INFORMATION
3	05/09/2024		ISSUE FOR INFORMATION
2	28/08/2024		ISSUE FOR INFORMATION
1	13/08/2024	-	ISSUE FOR INFORMATION

Rev	Date	Chkd	Reason for Issue

Based on Drawings Received:

NORTH

0 2 4 10m
SCALE 1:200

TOWN PLANNING ISSUE

NOT FOR CONSTRUCTION

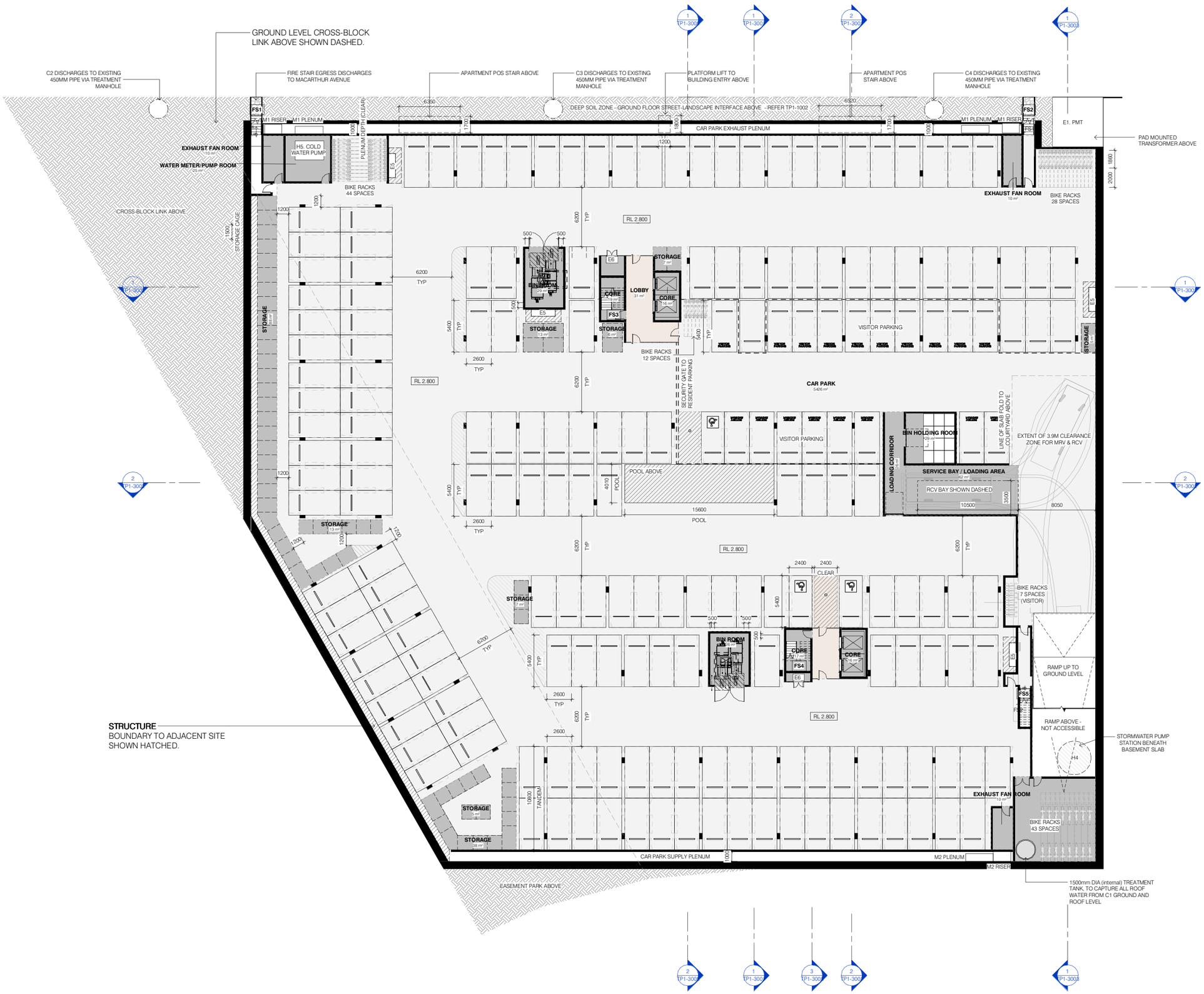
carr
Level 4
31 Flinders Lane
Melbourne VIC
3000 Australia

+61 3 9665 2300

melb@carr.net.au
carr.net.au

Project	LOT 17 NORTHSHORE HAMILTON
	Lot 17 280 Macarthur Avenue, Hamilton, Queensland
Title	GROUND LEVEL

Date	26/11/2024	Project No	24047
Scale @ A1	1 : 200	Dwg No	TP1-1002
Drawn By	MH/JH/ME	Chkd KW	Rev 18



STRUCTURE
BOUNDARY TO ADJACENT SITE SHOWN HATCHED.

GENERAL NOTES

CARS	REQUIRED	PROVIDED
VISITOR (INCLUDING 1 ACCESSIBLE)	19	**19**
RESIDENT (INCLUDING 2 ACCESSIBLE)	156	**174**
TANDEMS (RESIDENTIAL ONLY)	41	42
TOTAL	176	**193**

BIKES	REQUIRED	PROVIDED
VISITOR	29	**29**
RESIDENT	115	**115**
TOTAL	144	**144**

Rev	Date	Chkd	Reason for Issue
19	02/12/2024		ISSUE FOR INFORMATION
18	27/11/2024		DRAFT TOWN PLANNING ISSUE
17	26/11/2024		ISSUE FOR INFORMATION
16	22/11/2024		DRAFT TOWN PLANNING ISSUE
15	20/11/2024		ISSUE FOR INFORMATION
14	19/11/2024		ISSUE FOR INFORMATION
13	15/11/2024		ISSUE FOR INFORMATION
12	13/11/2024		ISSUE FOR INFORMATION
11	06/11/2024		ISSUE FOR INFORMATION
10	01/11/2024		ISSUE FOR INFORMATION
9	23/10/2024		ISSUE FOR INFORMATION
8	16/10/2024		ISSUE FOR INFORMATION
7	12/09/2024		ISSUE FOR INFORMATION
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5	05/09/2024		ISSUE FOR INFORMATION
4	29/08/2024		ISSUE FOR INFORMATION
3	29/08/2024		ISSUE FOR INFORMATION
2	20/08/2024		ISSUE FOR INFORMATION
1	13/08/2024	-	ISSUE FOR INFORMATION

Based on Drawings Received:

NORTH
0 2 4 10m
SCALE 1:200

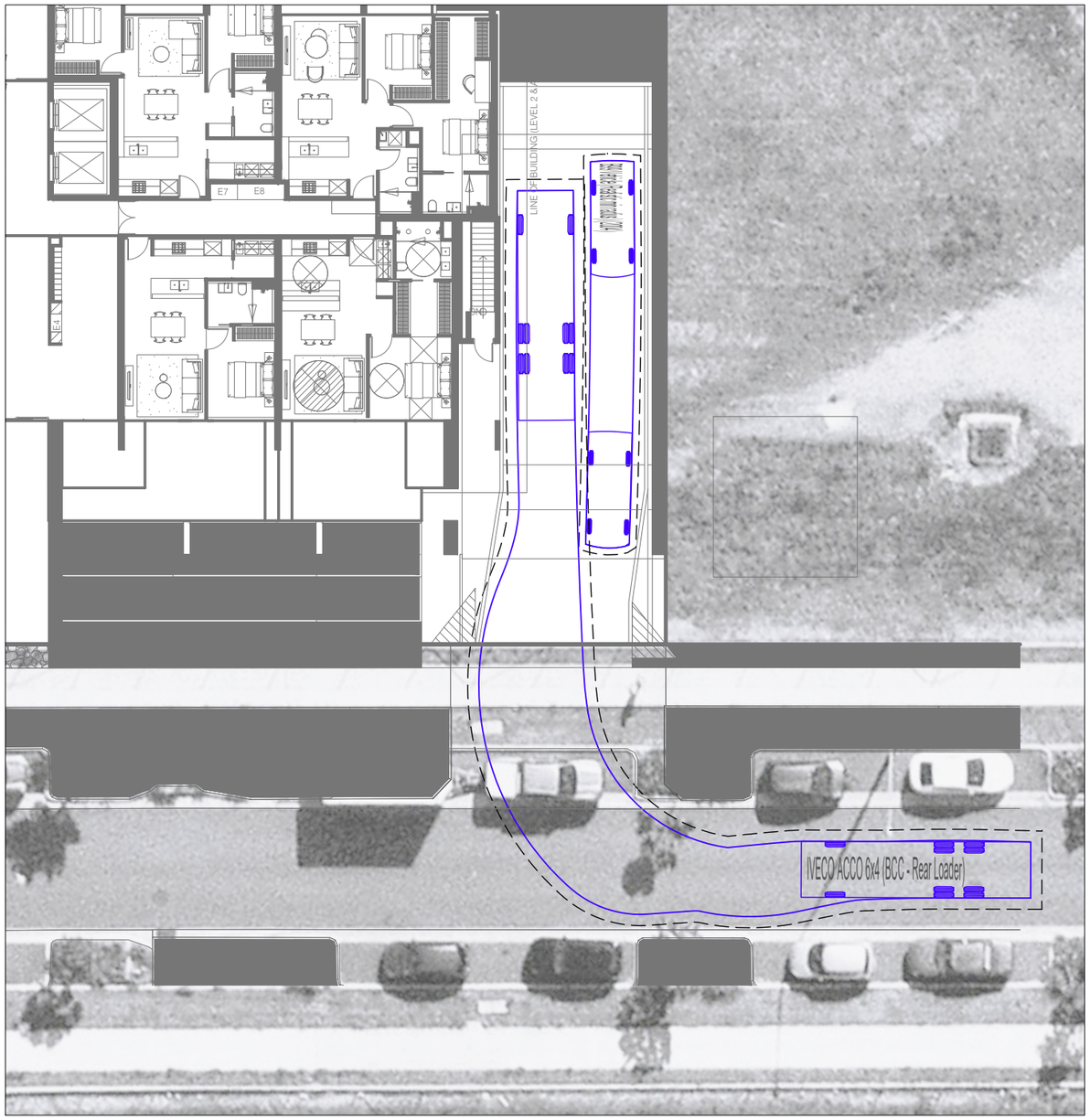
TOWN PLANNING ISSUE

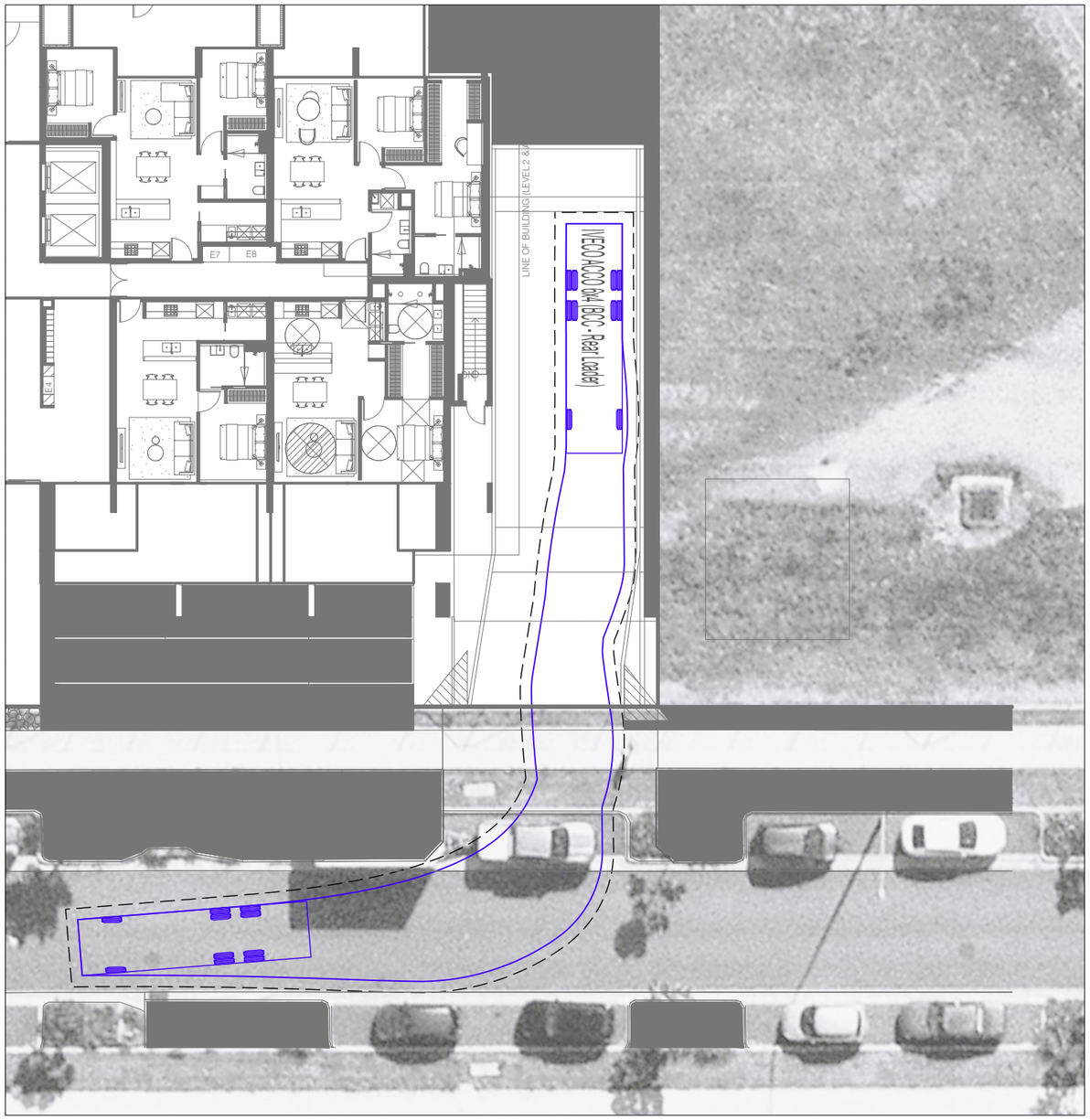
NOT FOR CONSTRUCTION

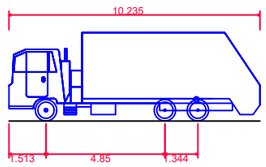
carr
Level 4
31 Flinders Lane
Melbourne VIC
3000 Australia
+61 3 9665 2300
melb@carr.net.au
carr.net.au

Project	LOT 17 NORTHSHORE HAMILTON
	Lot 17 280 Macarthur Avenue, Hamilton, Queensland
Title	BASEMENT 01
Date	22/11/2024
Project No	24047
Scale @ A1	1 : 200
Dwg No	TP1-1001
Drawn By	MH/ME Chkd KW
Rev	19

Appendix B TTM Drawings

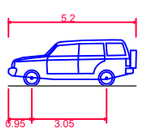






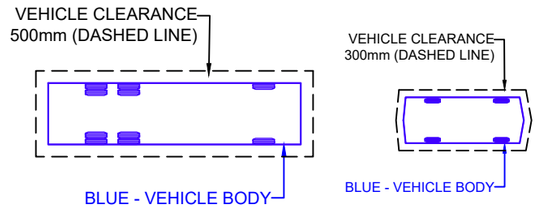
IVECO ACCO 6x4 (BCC - Rear Loader)

Overall Length	10.235m
Overall Width	2.500m
Overall Body Height	3.600m
Min Body Ground Clearance	0.260m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	9.757m
Design Speed Forward	5.0km/h
Clearance Envelope	0.500m



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
Design Speed Forward	5.0km/h
Clearance Envelope	0.300m



PRELIMINARY ADVICE ONLY

4 December 2024

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	04.12.2024	ORIGINAL ISSUE	JH	SC	SC

SCALE 0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

NORTH

CLIENT: Silverstone Developments

Colliers international Engineering & Design (TTMC) Pty Limited (Colliers)

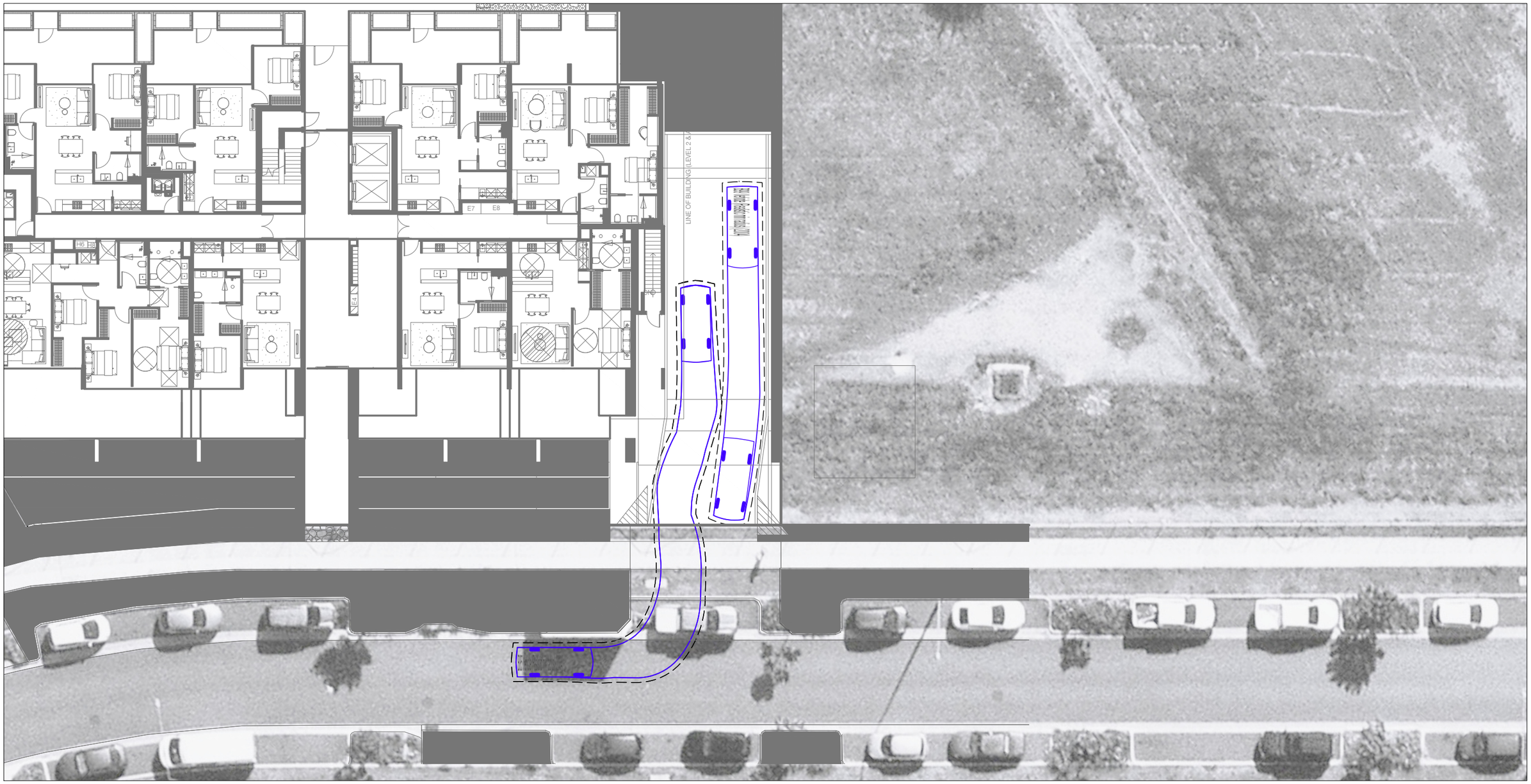
ABN 65 010 868 621
LEVEL 8, 369 Ann Street, BRISBANE QLD 4000
P.O. BOX 12015, BRISBANE QLD 4003

T: (07) 3327 9500 F: (07) 3327 9501
E: ttmbris@ttmgroup.com.au W: www.ttmgroup.com.au

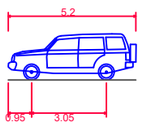
PROJECT: **330 MacArthur Ave, Hamilton**

DRAWING TITLE: **SWEPT PATH ANALYSIS**
10.24m Refuse Collection Vehicle (RCV) - DESIGN VEHICLE

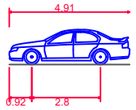
PROJECT NUMBER	24BRT0389
ORIGINAL SIZE	A3
DRAWING NUMBER	24BRT0389-01
REVISION	A
DATE	4 Dec 2024
SHEET	1 OF 3



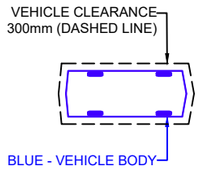
VEHICLE PASSING - B99 vs B85



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
Design Speed Forward	5.0km/h
Clearance Envelope	0.300m



B85 Vehicle (Realistic min radius) (2004)	
Overall Length	4.910m
Overall Width	1.870m
Overall Body Height	1.421m
Min Body Ground Clearance	0.159m
Track Width	1.770m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	5.750m
Design Speed Forward	5.0km/h
Clearance Envelope	0.300m



PRELIMINARY ADVICE ONLY

4 December 2024

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	04.12.2024	ORIGINAL ISSUE	JH	SC	SC

SCALE 0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

NORTH

CLIENT: Silverstone Developments

Colliers international Engineering & Design (TTMC) Pty Limited (Colliers)

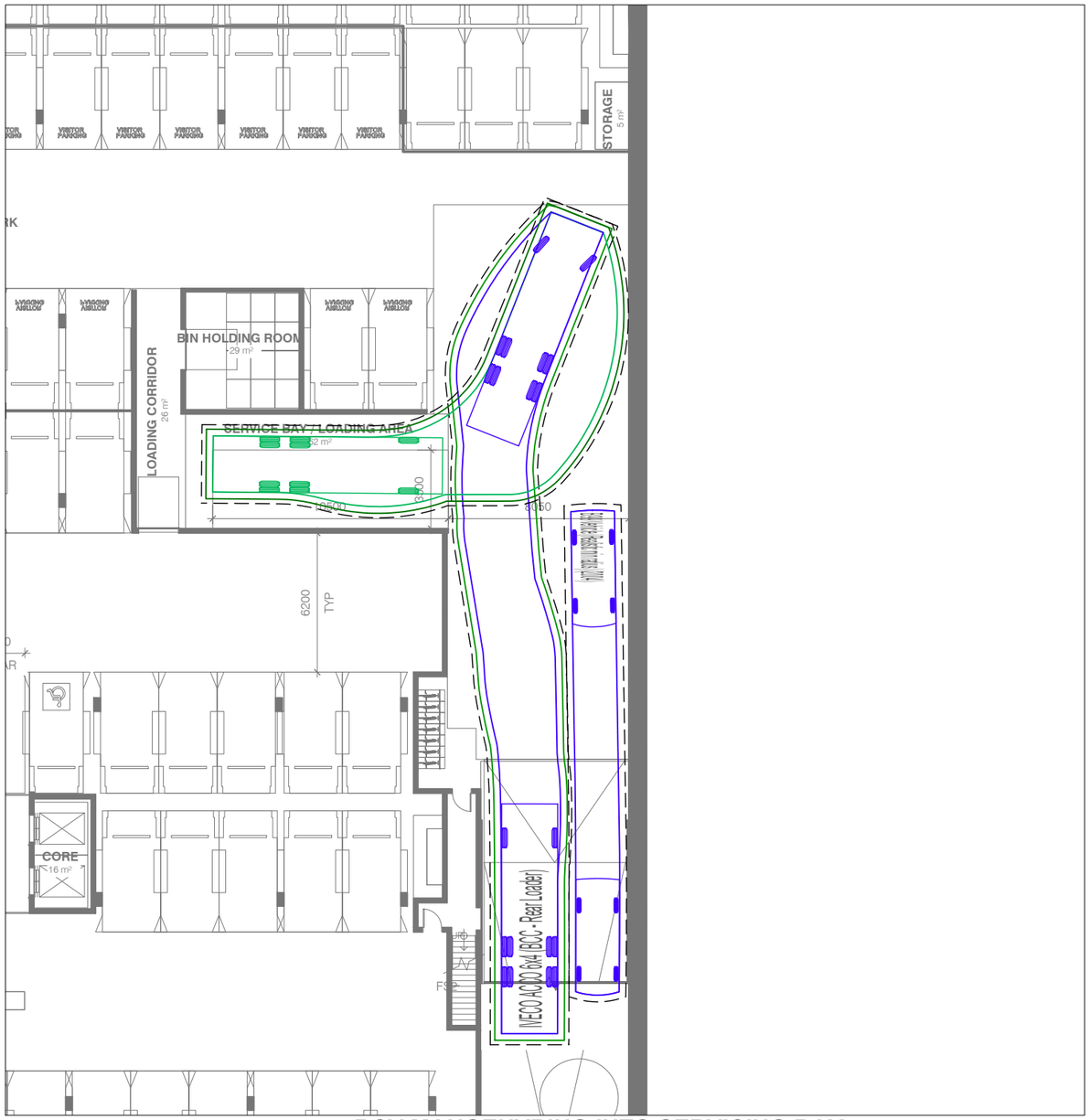
ABN 65 010 868 621
LEVEL 8, 369 Ann Street, BRISBANE QLD 4000
P.O. BOX 12015, BRISBANE QLD 4003

T: (07) 3327 9500 F: (07) 3327 9501
E: ttmbris@ttmgroup.com.au W: www.ttmgroup.com.au

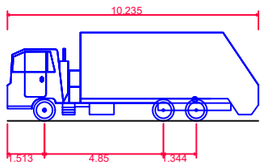
PROJECT: **330 MacArthur Ave, Hamilton**

DRAWING TITLE: **SWEPT PATH ANALYSIS**
B99 and B85 - DESIGN VEHICLES

PROJECT NUMBER	24BRT0389
ORIGINAL SIZE	A3
DRAWING NUMBER	24BRT0389-02
REVISION	A
DATE	4 Dec 2024
SHEET	2 OF 3



RCV MANOEUVRING INTO SERVICING BAY



IVECO ACCO 6x4 (BCC - Rear Loader)

Overall Length	10.235m
Overall Width	2.500m
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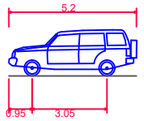
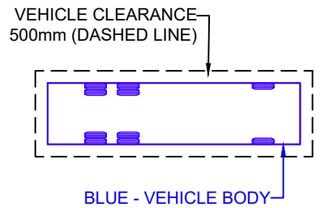
Design Speed Forward	5.0km/h
Clearance Envelope	0.500m

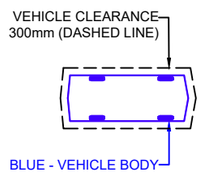


B99 Vehicle (Realistic min radius) (2004)

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
Design Speed Forward	5.0km/h
Clearance Envelope	0.300m

RCV MANOEUVRING OUT SERVICING BAY





DIRECTOR

SIMON CRANK RPEQ 18360

APPROVED 4 Dec 2024

PRELIMINARY ADVICE ONLY

4 December 2024

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	04.12.2024	ORIGINAL ISSUE	JH	JH	SC

SCALE 0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

NORTH

CLIENT: Silverstone Developments

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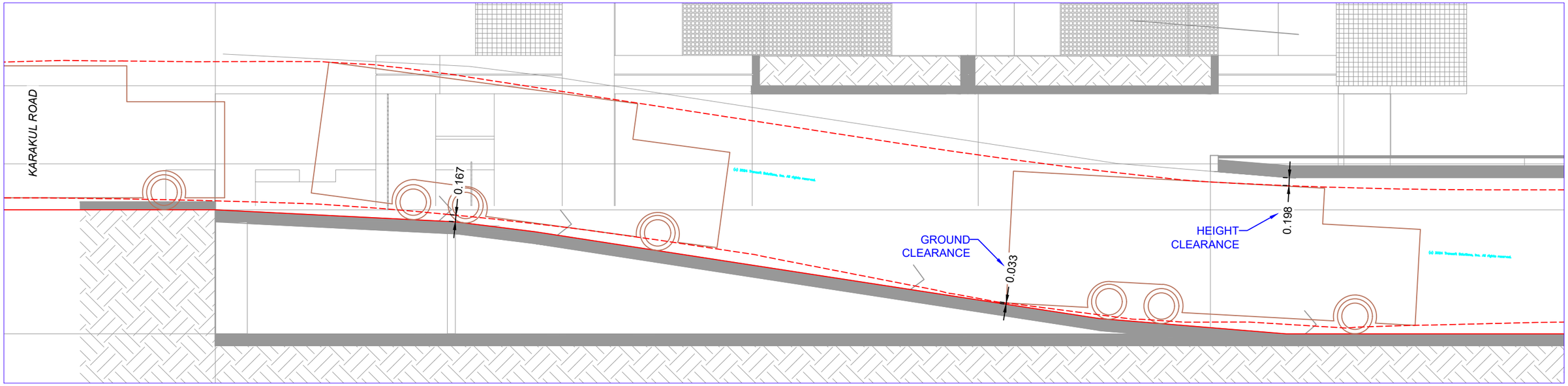
E: ttmbris@ttmgroup.com.au W: www.ttmgroup.com.au

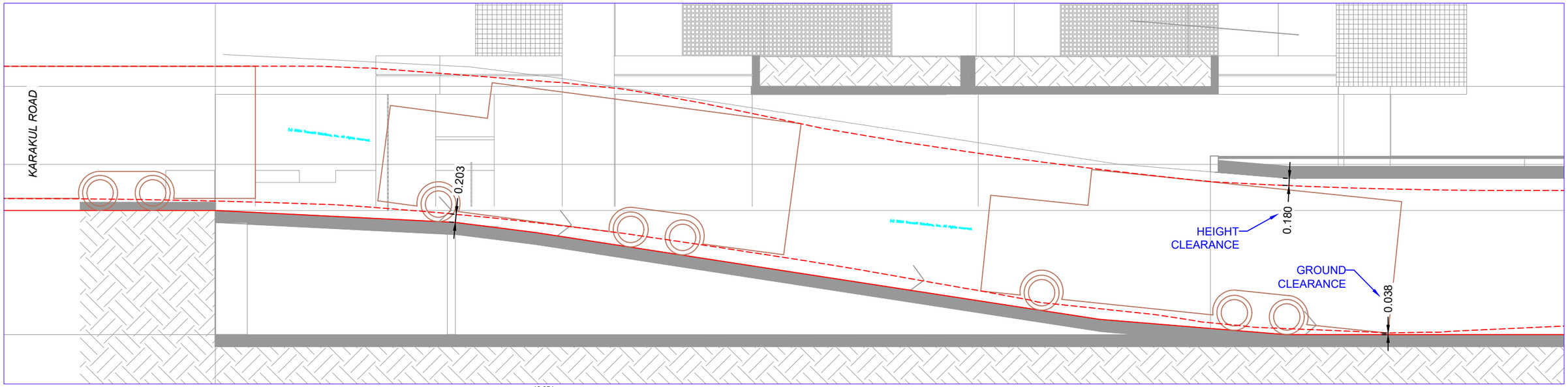
PROJECT: **330 MacArthur Ave, Hamilton**

DRAWING TITLE: **SWEPT PATH ANALYSIS**
10.24m Refuse Collection Vehicle (RCV) - DESIGN VEHICLE

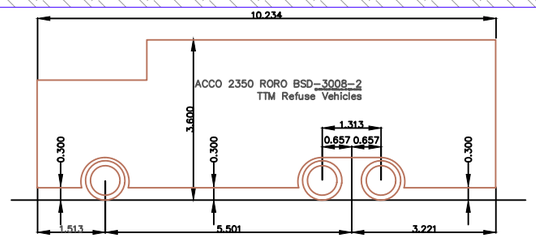
PROJECT NUMBER	24BRT0389
ORIGINAL SIZE	A3
DRAWING NUMBER	24BRT0389-03
REVISION	A
DATE	4 Dec 2024
SHEET	3 OF 3



INGRESS MANOEUVRE



EGRESS MANOEUVRE



Ground Clearance (units: m)

Part #	Front	Wheelbase	Rear
#1	0.30	0.30	0.30

NOTES:

1. VEHICLE MANOEUVRING SOFTWARE USED FOR REVIEW IS:
   - AUTOTURN PRO BY TRANSOFT SOLUTIONS.

PRELIMINARY ADVICE ONLY

11 November 2024

REV.	DATE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	11-11-24	ORIGINAL ISSUE		JH	SC

SCALE 0 1 2 3 4 5m

SCALE 1:100 AT ORIGINAL SIZE

NORTH

CLIENT: SILVERSTONE DEVELOPMENTS

TTM CONSULTING PTY LTD
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LEVEL 8, 369 Ann Street, BRISBANE QLD 4000
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E: ttmbris@ttmgroup.com.au W: www.ttmgroup.com.au

PROJECT: **330 MacArthur Ave, Hamilton**

DRAWING TITLE: **GROUND AND HEIGHT CLEARANCE REVIEW - ACCESS DRIVEWAY**
10.24m REAR LOADING REFUSE COLLECTION VEHICLE

PROJECT NUMBER	ORIGINAL SIZE
24BRT0389	A3
DRAWING NUMBER	REVISION
24BRT0389-04	A
DATE	SHEET
11 Nov 2024	1 OF 1

24BRT0389-F01 V00 RCV GRADE PROFILES 241114.DWG