Report Prepared for
Marriot Management Pty Ltd

ratio:

Proposed Residential Development

15-17 Marriot Parade, Glen Waverley

January 2020

traffic:impact

r:

ratio:consutants

8 Gwynee Street
Cremorne VIC 3121
ABN 93 983 380 225

Prepared for:

Marriot Management Pty Ltd
Our reference 13397T-REP01-F01

Date	Version	Reason for Issue	Prepared By	Checked By
24.01.2020	D01	Draft	S Dangol	R Fairlie
30.01.2020	F01	Final	S Dangol	R Fairlie

Directory Path	Y:\13001 - 13500\13397 - 15-17 Marriot Parade, Glen Waverley (Proposed Residential Development)\2019 -2020 Work\Reports\13397T-REP01-F01.docx

Table of contents:

1 Introduction:

Ratio Consultants Pty Ltd was commissioned by Marriot Management Pty Ltd to assess the traffic and parking implications of a proposed residential development at 15-17 Marriot Parade, Glen Waverley.

The proposed development involves the construction of townhouses and an apartment building, incorporating the following:

— Five attached part two and three-storey four-bedroom townhouses.

— 11 x three-bedroom and four-bedroom apartments in a four-storey building.

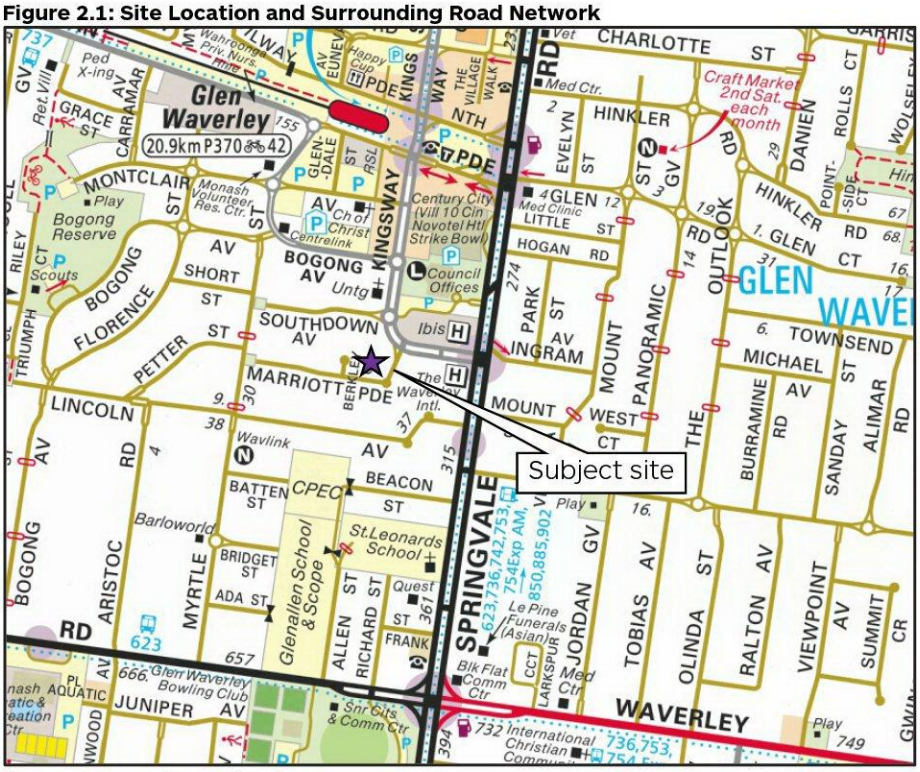
— A single level basement car park consisting of 22 single parking spaces and five double garages.

This report has been prepared to address the parking and traffic matters of the proposed development, and is based on surveys and observations in the vicinity of the site, and of previous studies of similar developments elsewhere in Melbourne.

2.1 Location and Environment

The proposed development is located at 15-17 Marriot Parade, Glen Waverley. The subject site is located along the north-western corner of the 90 degree bend in Marriott Parade and continues to the Kingsway intersection. The site's location relative to the road network is shown in Figure 2.1 below.

Figure 2.1: Site Location and Surrounding Road Network



Source: www.online.melway.com.au

The site is irregular in shape with a frontage to Marriott Parade of 83.0 metres for an overall area of approximately 2,184 square metres. The site is currently occupied by two single storey detached dwellings on adjacent allotments. The land at 17 Marriott Parade is located in a Residential Growth Zone (RGZ4) whereas the land at 15 Marriott Parade is located in a General Residential Zone – Schedule 2 (GRZ7), just outside the Glen Waverley Principal Activity Centre.

Land use within the immediate vicinity of the site is commercial to the north and east, within the Glen Waverly Principal Activity Centre, along Springvale Road and residential to the west and south. The surrounding land use therefore includes a range of retail, dining, entertainment and commercial businesses.

Some other key land uses include:

- Monash City Council, located 50 metres east of the subject site.
- Century City (Village Cinemas, Strike Bowling and the Novotel Hotel), located 250 metres north of the subject site.
- The Glen Shopping Centre, located approximately 700 metres north of the subject site.
- St Leonards School located approximately 300 metres south of the subject site.
- Glenallen School and Scope located approximately 400 metres south of the subject site

— Glen Waverley Reserve located approximately 600 metres south of the subject site.

Figure 2.2 shows an aerial photograph of the subject site relative to its surroundings.

Figure 2.2 Aerial Photograph of Subject Site and Surrounds

Source: www.nearmap.com

2.2 Road Network

Marriott Parade is a Local Road which essentially runs in an L-shaped alignment between Kingsway and its termination to the west. In the vicinity of the site, Marriott Parade caters for a shared traffic lane and kerbside parallel parking on both sides. Marriott Parade has an approximate carriageway width of 6.95 metres, constructed footpaths along both sides of the road and a mandatory speed limit applicable to a built-up area of 50 km/h.

At its intersection with Kingsway, vehicles can only exit left, with both left and right turns permitted for vehicles entering Marriot Parade. Additionally, at its termination, Marriott Parade provides pedestrian access to/from Myrtle Street but does not incorporate a turning bulb.

Kingsway functions as a Collector Road that runs in an L-shape between High Street Road and Springvale Road in Glen Waverley. Kingsway intersects with Marriott Parade approximately 140 metres west of Springvale Road. In the vicinity of the site, west of Marriott Parade, Kingsway caters for two traffic lanes in each direction separated by a central median with kerbside parking permitted in the kerbside lane along both sides of the road. An opening is created in the median opposite Marriot Parade to cater for right turn ingress movements into Marriot Parade. Kingsway has a sign posted speed limit of 40km/h.

2.3 Traffic Conditions

Ratio Consultants previously conducted a peak period vehicle turning movement survey at the Marriott Parade/Kingsway intersection back in May 2014. Marriott Parade recorded 30 movements during the AM peak hour, with the dominant movement being the left-out to Kingsway (18 movements) and 24 movements during the PM, with dominant movement being the left-out to Kingsway (15 movements). Kingsway carried in the order of 700 vehicles during AM and PM peak hours.

By applying the generally accepted approximation that the daily level of traffic on a road is equivalent to approximately 10 times the peak hour volume, this section of Kingsway was carrying in the order of 7,000 vehicles per day (vpd) whilst Marriott Parade was carrying approximately 270 vpd. This latter figure is well below the traffic capacity of a local road such as Marriot Parade.

2.4 Parking Conditions

Recent observations and previous parking surveys indicate that the overall parking demand in the immediate precinct of the site is moderate during both weekday and Saturday periods.

Parking in the vicinity of the site is subject to parking restrictions with predominantly 2P and Permit Zone restrictions. Overall, it is considered that there is ample spare on-street parking capacity within the vicinity of the site to accommodate an increase in parking demand.

2.5 Sustainable Transport

Public Transport

The site has excellent access to a range of public transport facilities with the following services within convenient proximity of the site:

— Glen Waverley Railway Station (Glen Waverley Line) is located approximately 380 metres to the north of the subject site;

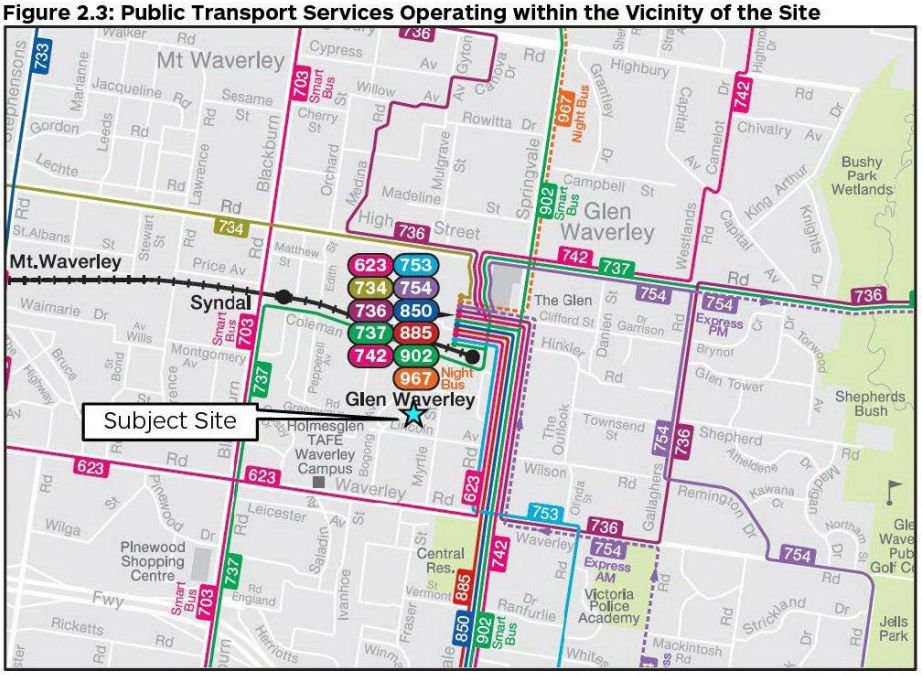
The following bus services are in operation nearby at the Glen Waverley Railway Station:

— Route 623 (Glen Waverley to St Kilda via Mount Waverley, Chadstone, Carnegie);
— Route 734 (Glen Iris to Glen Waverley);
— Route 736 (Mitcham to Blackburn via Vermont South, Glen Waverley, Forest Hill);
— Route 737 (Croydon to Monash University via Boronia, Knox City Shopping Centre, Glen Waverley);
— Route 742 (Eastland to Chadstone via Vermont South, Glen Waverley, Oakleigh);
— Route 753 (Glen Waverley to Bayswater via Wheelers Hill, Knoxfield, Boronia);
— Route 754 (Rowville to Glen Waverley via Caufield Grammar, Wheelers Hill);
— Route 850 (Dandenong to Glen Waverley via Mulgrave, Brandon Park);
— Route 885 (Glen Waverley to Springvale via Wanda Street); and
— Route 902 SMARTBUS (Chelsea to Airport West).
— Night Bus Route 967 (Glen Waverly - Burwood Highway – Bayswater (returns via Bayswater North – Ferntree Gully).

The site is located within the Principal Public Transport Network (PPTN) area, which reflects its excellent access to public transport services.

Figure 2.5 shows the public transport services operating within convenient proximity of the site.

Figure 2.3: Public Transport Services Operating within the Vicinity of the Site



Source: www.ptv.vic.gov.au

Pedestrian and Bicycle Facilities

The subject site has reasonable access to a bicycle network and has an excellent footpath network with safe and convenient access to the Glen Waverley Activity Centre. The local road network also provides a safe and convenient option for cycling.

3 The Proposal:

It is proposed to demolish the existing two dwellings and construct a part two and three-storey attached residential townhouses and a four-storey apartment development, with an associated basement car park. More specifically, the development includes the following:

— Five 4-bedroom attached townhouses, comprising:
  - Four two-storey townhouses.
  - One three-storey townhouse.
  - Five double garages within a basement.

— 11 apartments within four-storey building comprising:
  - One x 3-bedroom apartment.
  - 10 x 4-bedroom apartments.
  - 22 resident spaces in a basement car park.

— A single level basement car park consisting of 22 single parking spaces and five double garages.

— A total of 24 bicycle parking spaces, 22 for residents within the basement and 2 for visitors on ground floor.

Vehicular access to the site will be provided directly to/from Marriott Parade via a double width vehicle crossover. The redundant vehicle crossovers will be removed and reinstated with kerb, channel and nature strip to the satisfaction to the Responsible Authority.

A bin store has been provided at basement level along the sites accessway.

Pedestrian access to the proposed residential development will be provided to/from Marriott Road via two separate locations, as well as a direct separate connection to Townhouse 1, with stair and lift access to/from the basement level.

4.1 Planning Scheme Assessment

Clause 52.06 – Parking Assessment

Statutory car parking requirements for a range of developments are set out under Clause 52.06 of the Monash Planning Scheme.

The number of car parking spaces required for the specified uses is listed under Table 1 of Clause 52.06-5. Table 1 includes two sets of parking rates listed as Column A and Column B. Column A rates apply unless the Column B rates are applicable. Column B rates are to be used under the following circumstances:

— Any part of the land is identified as being within the Principal Public Transport Network Area as shown on the *Principal Public Transport Network Area Maps* (State Government of Victoria, 2018); or
— A Schedule to the Parking Overlay on another provision of the planning scheme specifies that Column B applies.

The subject site is located within the Principal Public Transport Network and is not subject to any Parking Overlays. Accordingly, the relevant Column B rates are applicable to the proposed development, as shown in Table 4.1.

Table 4.1: Clause 52.06 Planning Scheme Assessment

	Use	Number	Rate	Requirement
Residential	Three and four - bedroom dwellings	16	2.0 spaces to each three or more-bedroom dwelling	32 spaces
	Visitor	16	No parking required	0 spaces
TOTAL	16 Dwellings			32 spaces

4.2 Car Parking Adequacy

On the basis of the above, the development has a statutory requirement to provide 32 resident car spaces. A total of 32 on-site resident car spaces are proposed and accordingly the proposal satisfies the Monash Planning Scheme requirements for car parking and is therefore considered to be acceptable.

5.1 Clause 52.06-9 Design Standard Assessment

The proposed car parking spaces and double garages have been designed in accordance with the objectives and design requirements of Clause 52.06-9 of the Monash Planning Scheme, and/or relevant sections of AS/NZS 2890.1:2004.

An assessment against the relevant design standards of Clause 52.06-8 of the Monash Planning Scheme is provided below:

Design Standard 1 – Accessways

Vehicular access to the site will be provided directly to/from Marriott Parade via a double width vehicle crossover. The new crossover will be constructed with the Engineering Standard Drawings of Monash City Council.

The redundant vehicle crossovers will be removed and reinstated with kerb, channel and nature strip to the satisfaction to the Responsible Authority.

Design Standard 1 of Clause 52.06-9 relates to the design of accessways. The design requirements of Design Standard 1 are assessed against the proposal in Table 6.1.

Table 6.1: Design Standard 1 Assessment - Accessways

Requirement	Comments
Must be at least 3m wide.	Satisfied – The accessway has been designed with a minimum width of 6.1 metres (inclusive of 300mm wide kerbs on both sides) along the basement ramp exceeding Design Standard 1 and AS/NZS2890.1:2004.
Have an internal radius of at least 4m at changes of direction or intersection or be at least 4.2m wide.	Satisfied – The accessway widens to a width in excess of 4.2 metres at the change of direction.
Allow vehicles parked in the last space of a dead-end accessway in public car parks to exit in a forward direction with one manoeuvre.	N/A – The proposed car park is not a public car park. Notwithstanding this, vehicles parked in the last space of dead-end accessway can exit the car park in a forward direction with one manoeuvre.
Provide at least 2.1m headroom beneath overhead obstructions, calculated for a vehicle with a wheel base of 2.8m.	Satisfied – A minimum headroom clearance of 2.2 metres has been provided beneath overhead obstruction and within basement car park, exceeding the requirement.
If the accessway serves four or more car spaces or connects to a road in a Road Zone, the accessway must be designed so that cars can exit the site in a forward direction.	Satisfied – Vehicles accessing all parking spaces can enter and exit the site in a forward direction.
Provide a passing area at the entrance at least 6.1m wide and 7m long if the accessway serves ten or more car parking spaces and is either more than 50m long or connects to a road in a Road Zone.	Satisfied – The proposed access ramp is 6.1 metres wide and 8.5 metres long, accommodating required passing area at the entrance.
Have a corner splay or area at least 50% clear of visual obstructions extending at least 2m along the frontage road from the edge of an	Satisfied – A pedestrian sight triangle with the required dimension has been provided adjacent to the egress land of

exit lane and 2.5m along the exit lane from the frontage, to provide a clear view of pedestrians on the footpath of the frontage road. The area clear of visual obstructions may include an adjacent entry or exit lane where more than one lane is provided, or adjacent landscaped areas, provided the landscaping in those areas is less than 900mm in height.	the access ramp. Any landscaping or structures within this area to maintained below 900mm in height. Noting that the proposed access ramp is double width therefore a pedestrian sight triangle is not required to be provided adjacent to the ingress lane.
If an accessway to four or more car parking spaces is from land in a Road Zone, the access to the car spaces must be at least 6m from the road carriageway.	N/A – Access is not from land in a Road Zone and all car spaces are well in excess of 6 metres from the road carriageway.
If entry to the car space is from a road, the width of the accessway may include the road.	N/A - Entry to the car spaces is not accessed directly from a road.

Design Standard 2 - Car Parking Spaces

A single level basement car park consisting of 22 single parking spaces and five double garages.

Design Standard 2 of Clause 52.06-9 relates to the design of car parking spaces. The requirements of Design Standard 2 are assessed against the proposal in Table 6.2.

Table 6.2: Design Standard 2 Assessment – Car Parking Spaces

Requirement	Comments
Car parking spaces and accessways must have the minimum dimensions as outlined in Table 2 of Design Standard 2.	Satisfied – All standard car parking spaces and accessways have been designed in accordance with Table 2 of Design Standard 2. Typical car spaces comprise dimensions of 2.6 metres wide by 4.9 metres long and are accessed via a 6.4 metre wide aisle.
A wall, fence, column, tree, tree guard or any other structure that abuts a car space must not encroach into the area marked 'clearance required' on Diagram 1 of Design Standard 2, other than: - A column, tree or tree guard, which may project into a space if it is within the area marked 'tree or column permitted' on Diagram 1. - A structure, which may project into the space if it is at least 2.1m above the space.	Satisfied – Car parking spaces located next to a wall or object that impacts on the car parking envelope have been provided with an additional 300mm clearance. Columns have been located in accordance with Diagram 1 of Clause 52.06-9 of the Monash Planning Scheme
Car spaces in garages or carports must be at least 6m long and 3.5m wide for a single space and 5.5m wide for a double space measured inside the garage or carport.	Satisfied – All double garages are provided with a minimum internal length of 6.0 metres and a minimum width of 5.5 metres in accordance with the Monash Planning Scheme requirements.
Where parking spaces are provided in tandem (one space behind the other) an additional 500mm in length must be provided between each space.	N/A – No tandem car parking spaces are proposed.
Where two or more car parking spaces are provided for a dwelling, at least one space must be under cover.	Satisfied – All car parking spaces are provided within a basement car park.

Design Standard 3 – Gradients

Based on the RL of 112.15 metres at the top ramp and the RL of 111.06 metres at the bottom of the ramp (within the basement), the following ramp profile has been incorporated:

- Initial gradient of 1:10 for 5.0 metres;
- Mid-block gradient of 1:4.5 for 1.5 metres; and
- Final gradient of 1:8 for 2.0 metres.

Design Standard 3 of Clause 52.06-9 relates to the design of gradients. The requirements of Design Standard 3 are assessed against the proposal in Table 6.3.

Table 6.3: Design Standard 3 Assessment - Gradients

Requirement	Comments
Accessway grades must not be steeper than 1:10 (10%) within 5m of the frontage to ensure safety for pedestrians and vehicles. The design must have regard to the wheelbase of the vehicle being designed for; pedestrian and vehicular traffic volumes; the nature of the car park; and the slope and configuration of the vehicle crossover at the site frontage. This does not apply to accessways serving three dwellings or less.	**Satisfied** – The accessway does not exceed a grade of 1:10 within 5 metres of the property's frontage.
Ramps (except within 5 metres of the frontage) must have the maximum grades as outlined in Table 3 of Design Standard 3 and be designed for vehicles travelling in a forward direction.	**Satisfied** – The proposed grades are in accordance with Table 3 of Design Standard 3, with grades no steeper than 1:4.5.
Where the difference in grade between two sections of ramp or floor is greater than 1:8 (12.5%) for a summit grade change, or greater than 1:6.7 (15%) for a sag grade change, the ramp must include a transition section of at least 2 metres to prevent vehicles scraping or bottoming. Plans must include an assessment of grade changes of greater than 1:5.6 (18%) or less than 3 metres apart for clearances, to the satisfaction of the responsible authority.	**Satisfied** - Appropriate transition sections have been provided to prevent scraping or bottoming.

Swept Path Assessment

An assessment of the access arrangements has been conducted using the 'Autodesk Vehicle Tracking' software (refer to Appendix A). The B99 (99.8th percentile car) was used in the assessment and it was found that the B99 vehicle will be able to enter/exit the site in a forwards direction. Further, the assessment demonstrates that simultaneous two-way vehicle movement is provided at the entrance/exit, and throughout the basement car park.

An assessment of the accessibility to/from the critical parking spaces was conducted using B85 (85th percentile car). It was found that all critical car parking space could be accessed (ingress and egress) in a satisfactory manner. Some corrective manoeuvres may be required, which is in accordance with AS/NZS 2890.1:2004 (Table 1.1), which specifies that the three-point turn movements to enter and exit 90 degree parking spaces are permitted for regular users.

The assessment indicates that the access and car parking arrangements have been designed appropriately and in accordance with the requirements of the Monash Planning Scheme and/or AS/NZS 2890.1:2004.

Vertical Clearance and Ground Clearance Assessment

An assessment (refer to Appendix C) of the vertical clearance and ground clearance along the basement ramp has been undertaken using the 'Autodesk Vehicle Tracking' software.

The B899 'Vertical Clearance Model' (vehicle with a height of 2.2 metres and a wheel base of 3.05 metres as detailed in AS/NZS 2890.1:2004) was used in the vertical clearance assessment and it was found that the vehicle could gain access (ingress and egress) in a satisfactory manner without scraping any overhead obstructions.

The B99 'Ground Clearance Model' (vehicle with a wheel base of 3.05 metres and minimum ground clearance of 120mm as detailed in AS/NZS 2890.1:2004) was used in the ground clearance assessment and it was found that the vehicle could gain access (ingress and egress) in a satisfactory manner without scraping or bottoming out.

The assessment indicates that the access ramp has been designed appropriately and in accordance with the requirements of the Monash Planning Scheme, and/or AS/NZS 2890.1:2004.

6 Bicycle Facilities:

6.1 Bicycle Facilities

Clause 52.34 of the Monash Planning Scheme (Bicycle Facilities) specifies the following rates for bicycle spaces for residential developments of four or more storeys:

— One resident bicycle space per five dwellings; and
— One visitor bicycle space per ten dwellings.

Therefore, above rate does not strictly apply to two-storey or three-storey townhouse development. However, the proposed four-storey apartment development has a requirement to provide three bicycle spaces (two resident and one visitor).

The development proposes to provide a total of 24 bicycle parking spaces, 22 resident spaces within basement in the Arc De Triomphe or similar system and two visitor spaces within ground level in the Arc De Triomphe or similar system.

Furthermore, townhouse residents will able to store their bicycles informally within each of the individual double garages.

Accordingly, it is considered that adequate provision has been made for resident and visitor bicycle parking.

The bicycle parking layout has been designed in accordance with AS2890.1:2015 and this arrangement also exceeds the requirement to include a minimum of 20% of bicycle parking spaces to be provided in horizontal parking devices.

Refer to Appendix D for the bicycle parking specifications.

7 Waste Collection Arrangements:

7.1 Waste Collection

A Waste Management Plan (WMP) has been prepared for the development by Frater Consulting Services.

Waste and recyclables of the apartment development are proposed to be collected by private contractor using the mini rear loader waste truck, which has dimensions of 2.08 metres high, 6.35 metres long and 1.7 metres wide. However, waste and recyclables of the townhouse development are proposed to be collected kerbside (along Marriott Parade) via Council's Waste Collection Service (subject to the endorsement of Council). Townhouse residents will transfer the bins between their dwelling and the kerbside collection point.

The swept path assessment attached to Appendix B of this report demonstrates that ability of the proposed waste truck accessing the site in a forward direction, turnaround utilising the accessway, collect waste from bin storage area and depart the site in a forward direction.

Accordingly, it is considered that the proposed waste collection arrangements are acceptable from a traffic engineering perspective.

8.1 Traffic Generation

Residential townhouses and apartments of the scale and location proposed generate up to six vehicle trips per day. Therefore, the 16 dwellings would be expected to generate up to 96 vehicle trips per day. Generally, 10 percent of the trips, which equates to about 10 peak hour trips, will occur in each of the peak hours.

The majority of the traffic generated by the residential development during the morning peak period will be residents departing the site (80 percent out and 20 percent in) and the majority of the traffic during the evening peak period will be residents returning to the site (30 percent out and 70 percent in).

Accordingly, the expected trip generation for a typical weekday AM and PM peak hours is estimated as shown in Table 8.1.

Table 8.1: Traffic Generation

	AM Peak Hour	PM Peak Hour
Arriving Trips	2	6
Departing Trips	8	4
Total Trips	10	10

8.2 Traffic Distribution and Impacts

The traffic generated by the proposed residential development will flow directly onto Marriott Parade and then onto Kingsway. The surrounding road network has the ability to readily accommodate the expected traffic volumes (in the order of 10 vehicle movements in each of the AM and PM peak hours) associated with the proposed development.

On this basis it is expected that the development will not create adverse traffic safety or operational impacts onto the surrounding road network.

9 Conclusion:

The proposed residential development at 15-17 Marriot Parade, Glen Waverley comprises 16 dwellings and provision of 32 on-site car parking spaces within a basement car park accessed via Marriott Parade.

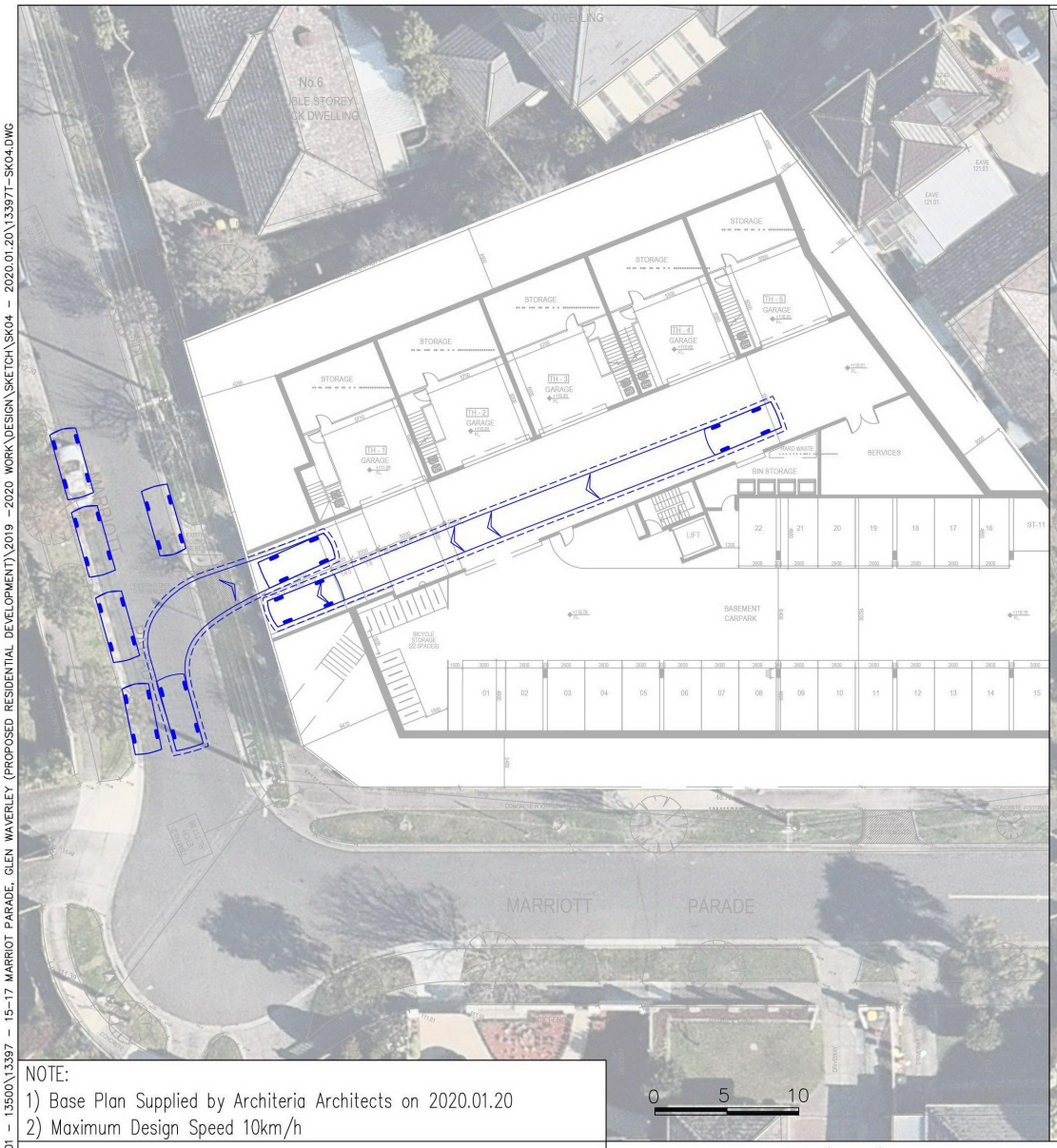
Based on the above considerations, it is considered that:

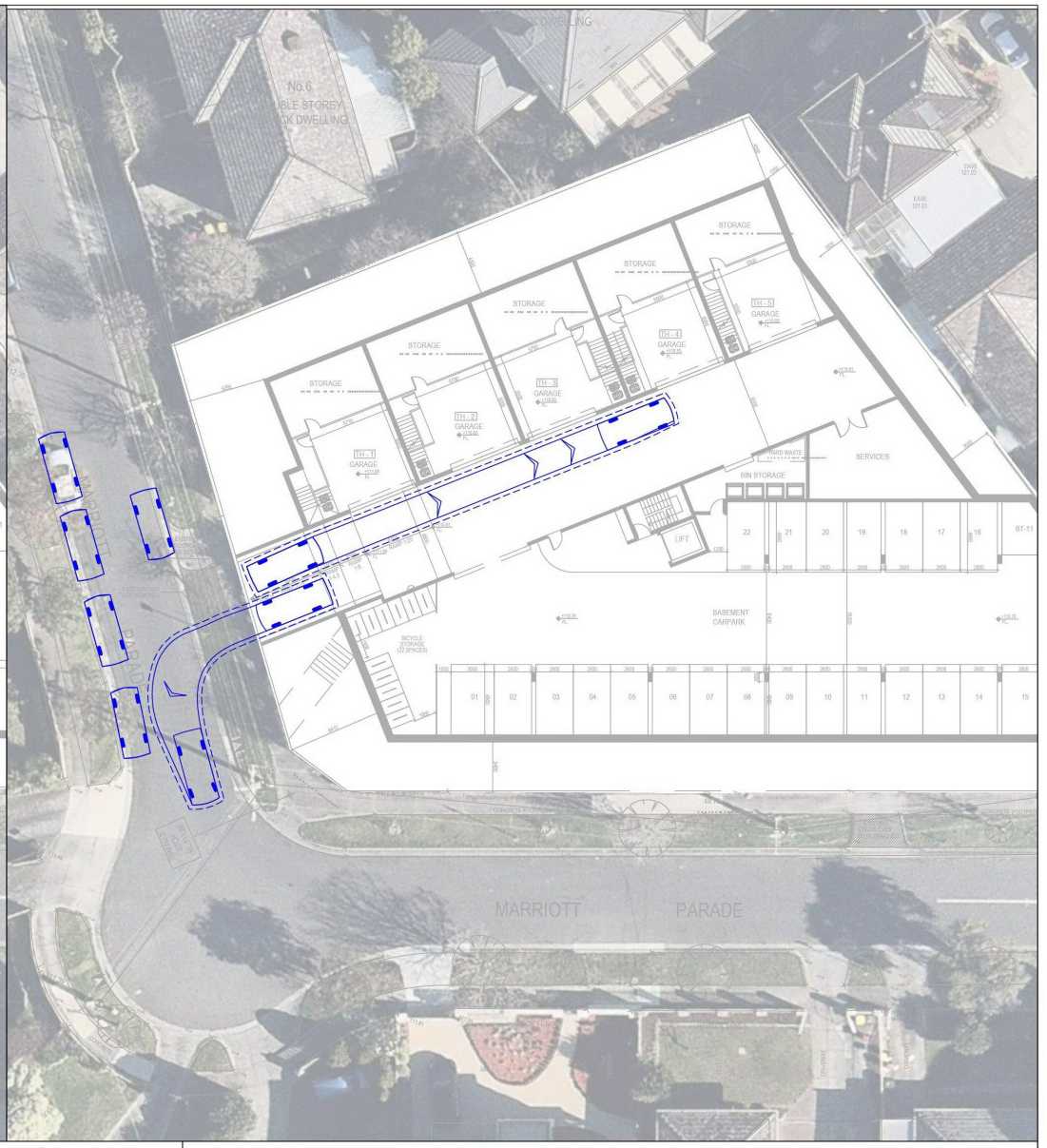
- The proposed on-site parking provision satisfies the statutory requirements for residents to Clause 52.06 of the Monash Planning Scheme.
- There is no requirement to provide any on-site visitor car park.
- The subject site has excellent access to a number of sustainable transport alternatives that may reduce individuals' dependence on private motor vehicle ownership and travel.
- The proposed car park and access arrangements have been suitably designed and are in accordance with the requirements of Monash Planning Scheme and/or AS/NZS 2890.1:2004.
- The swept path assessment demonstrates that access to/from the site and critical car spaces is satisfactory.
- The proposed bicycle parking provision and arrangement is satisfactory and exceeds the requirements of the Monash Planning Scheme.
- Up to 10 vehicular trips will be generated during AM an PM peak hours by the proposed development. The surrounding road network has the capacity to accommodate these traffic volumes in a safe and satisfactory manner.

Overall, the proposed development is not expected to create adverse traffic or parking impacts in the precinct.

Appendix A Swept Path Assessment:

D20-56049





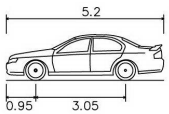
0 5 10

NOTE:
1) Base Plan Supplied by Architeria Architects on 2020.01.20
2) Maximum Design Speed 10km/h

ratio:

RATIO CONSULTANTS PTY LTD
ABN 005 422 104
8 GWYNNE STREET
CREMORNE, VICTORIA 3121
TELEPHONE (03)9429 3111
FACSIMILE (03)9429 3011

B99 Vehicle (AS/NZS2890.1:2004)



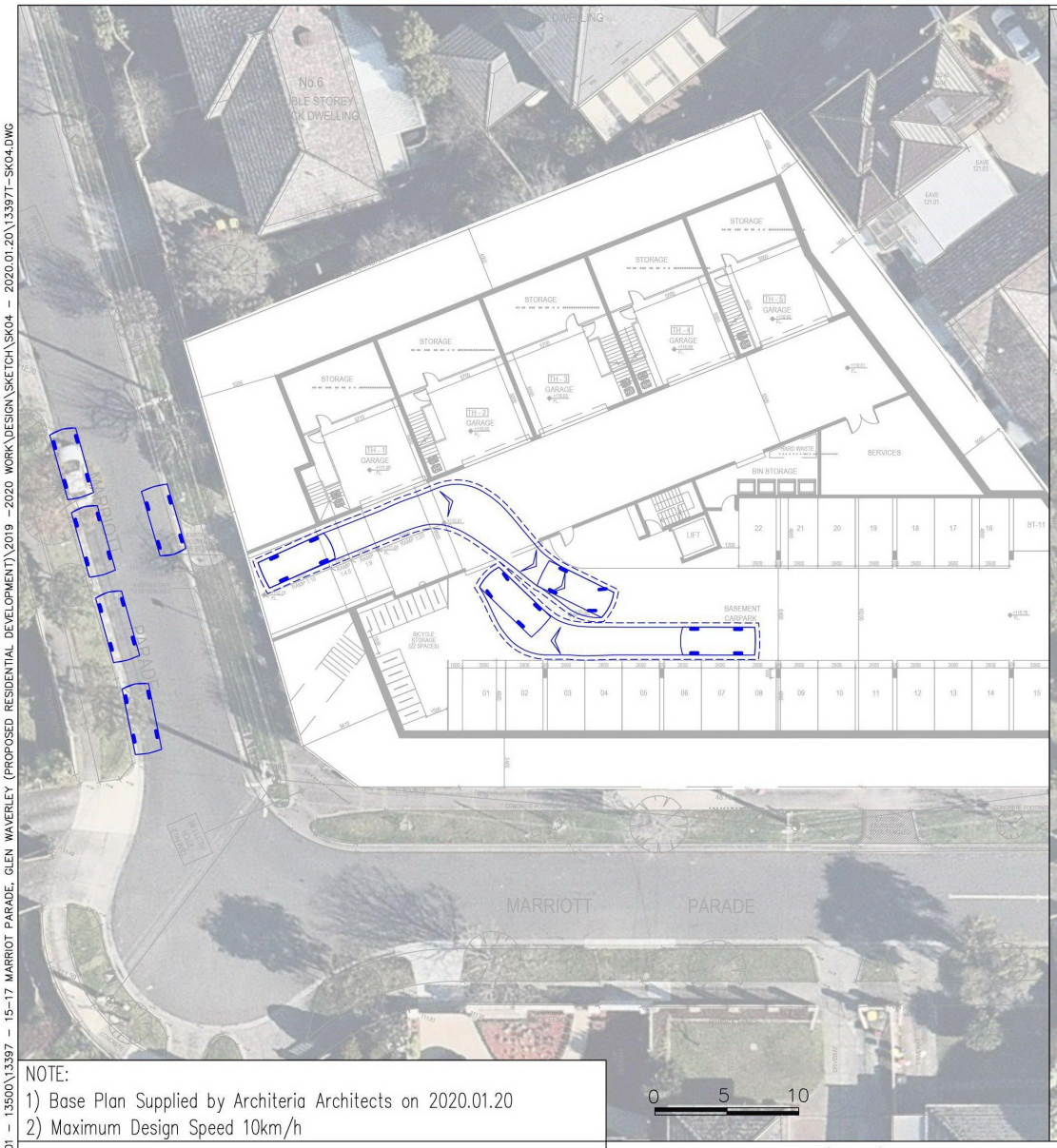
VEHICLE ENVELOPE (FORWARD)
300mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
300mm CLEARANCE (REVERSE)

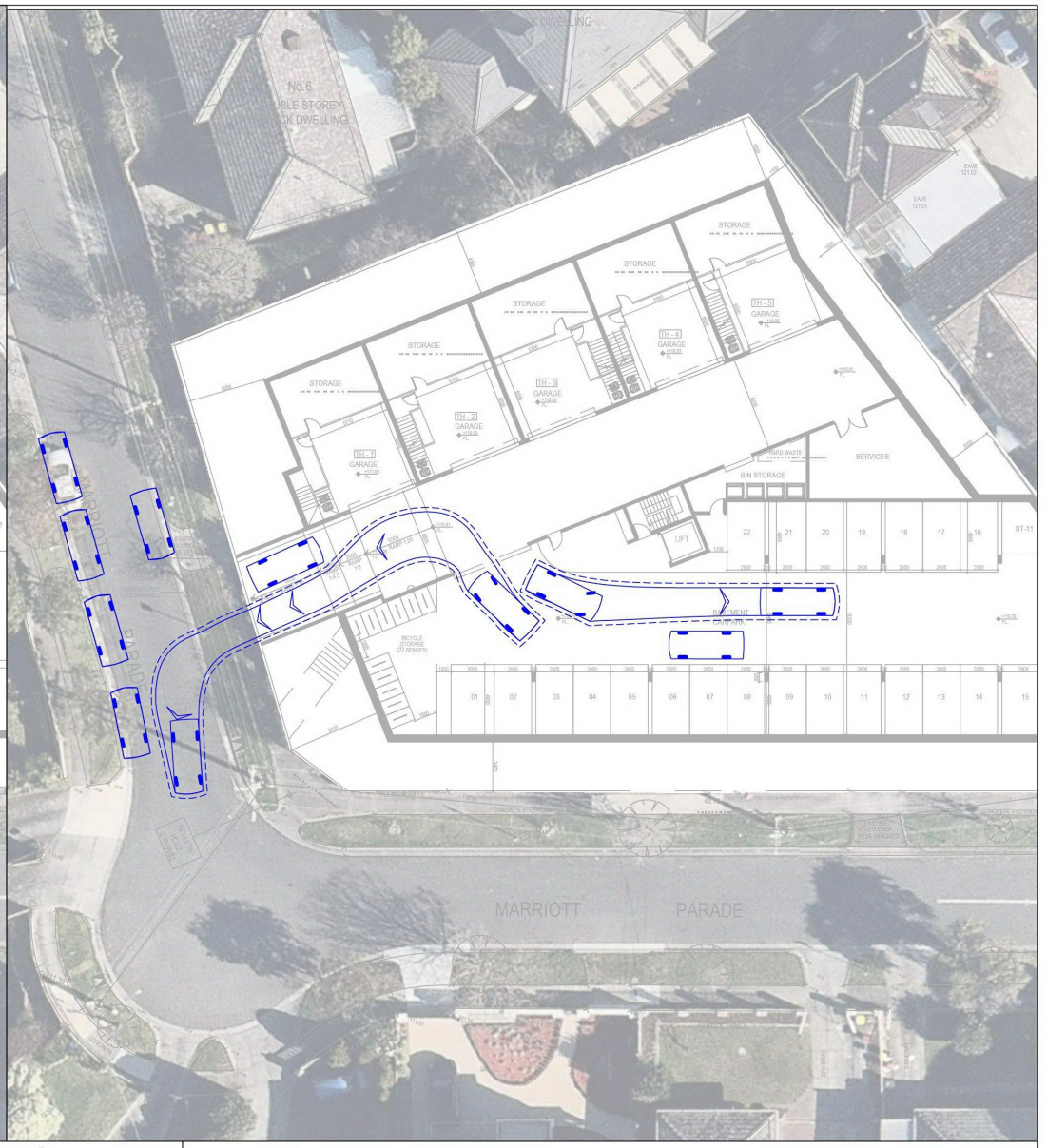
Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	2.200m
Min Body Ground Clearance	0.312m
Track Width	1.840m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	6.30m

Proposed Residential Development
15-17 Marriott Parade, Glen Waverley
Swept Path Assessment

RATIO REFERENCE	SHEET No.	SCALE	DATE
13397T-SK04/SD	1 of 9	1:500@A4	23/01/2020

D20-56049





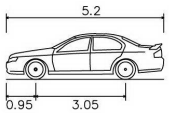
0 5 10

NOTE:
1) Base Plan Supplied by Architeria Architects on 2020.01.20
2) Maximum Design Speed 10km/h

ratio:

RATIO CONSULTANTS PTY LTD
ABN 005 422 104
8 GWYNNE STREET
CREMORNE, VICTORIA 3121
TELEPHONE (03)9429 3111
FACSIMILE (03)9429 3011

B99 Vehicle (AS/NZS2890.1:2004)



VEHICLE ENVELOPE (FORWARD)
300mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
300mm CLEARANCE (REVERSE)

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	6.30m

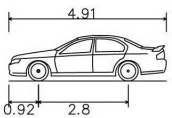
Proposed Residential Development
15-17 Marriott Parade, Glen Waverley
Swept Path Assessment

RATIO REFERENCE	SHEET No.	SCALE	DATE
13397T-SK04/SD	2 of 9	1:500@A4	23/01/2020

D20-56049

NOTE:
1) Base Plan Supplied by Architeria Architects on 2020.01.20
2) Maximum Design Speed 10km/h

B85 Vehicle (AS/NZS2890.1: 2004)



VEHICLE ENVELOPE (FORWARD)
300mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
300mm CLEARANCE (REVERSE)

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	4.00 sec
Curb to Curb Turning Radius	5.80m

ratio:
RATIO CONSULTANTS PTY LTD
ABN 005 422 104
8 GWYNNE STREET
CREMORNE, VICTORIA 3121
TELEPHONE (03)9429 3111
FACSIMILE (03)9429 3011

Proposed Residential Development
15-17 Marriott Parade, Glen Waverley
Swept Path Assessment

RATIO REFERENCE	SHEET No.	SCALE	DATE
13397T-SK04/SD	3 of 9	1:250@A4	23/01/2020

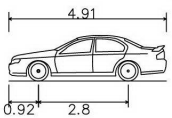
D20-56049

NOTE:
1) Base Plan Supplied by Architeria Architects on 2020.01.20
2) Maximum Design Speed 10km/h

ratio:

RATIO CONSULTANTS PTY LTD
ABN 005 422 104
8 GWYNNE STREET
CREMORNE, VICTORIA 3121
TELEPHONE (03)9429 3111
FACSIMILE (03)9429 3011

B85 Vehicle (AS/NZS2890.1: 2004)



VEHICLE ENVELOPE (FORWARD)
300mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
300mm CLEARANCE (REVERSE)

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	4.00 sec
Curb to Curb Turning Radius	5.80m

Proposed Residential Development
15-17 Marriott Parade, Glen Waverley
Swept Path Assessment

RATIO REFERENCE	SHEET No.	SCALE	DATE
13397T-SK04/SD	4 of 9	1:250@A4	23/01/2020

D20-56049

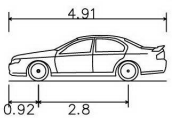
NOTE:
1) Base Plan Supplied by Architeria Architects on 2020.01.20
2) Maximum Design Speed 10km/h

0 2.5 5

ratio:

RATIO CONSULTANTS PTY LTD
ABN 005 422 104
8 GWYNNE STREET
CREMORNE, VICTORIA 3121
TELEPHONE (03)9429 3111
FACSIMILE (03)9429 3011

B85 Vehicle (AS/NZS2890.1:2004)



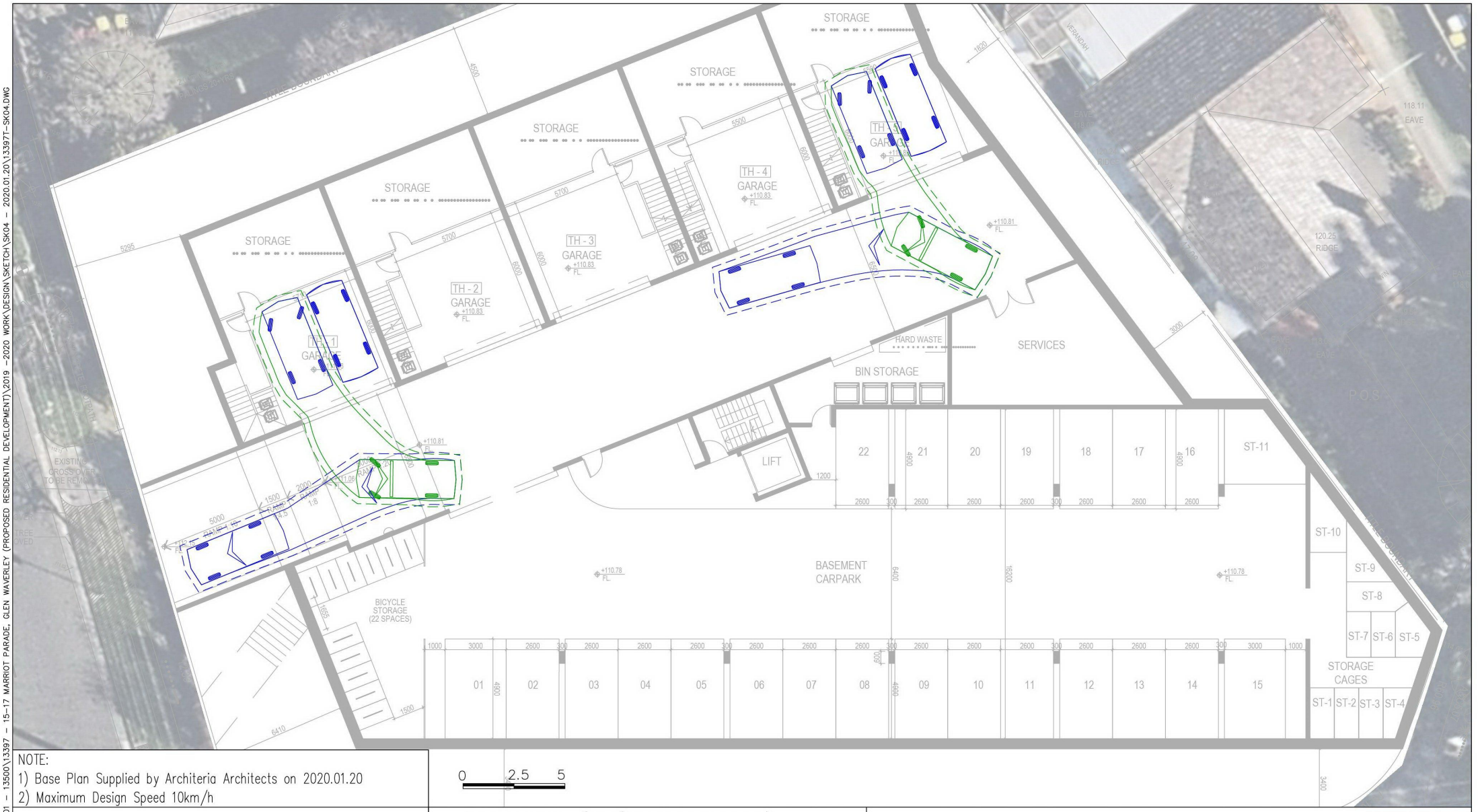
VEHICLE ENVELOPE (FORWARD)
300mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
300mm CLEARANCE (REVERSE)

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	4.00 sec
Curb to Curb Turning Radius	5.80m

Proposed Residential Development
15-17 Marriott Parade, Glen Waverley
Swept Path Assessment

RATIO REFERENCE	SHEET No.	SCALE	DATE
13397T-SK04/SD	5 of 9	1:250@A4	23/01/2020

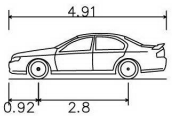
D20-56049



NOTE:
1) Base Plan Supplied by Architeria Architects on 2020.01.20
2) Maximum Design Speed 10km/h

0 2.5 5

B85 Vehicle (AS/NZS2890.1: 2004)



VEHICLE ENVELOPE (FORWARD)
300mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
300mm CLEARANCE (REVERSE)

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	4.00 sec
Curb to Curb Turning Radius	5.80m

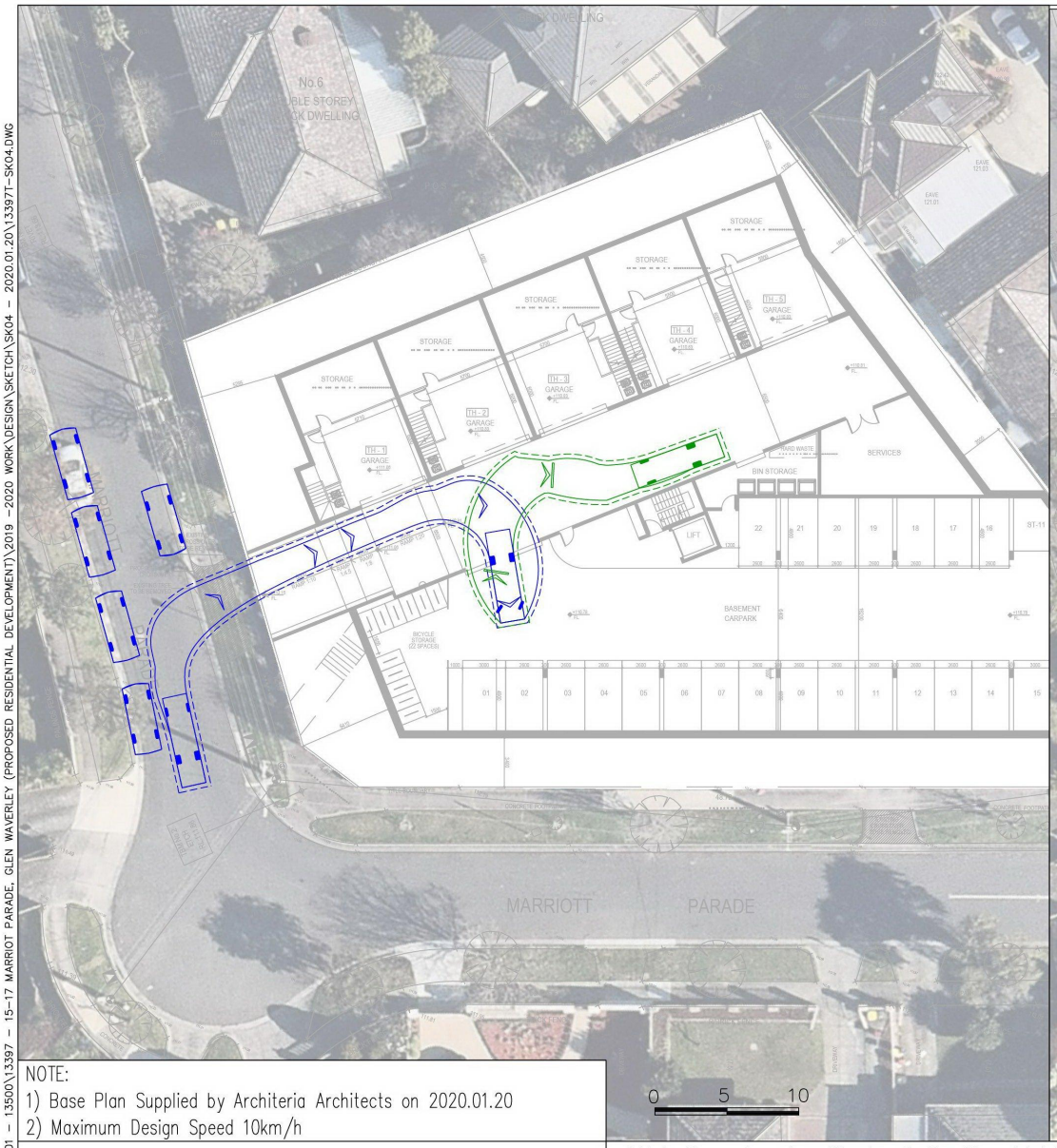
ratio:
RATIO CONSULTANTS PTY LTD
ABN 005 422 104
8 GWYNNE STREET
CREMORNE, VICTORIA 3121
TELEPHONE (03)9429 3111
FACSIMILE (03)9429 3011

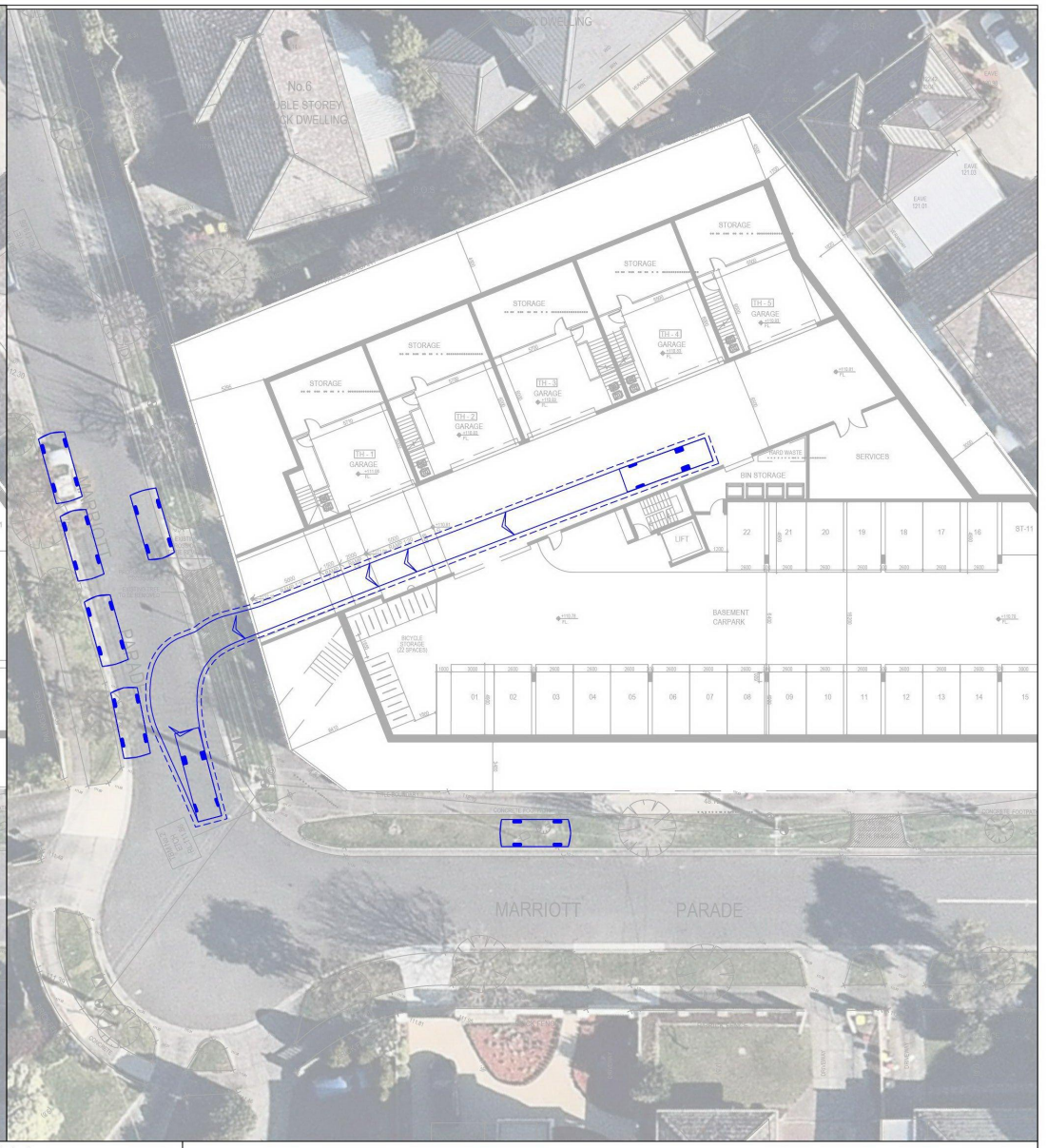
Proposed Residential Development
15-17 Marriott Parade, Glen Waverley
Swept Path Assessment

RATIO REFERENCE	SHEET No.	SCALE	DATE
13397T-SK04/SD	6 of 9	1:250@A4	23/01/2020

Appendix B Waste Vehicle Swept Path Assessment:

D20-56049

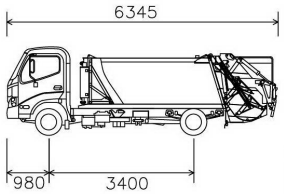




NOTE:
1) Base Plan Supplied by Architeria Architects on 2020.01.20
2) Maximum Design Speed 10km/h

0 5 10

Mini–Rear Loader Waste Collection Vehicle



VEHICLE ENVELOPE (FORWARD)
300mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
300mm CLEARANCE (REVERSE)

Overall Length	6.345m
Body Width	1.700m
Overall Body Height	2.080m
Min Body Ground Clearance	0.205m
Track Width	1.670m
Lock to lock Time	4.00 sec
Curb to Curb Turning Radius	6.450m

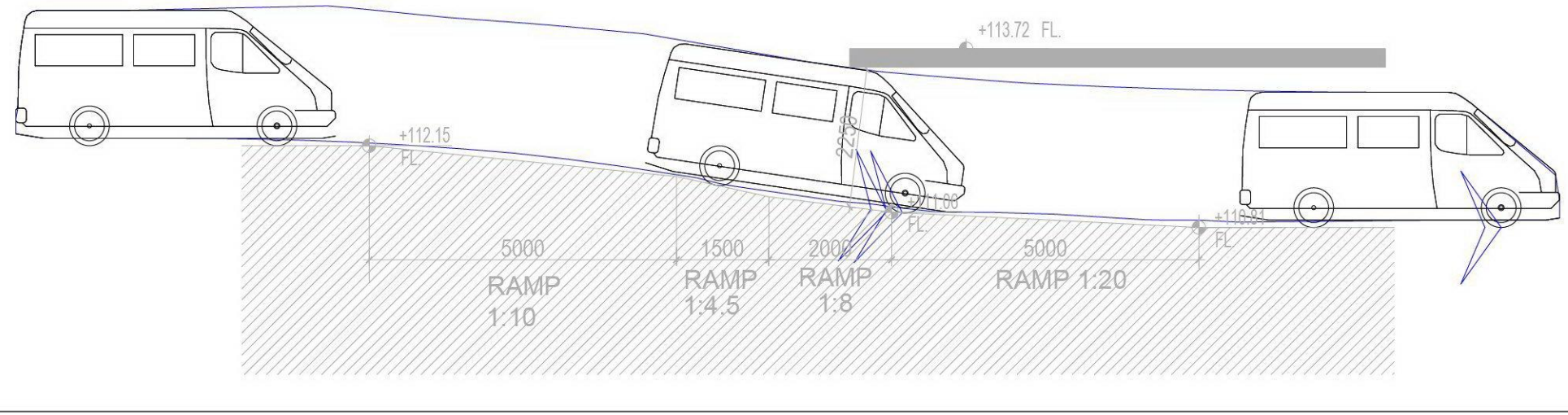
ratio:
RATIO CONSULTANTS PTY LTD
ABN 005 422 104
8 GWYNNE STREET
CREMORNE, VICTORIA 3121
TELEPHONE (03)9429 3111
FACSIMILE (03)9429 3011

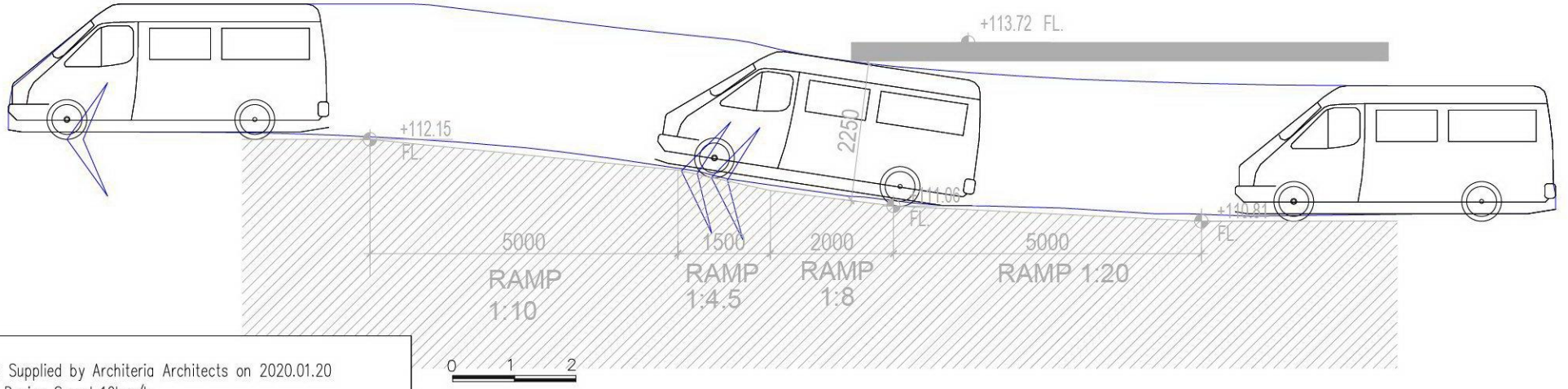
Proposed Residential Development
15–17 Marriott Parade, Glen Waverley
Swept Path Assessment

RATIO REFERENCE	SHEET No.	SCALE	DATE
13397T–SK04/SD	7 of 9	1:500@A4	23/01/2020

Appendix C Vertical and Ground Clearance Assessment:

D20-56049





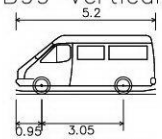
0 1 2

NOTE:
1) Base Plan Supplied by Architeria Architects on 2020.01.20
2) Maximum Design Speed 10km/h

ratio:

RATIO CONSULTANTS PTY LTD
ABN 005 422 104
8 GWYNNE STREET
CREMORNE, VICTORIA 3121
TELEPHONE (03)9429 3111
FACSIMILE (03)9429 3011

B99 Vertical Model (AS/NZS2890.1:2004)

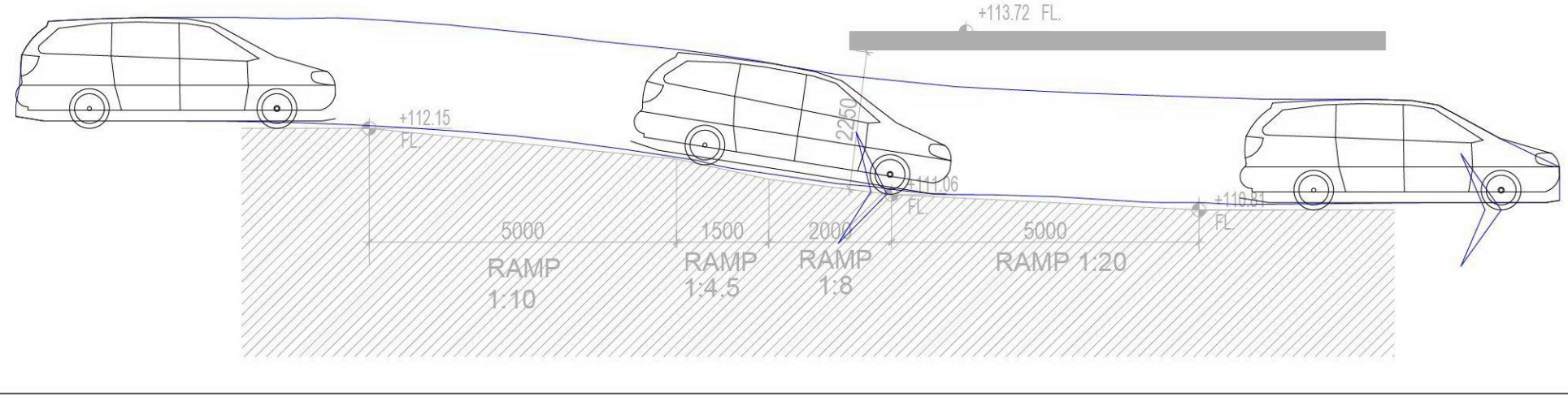


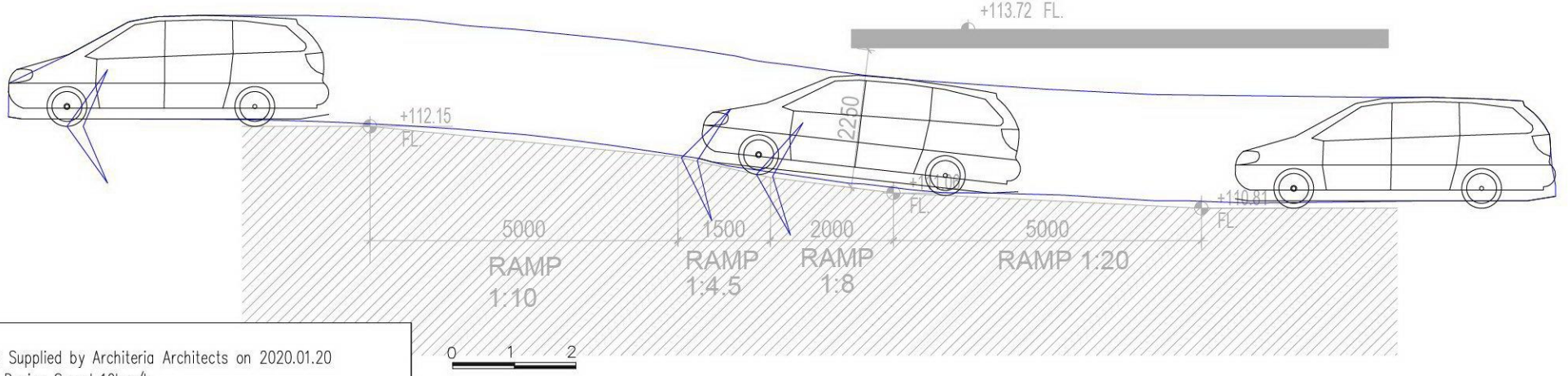
Overall Length	5.200m
Overall Width	1.940m
Overall Body Height	2.200m
Min Body Ground Clearance	0.120m
Track Width	1.840m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	8.000m

Proposed Residential Development
15-17 Marriott Parade, Glen Waverley
Vertical Clearance Assessment

RATIO REFERENCE	SHEET No.	SCALE	DATE
13397T-SK04/SD	8 of 9	1:100@A4	23/01/2020

D20-56049



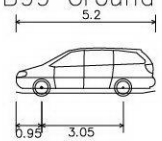


NOTE:
1) Base Plan Supplied by Architeria Architects on 2020.01.20
2) Maximum Design Speed 10km/h

ratio:

RATIO CONSULTANTS PTY LTD
ABN 005 422 104
8 GWYNNE STREET
CREMORNE, VICTORIA 3121
TELEPHONE (03)9429 3111
FACSIMILE (03)9429 3011

B99 Ground Clearance Model (AS/NZS2890.1:2004)



Overall Length	5.200m
Overall Width	1.940m
Min Body Ground Clearance	0.120m
Track Width	1.840m
Lock to Lock Time	4.00 sec
Curb to Curb Turning Radius	8.000m

Proposed Residential Development
15-17 Marriott Parade, Glen Waverley
Ground Clearance Assessment

RATIO REFERENCE	SHEET No.	SCALE	DATE
13397T-SK04/SD	9 of 9	1:100@A4	23/01/2020

Appendix D Bicycle Parking Specifications:

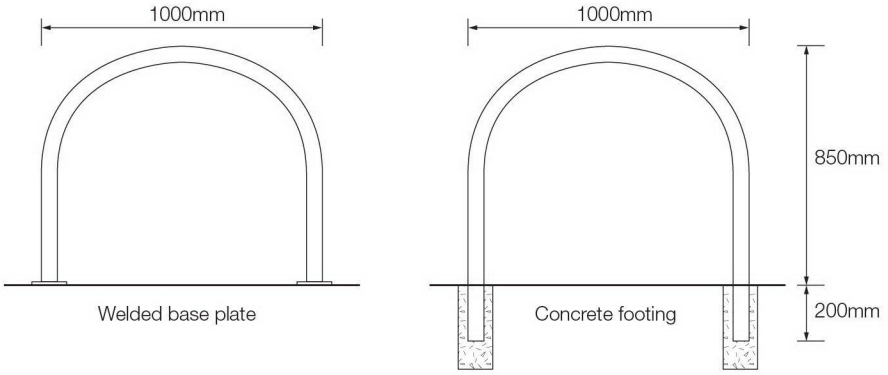
Arc de Triomphe™

Galvanised finish / Stainless Steel finish

Features

- Each rail supports two adult bikes in an upright position
- Can be either bolted to a concrete slab or concreted in situ
- Available in stainless steel or galvanised steel
- Provides the ability to lock both wheels and frame
- Suitable for foyers and entry areas

Dimensions



Specifications

Material options

- Galvanised (Duragal)
- 316 Marine grade stainless steel

Fixing options

- Welded flange - Bolt on
- In situ

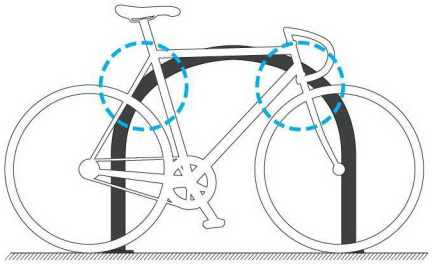
Recommended fasteners

- Galvanised Dynabolts (M10 x 65mm)
- Stainless Dynabolts (M10 x 65mm)
- Shear Nut security fasteners

Dimensions

1000mm [w] x 850mm [h]

Locking Points

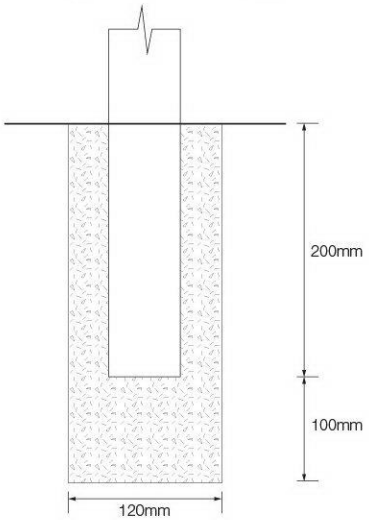


BICYCLE NETWORK BIKE PARKING

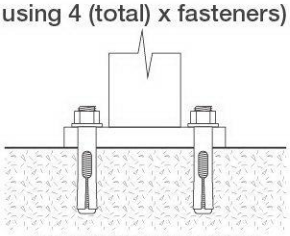
DESIGN. SUPPLY. INSTALL.
Bicycle Network ABN 41 026 835 903
p. 1300 727 563 e. parking@bicyclenetwork.com.au bikeparking.com.au
VIC Level 4, 246 Bourke Street, Melbourne VIC 3000 NSW 234 Crown Street, Darlinghurst NSW 2010
TAS 210 Collins Street, Hobart TAS 7000 NT Suite 5, 18-20 Cavenagh Street, Darwin 0800

Fixing options

In situ (Concrete footing)

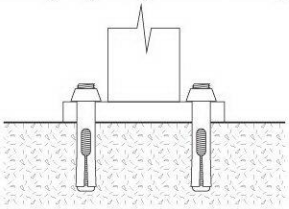


Welded flange (Bolt on)
using 4 (total) x fasteners)



Shown with M10 x 65mm fastener

Welded flange (Security heads)
using 4 (total) x fasteners)

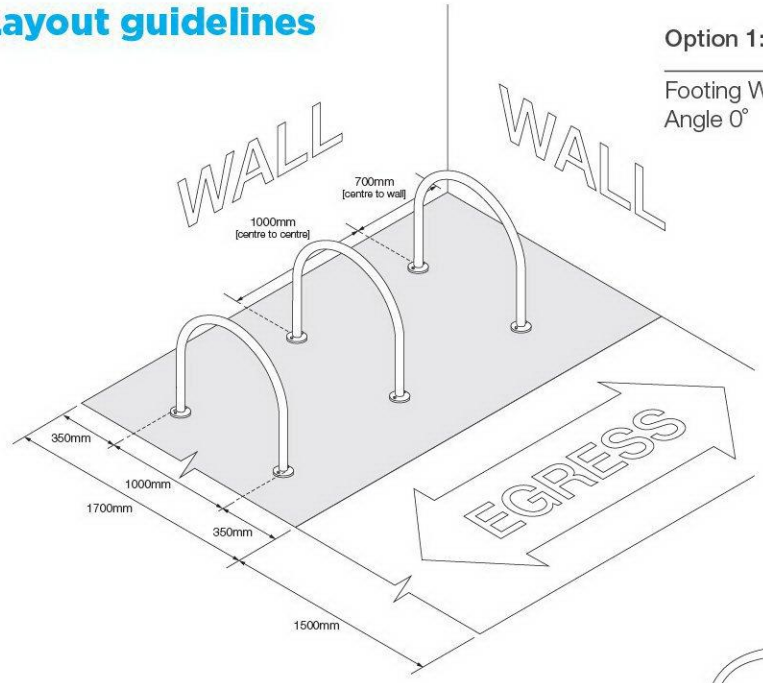


Shown with M10 x 65mm Shear Nuts

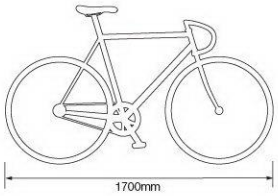
Layout guidelines

Option 1:

Footing Width 1700mm
Angle 0°

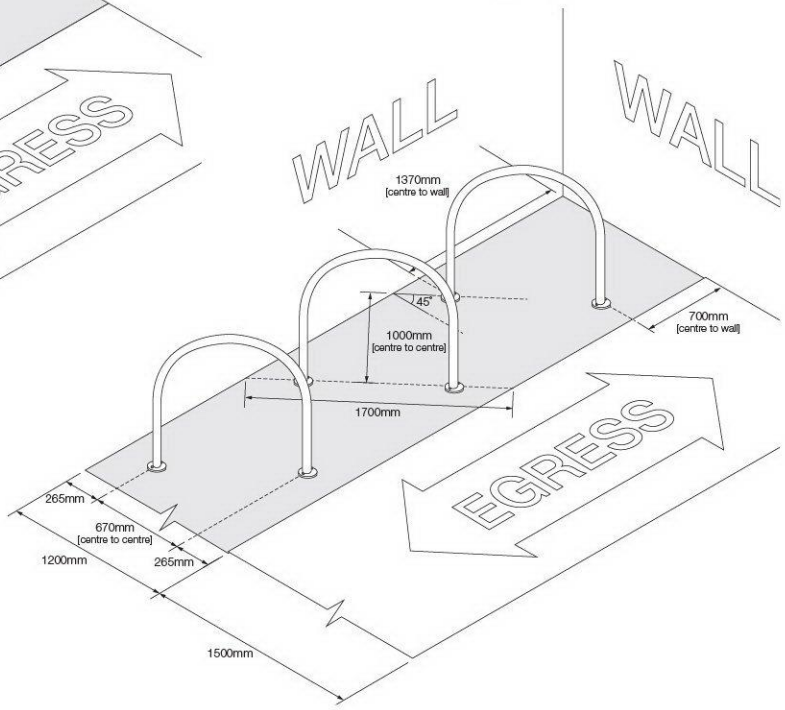


Typical Bicycle Length



Option 2:

Footing Width 1200mm
Angle 45°



BICYCLE NETWORK BIKE PARKING

DESIGN. SUPPLY. INSTALL.
Bicycle Network ABN 41 026 835 903
p. 1300 727 563 e. parking@bicyclenetwork.com.au bikeparking.com.au
VIC Level 4, 246 Bourke Street, Melbourne VIC 3000 NSW 234 Crown Street, Darlinghurst NSW 2010
TAS 210 Collins Street, Hobart TAS 7000 NT Suite 5, 18-20 Cavenagh Street, Darwin 0800