

Report Prepared for
The Applicant

ratio:

Proposed Child Care Centre

20 David Hill Road, Monbulk
App. No. YR-2022/452

28 September 2022

transport:report

r:

Date	Issue	Prepared By	Checked By
24/05/2022	Final	S. Lewis	C. Greenland
28/09/2022	Amended Final	S. Lewis	C. Greenland

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1 Introduction:

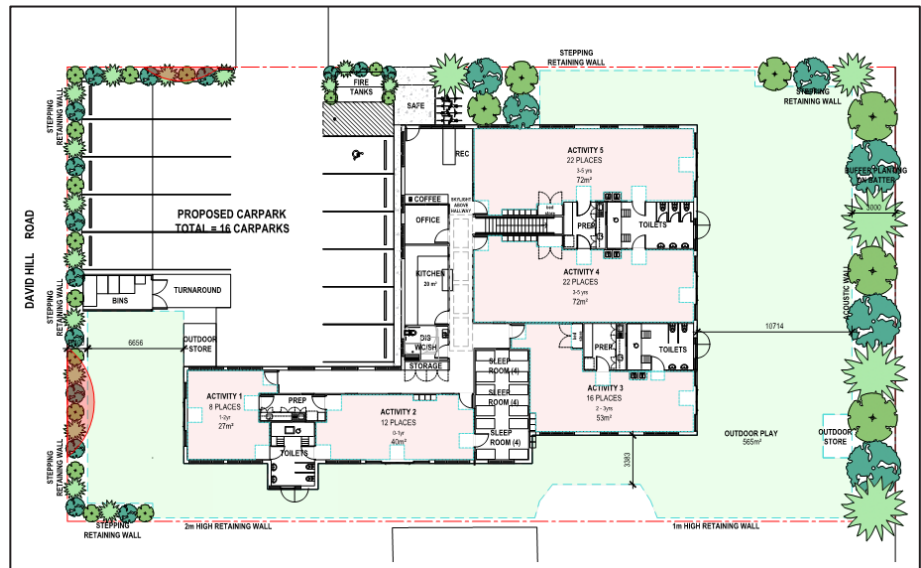
1.1 Introduction

Ratio Consultants was commissioned by The Applicant (the permit applicant) to assess the transport and parking implications of a proposed childcare centre on land located at 20 David Hill Road in Monbulk.

The proposal seeks to demolish the existing building on the subject site to construct a two-storey childcare centre to accommodate a maximum of 80 children, along with an associated on-site car parking area to cater for car and bicycle parking and waste facilities.

A broad overview plan of the site is provided in Figure 1.1 below.

Figure 1.1: Overview Plan



1.2 Planning History

The original version of this report (dated 24 May 2022) was included in the planning submission for the proposed development of the subject site.

Upon review the material, Council issued a Request for Further Information (RFI) letter (dated 23 June 2023). This updated version of the Traffic Impact Assessment report has been prepared to respond to the transport-related queries within Council's RFI letter (App. No. YR-2022/452) as follows:

"5. Amended Traffic Report or confirmation:

- a) *Specify the actual location of the signalised pedestrian crossing on David Hill Road that is referred to in the Transport Report by Ratio Consultants or confirmation it refers to an existing school crossing.*
- b) *The care and management of David Hill Road is Yarra Ranges Council not Department of Transport.*
- c) *Update details to reflect new vehicle crossing is proposed on Victoria Avenue.*
- d) *Confirm that, due to limited parking at the Primary School, the reverse multi-purpose trip is more likely whereby parents park at or near the childcare and walk to the school.*
- e) *Confirm that the staff parking does not remain consistent throughout the day as there are typically morning and afternoon shifts that have overlaps in the middle of the day to avoid long shifts for individual staff members.*

f) Provide a justification why the traffic distribution should not reflect higher volumes west to/from the major employment (and education) destinations.

6. Provide swept path assessment with single movement forward entry to tandem spaces that does not rely on unrealistic driver behaviour of stopping at a single point and turning wheels to/from near straight or full lock to near full lock while stationary for 2 or 4 seconds respectively.”

For reference, the locations within the updated Transport Impact Assessment Report that seek to address and respond to the above, are summarised in Table 1.1 below.

Table 1.1: Request for Information (RFI) and Relevant Response

No.	Request for Information Item	Response	Location
5a	Specify the actual location of the signalised pedestrian crossing on David Hill Road that is referred to in the Transport Report by Ratio Consultants or confirmation it refers to an existing school crossing.	Accepted	Page 7
5b	The care and management of David Hill Road is Yarra Ranges Council not Department of Transport.	Accepted	Page 10
5c	Update details to reflect new vehicle crossing is proposed on Victoria Avenue.	Accepted	Page 15
5d	Confirm that, due to limited parking at the Primary School, the reverse multi-purpose trip is more likely whereby parents park at or near the childcare and walk to the school.	Partially Accepted	Page 18
5e	Confirm that the staff parking does not remain consistent throughout the day as there are typically morning and afternoon shifts that have overlaps in the middle of the day to avoid long shifts for individual staff members.	Accepted	Page 18
5f	Provide a justification why the traffic distribution should not reflect higher volumes west to/from the major employment (and education) destinations.	Completed	Page 27
6	Provide swept path assessment with single movement forward entry to tandem spaces that does not rely on unrealistic driver behaviour of stopping at a single point and turning wheels to/from near straight or full lock to near full lock while stationary for 2 or 4 seconds respectively.	Contested	Page 23 Appendix C

Furthermore, other amendments have been provided within the site (since the original application) to respond to other (non-transport) matters raised.

1.3 Purpose & Structure of this Report

This report sets out an assessment of the anticipated parking, traffic and transport implications of the proposed development, including consideration of the:

1. Existing traffic conditions surrounding the site.
2. Parking demand likely to be generated by the proposed development.
3. Suitability of the proposed parking in terms of supply and layout.
4. Traffic generation characteristics of the proposed development.

5. Proposed access arrangements for the site.
6. Transport impact of the development proposal on the surrounding road network.

1.4 References

In preparing this report, reference has been made to the following:

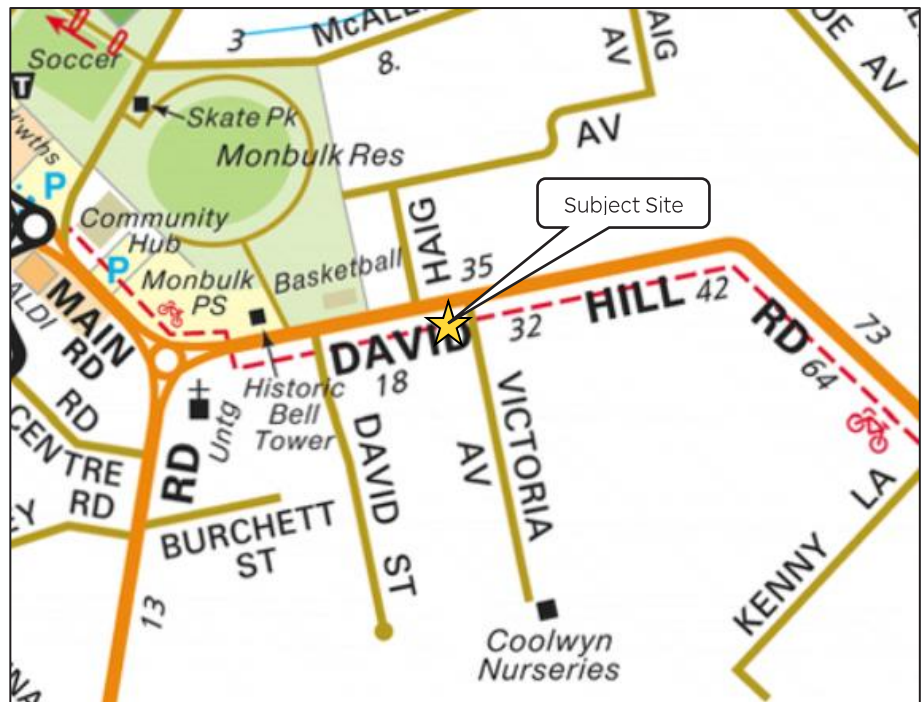
- Amended plans for the proposed development prepared by ON Architecture (Drawing No. SK06.1, dated April 2022), located within Appendix A of this report.
- Council's RFI letter (dated 23 June 2022).
- Yarra Ranges Planning Scheme.
- Australian/New Zealand Standard, Parking Facilities Part 1: Off-Street Car Parking (AS2890.1:2004).
- Australian Standard, Parking Facilities Part 2: Off-Street Commercial Vehicle Facilities (AS2890.1:2002).
- Australian/New Zealand Standard, Parking Facilities Part 6: Off-Street Parking for People with Disabilities (AS/NZS 2890.6:2009).
- Traffic surveys undertaken by Trans Traffic Surveys on Thursday 19/5/2022.
- A site visit to inspect the subject site and its surrounds.
- Other documents as nominated.

2 Existing Conditions:

2.1 Site Locality

The subject site is located at 20 David Hill Road in Monbulk. The location of the site relative to the surroundings is shown below in Figure 2.1.

Figure 2.1: Site Location



Source: www.melway.com.au

The site of approximately 1,813sqm consists of a single land parcel that is currently occupied by a single double-storey building. Road frontages are provided to both David Hill Road and Victoria Avenue, noting that David Hill Road is located within a Transport Zone 3 (TRZ3).

Additionally, the site falls within a Low-Density Residential Zone (LDRZ). The land is subject to Bushfire Management Overlay (BMO) and Significant Landscape Overlay – Schedule 22 (SLO22).

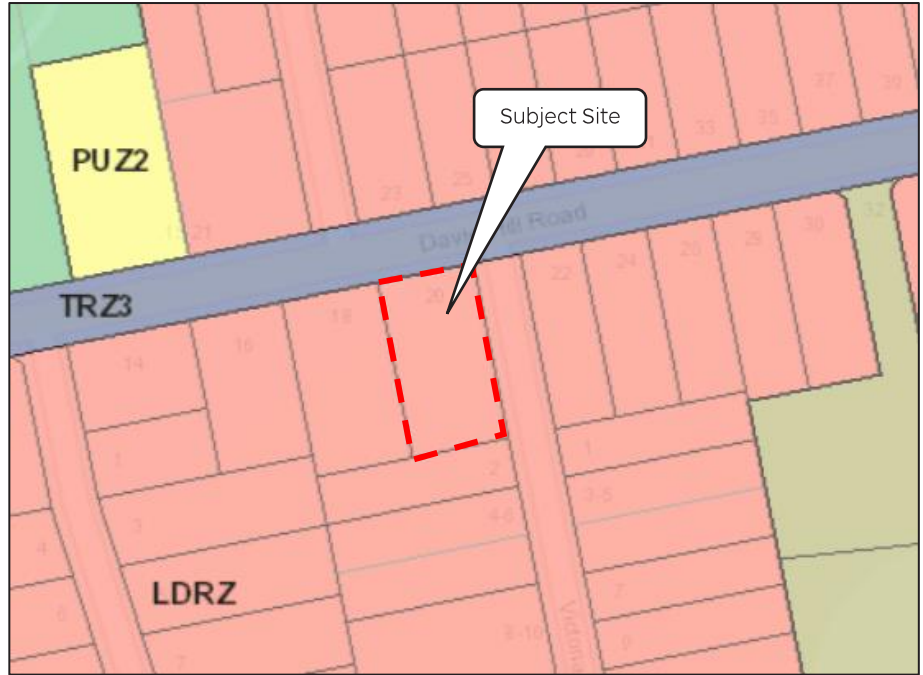
The subject site is bound by David Hill Road to the north, Victoria Avenue to the east, a residential property to the south and a residential property to the west.

A signalised pedestrian crossing is located approximately 180m to the west of the site on David Hill Road between the intersection with Moxhams Road and David Street. The signalised pedestrian crossing provides safe pedestrian connectivity to nearby properties in the northern side of David Hill Road.

It is also important to note that Monbulk Primary School is located within a short walking distance to the west of the site.

Figure 2.2 shows the location of the site and the surrounding Yarra Ranges Planning Scheme Zones.

Figure 2.2 Planning Scheme Zones



Source: Planning Maps Online

An aerial view of the subject site and the surrounding road network is presented in Figure 2.3 below.

Figure 2.3: Aerial View of the Subject Site and the Surrounding Road Network



2.2 Road Network

Adjoining Roads

Victoria Avenue functions as a local road (Council controlled). It is a two-way road generally aligned in a north-south direction from David Hill Road to the north and prior to termination to the south.

Within the vicinity of the site, it has a carriageway width of approximately 7.4 metres, accommodating one lane of traffic in each direction.

Victoria Avenue operates at a default speed limit of 50km/hr and footpaths have been provided on both sides of the road.

Victoria Avenue carries approximately 250 vehicles per day¹ and is shown in Figure 2.4 and Figure 2.5.

Figure 2.4: Victoria Avenue (Looking South)



Figure 2.5: Victoria Avenue (Looking North)



David Hill Road is classified as a Significant Municipal Road (Transport Zone 3) under the care and management of Council.

David Hill Road extends in a northeast-southwest direction between Monbulk to the west and Emerald-Monbulk Road to the east.

David Hill Road accommodates one traffic lane in each direction, contains a pedestrian path on both sides of the road and a signalised pedestrian crossing in the vicinity of the site.

¹ Based on peak hour traffic counts undertaken in May 2022 and assuming a peak-to-daily ratio of 10% for local roads.

David Hill Road has a posted speed limit of 50 km/hr in the vicinity of the site.

David Hill Road carries approximately 6,200 vehicles per day² and is shown in Figure 2.6 and Figure 2.7.

Figure 2.6: David Hill Road (Looking West)



Figure 2.7: David Hill Road (Looking East)



Surrounding Intersections

Key intersections within the vicinity of the site include:

- Victoria Avenue / David Hill Road (unsignalised T-intersection).
- Haig Avenue / David Hill Road (unsignalised T-intersection).

2.3 Sustainable Transport

Public Transport

The subject site has convenient access to the public transport network with two bus services operating within close proximity of the subject site.

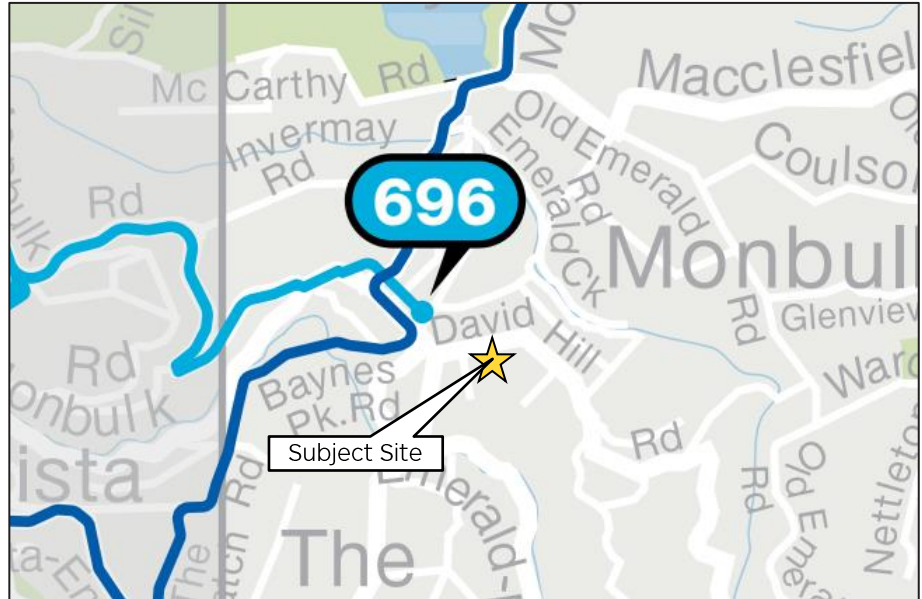
² Based on peak hour traffic counts undertaken in May 2022 and assuming a peak-to-daily ratio of 8% for arterial roads.

The public transport services operating in the vicinity of the subject site are summarised in Table 2.1 and presented in Figure 2.8.

Table 2.1: Bus Services in the vicinity of the Subject Site

Route No	Route Description	Nearest Stop	Walking Distance
663	Belgrave – Lilydale	Main Road	450 metres
696	Olinda - Monbulk		

Figure 2.8: Public Transport Services in the vicinity of the Subject Site



Bicycle Network

The site also has good access to bicycle facilities that help facilitate cycling to/from the subject site.

Pedestrian Facilities

The subject site enjoys a connected pedestrian network, with the majority of streets in the local area having sealed footpaths and street lighting.

Pedestrians are well facilitated with footpaths provided along both sides of David Hill Road and Victoria Avenue.

A signalised pedestrian crossing is provided on David Hill Road to provide a safe crossing facility for pedestrians.

Footpaths are provided on the link between the subject site and surrounding public transport services.

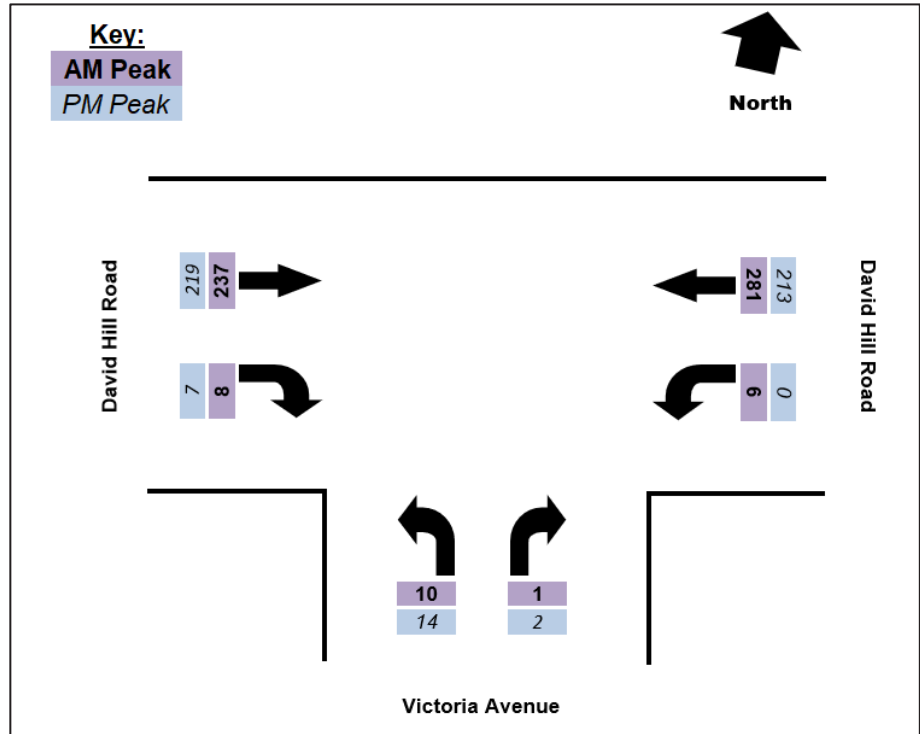
2.4 Traffic Conditions

In order to determine the current traffic conditions in the vicinity of the subject site, Ratio Consultants commissioned turning movement surveys at the David Hill Road / Victoria Avenue intersection.

The survey was conducted on Thursday 19 May 2022 between 7:00 am-10:00 am and between 3:00pm-6:00pm.

The peak hour turning movements for the intersections are shown in Figure 2.9, with detailed results presented in Appendix B.

Figure 2.9: Peak Hour Turning Movement Volumes



2.5 Existing Intersection Operation

General

An existing conditions peak hour intersection analysis has been undertaken of the David Hill Road / Victoria Avenue intersection, using the analysis program SIDRA Intersection.

SIDRA Parameters

The key parameters used to determine the operational capacity of an intersection are queue length, average delay and degree of saturation (or volume to capacity ratio).

Degree of Saturation (DOS) is a ratio of arrival (or demand) flow to capacity. DOS above 1.0 represent oversaturated conditions and a DOS below 1.0 represent undersaturated conditions.

The operational rating associated with the DOS is summarised in Table 2.2.

Table 2.2: Ratings of Degree of Saturation

Degree of Saturation (DOS)	Rating
Up to 0.6	Excellent
0.61 – 0.70	Very Good
0.71 – 0.80	Good
0.81 – 0.90	Fair
0.91 – 1.00	Poor
Greater than 1.00	Very poor

Although operating conditions with a degree of saturation around 1.00 are undesirable, it is acknowledged that this level of congestion is typical of many metropolitan intersections during the AM and PM peak hours.

The 95th percentile queue length is the value below which 95 percent of all observed cycle queue lengths fall, or 5 percent of all observed queue lengths exceed.

Average Delay is the average time, in seconds, that all vehicles making a particular movement can expect to wait at an intersection.

David Hill Road / Victoria Avenue

The results of the existing AM and PM peak hour SIDRA analysis are detailed in Appendix C and summarised in Table 2.3 and Table 2.4.

Table 2.3: Existing AM Peak SIDRA – David Hill Road / Victoria Avenue

Approach	Movement	AM Peak		
		DoS	95%ile Queue (m)	Avg Delay (s)
Victoria Avenue	Left	0.01	1	9
	Right	0.01	1	10
David Hill Road (E)	Left	0.16	0	6
	Through	0.16	0	0
David Hill Road (W)	Through	0.13	1	1
	Right	0.13	1	7
Intersection		0.16		

Table 2.4: Existing PM Peak SIDRA – David Hill Road / Victoria Avenue

Approach	Movement	PM Peak		
		DoS	95%ile Queue (m)	Avg Delay (s)
Victoria Avenue	Left	0.02	1	9
	Right	0.02	1	10
David Hill Road (E)	Left	0.12	0	6
	Through	0.12	0	0
David Hill Road (W)	Through	0.12	1	0
	Right	0.12	1	6
Intersection		0.12		

As shown in the preceding tables, the David Hill Road / Victoria Avenue intersection is currently operating with 'Excellent' conditions during the AM peak hour and PM Peak hour, indicating that there are minimal queues and delays during either peak hour at this intersection.

The above conclusions are consistent with on-site observations that showed no noticeable queuing or delay issues for motorists.



3.1 General

It is proposed to demolish the existing building on the subject site to construct a two-storey childcare centre to accommodate a maximum of 80 children, along with an associated on-site car parking area to cater for car and bicycle parking and waste facilities.

The operating hours are proposed to be between 6:30am-6:30pm.

More specifically, the development will incorporate the following land use yield and associate transport infrastructure, as summarised in Table 3.1.

Table 3.1: Development Schedule

Land Use		
Land Use Classification	Size/No.	
Childcare Centre	80 children	
Transport Infrastructure		
Type	Description	Size/No.
Pedestrian Access	Along Eastern Boundary	-
Vehicle Access	Victoria Avenue	Fully Directional
Parking	Car Spaces	16 Spaces [1]
	Bicycle Spaces	4 Spaces
Loading	Loading and Waste	Trucks up ~6.4m long

[1] Including 5 standard car parking spaces, 10 tandem car parking spaces and one DDA space.

It is proposed to provide 16 on-site car parking spaces, including one DDA compliant parking space.

Furthermore, a turnaround bay is proposed to be provided to the rear (west) of the car park to provide vehicles with an ability to turnaround on the unlikely scenario that all on-site car parking spaces are occupied.

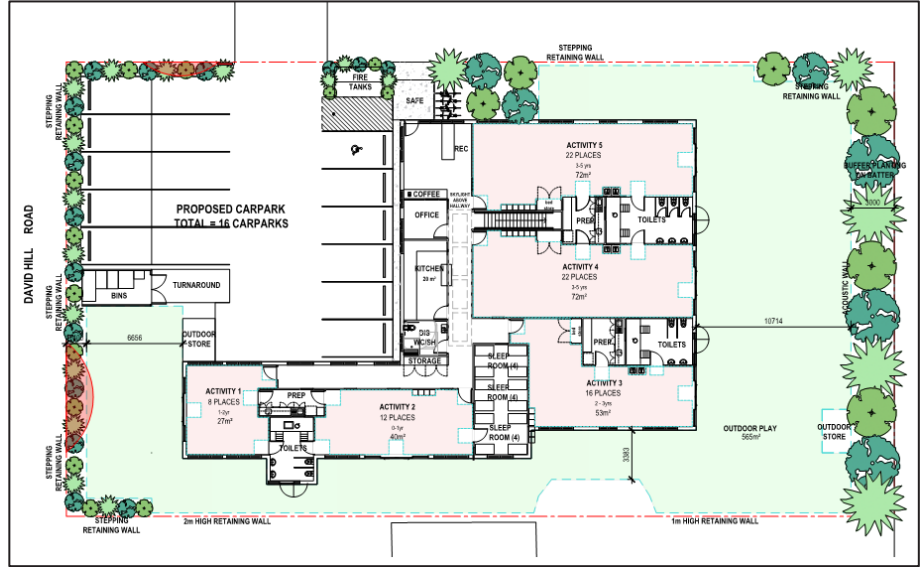
Vehicle access to the development will be via a new vehicle crossover along the eastern boundary of the site to Victoria Avenue. It should also be noted that no vehicle access is proposed via David Hill Road.

Pedestrian access to the subject site will be provided directly from Victoria Avenue.

The proposed development will also include a total of four on-site bicycle parking spaces located within the car parking area.

For reference, the proposed site layout is shown in Figure 3.1.

Figure 3.1: Proposed Site Layout



4.1 Car Parking Provision

Statutory Car Parking Requirements

Parking requirements for a range of uses are set out under Clause 52.06 of the Yarra Ranges Planning Scheme. Table 1 of Clause 52.06 sets out the car parking requirement that applies to a use listed in the Table.

Of relevance, Clause 52.06-5 states that:

“A car parking requirement in Table 1 is calculated by multiplying the figure in Column A or Column B (which ever applies) by the measure in Column C.

Column A applies unless Column B applies.

Column B applies if:

- *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 or another provision of the Planning Scheme specifies that Column B applies.”*

Additionally, the car parking requirement specified for a use listed in Table 1 does not apply if:

- *“A car parking requirement for the use is specified under another provision of the Planning Scheme: or*
- *A schedule to the Parking Overlay specifies the number of car parking spaces required for the use.”*

The subject site is not located within the PPTN area and is not subject to a car parking overlay. In this regard, the Column A rates outlined in Table 1 of Clause 52.06-5 applies.

Table 4.1: Statutory Car Parking Requirements

Use	Size/Number	Column A Rates	Car Parking Requirement
Child Care Centre	80 children	0.22 spaces to each child	17 spaces

A review of Table 4.1 indicates that the proposed development has a statutory requirement to provide a total of 17 on-site car parking spaces in accordance with the Yarra Ranges Planning Scheme.

The proposed development includes 16 on-site car parking spaces.

In this instance, the statutory car parking requirement is not being met and a Planning Permit is being sought to reduce this requirement.

An assessment of the expected parking demand and the appropriateness of allowing a reduction of on-site parking for the proposed development is discussed below.

4.2 Car Parking Demand Assessment

In accordance with Clause 52.06-6, an assessment of car parking demand likely to be generated by the use must have regard to the following factors, considered relevant to the proposal.

- *“The likelihood of multi-purpose trips within the locality which are likely to be combined with a trip to the land in connection with the proposed use.*
- *The variation of car parking demand likely to be generated by the proposed use over time.*
- *The short-stay and long-stay car parking demand likely to be generated by the proposed use.*
- *The availability of public transport in the locality of the land.*
- *The convenience of pedestrian and cyclist access to the land.*
- *The anticipated car ownership rates of likely or proposed visitors to or occupants (residents or employees) of the land.*
- *Any empirical assessment or case study.”*

An assessment of the projected car parking demand for the proposed development, accounting for these factors is discussed as follows.

The Likelihood of Multi-Purpose Trips within the Locality

As discussed in Practice Note 22 – Using the Car Parking Provisions, in some situations a trip will serve more than one function, and this will tend to reduce an accumulative need for car parking.

Given the location of the subject site, in close proximity to Monbulk Primary School, it is highly likely for a number of children attending the proposed childcare centre to be derived from existing families of Monbulk Primary School and have older brothers / sisters who will attend the adjacent Primary School.

It is anticipated that a number of parents, following dropping-off their older child/children at Monbulk Primary School, will utilise the pedestrian facilities to walk to the subject site and drop-off their younger child/children without the need to park their vehicle within the car park of the subject site. There are also potentially instances whereby parents may use the childcare centre to park their vehicle and walk to the school.

The Variation of Car Parking Demand Over Time

Car parking demands for childcare centres typically peak for short periods of time on weekdays, coinciding with set-down periods and afternoon pick-up.

It is noted that in respect to staff car parking, typically morning and afternoon shifts have overlaps in the middle of the day to avoid long shifts for individual staff members. At this time the visitor demand is typically very low and as such, the staff changeover can be readily accommodated on-site.

The Availability of Public Transport in the Locality of the Land

The subject site is located within convenient walking distance to a number of bus services, as discussed in Section 2.

Accordingly, the range of public transport opportunities are expected to be utilised by some parents, carers and staff of the proposed development.

Providing less car parking spaces on site can encourage parents, carers and staff to utilise the sustainable transport options that are available to them and minimise the overall congestion on the road network in the vicinity of the site.

The Convenience of Pedestrians and Cyclist Access to the Land

Pedestrian footpaths are provided on both sides of the frontage roads, facilitating connections to the broader precinct and land uses in the surrounding area.

Indeed, the provision of safe pedestrian crossing facilities via the signalised crossing on David Hill Road, as well as the pathways between the school and nearby residences, it is evident that there walking and cycling represent convenient transport options for the local community.

The Provision of Bicycle Parking and End of Trip Facilities for Cyclists

The proposal includes a provision of four (4) bicycle spaces within horizontal bicycle rails.

A generous provision of bicycle parking (that exceed the typical bicycle parking demands) and end of trip facilities are proposed to be provided on the site.

These facilities provide an active and viable means of alternative transport that is expected to reduce future reliance on private motor vehicles.

Empirical Assessment

Guidance on the anticipated car parking characteristics of the proposal can be established from various sources.

In this instance, guidance is sought via empirical data of similar childcare centres in Melbourne, along with a case study for childcare centres in Croydon, which is considered to be reflective of the site given the close proximity to Monbulk.

The data is summarised in Table 4.2 with a full list of surrounding sites is provided in Appendix D of this report.

Table 4.2: Typical Childcare Centre Peak Parking Rates

Source	Peak Parking Rate
Other Surveys*	0.19 parking spaces per child
Case Study (Croydon)	0.18 parking spaces per child

**Average peak parking rate based on surveys of 13 childcare centres throughout Metropolitan Melbourne undertaken by various traffic consultancies*

On the basis of the above data, a design rate of 0.19 spaces per child has been adopted for the proposed development to provide for a conservative assessment on the high side despite the proposed development being located in close proximity to Monbulk Primary School.

Application of this rate to the proposed 80 places indicates a peak parking demand of 15 spaces could be expected.

In this instance, the proposed on-site provision of 16 car spaces is anticipated to meet the peak car parking demand and is therefore considered suitable.

4.3 Adequacy of the Parking Provision

Based on the assessment undertaken above, it is evident that the on-site provision of 16 parking spaces would be capable of accommodating the peak parking demand of 15 spaces likely to be generated by the development.

4.4 Parking for People with Disabilities

The Building Code of Australia (BCA) requires car parking for disabilities for this land use at a rate of *“1 Space for every 50 carparking spaces or part thereof”*.

In this instance, the one on-site disabled car parking space meets the BCA requirements and is considered satisfactory.

5.1 Clause 52.06 – Design Standard Assessment

The proposed vehicular access arrangements and car park layout have been designed in accordance with the objectives and design requirements of Clause 52.06-9 of the Yarra Ranges Planning Scheme, and in accordance with the relevant sections of AS/NZS 2890.1:2004.

An assessment against the relevant design standards of Clause 52.06-9 of the Planning Scheme is provided below:

Design Standard 1 – Accessways

Vehicular access to the on-site car park is proposed via a 6.4-metre-wide double width vehicle crossover located at the eastern boundary of the subject site along Victoria Avenue.

Design Standard 1 of Clause 52.06-9 relates to the design of accessways. The requirements of Design Standard 1 are assessed against the proposal in Table 5.1 below.

Table 5.1: Design Standard 1 Assessment - Accessways

Requirement	Comments
Must be at least 3m wide.	<u>Satisfied:</u> The accessway within the site has been designed to have a minimum width to accommodate simultaneous two-way movements at all locations.
Have an internal radius of at least 4m at changes of direction or intersection or be at least 4.2m wide.	<u>Satisfied:</u> The accessway and internal layout have been designed to be at least 4.2m wide at all changes 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.	<u>Satisfied:</u> The swept path assessment (refer to Appendix E) confirms that vehicles parked in the end spaces can exit in a forward direction in one manoeuvre.
Provide at least 2.1m headroom beneath overhead obstructions, calculated for a vehicle with a wheel base of 2.8m.	<u>Satisfied:</u> A minimum headroom clearance of at least 2.1 metres has been maintained throughout the car park.
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.	<u>Satisfied:</u> All vehicles are able to exit the site in a forward direction.
Provide a passing area at the entrance at least 5m 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.	<u>Satisfied:</u> The accessway at the entrance of the site has been designed to enable for simultaneous two-way vehicle movements to/from the site and accordingly complies with the requirement to provide a passing area.
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 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.	<u>Satisfied:</u> Pedestrian sight triangles are provided on both sides of the vehicle exit point onto Victoria Avenue, in accordance with the requirements of the Yarra Ranges Planning Scheme.

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.	<u>N/A</u> : Car spaces are not accessed directly to/from a road in a Road Zone.
If entry to the car space is from a road, the width of the accessway may include the road.	<u>N/A</u> : Entry to the car spaces is not accessed directly from a road.

Design Standard 2 - Car Parking Spaces

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 5.2 below.

Table 5.2: 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.	<u>Satisfied</u> : All standard car parking spaces meet the dimensional requirements set out in Table 2 of Design Standard 2. The accessible space meets the dimensional requirements of AS2890.6:2009.
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.	<u>Satisfied</u> : The car parking spaces have been designed to accord with Diagram 1 of Design Standard 2.
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.	<u>N/A</u> : No garage car parking spaces are proposed.
Where parking spaces are provided in tandem (one space behind the other) an additional 500mm in length must be provided between each space.	<u>Satisfied</u> : The six pairs of tandem car parking spaces are provided with the additional 500mm length provided between each space.
Where two or more car parking spaces are provided for a dwelling, at least one space must be under cover.	<u>N/A</u> : No dwellings are proposed as part of the development.
Disabled car parking spaces must be designed in accordance with Australian Standard AS2890.6-2009 (disabled) and the Building Code of Australia. Disabled car parking spaces may encroach into an accessway width specified in Table 2 of Design Standard 2 by 500mm.	<u>Satisfied</u> : All standard car parking spaces meet the dimensional requirements set out in Table 2 of Design Standard 2. The accessible space meets the dimensional requirements of AS2890.6:2009.

5.2 Swept Path Assessment

Site Access

An assessment of the accessibility to/from the site using the 'Autodesk Vehicle Tracking' software has been conducted. The swept path demonstrated that two opposing B99 design vehicles (99.8th percentile car), could pass adequately simultaneously at the site access point to Victoria Avenue.

Further, all vehicles will be able to enter / exit the site in a forward direction.

Car Parking Spaces

An assessment of the accessibility to/from the critical parking bays was also undertaken using the B85 design vehicle (85th percentile car) and it was found that each of the critical parking space could be accessed (ingress and egress) in a satisfactory manner.

A number of spaces may require corrective manoeuvres on entry, however, this is expressly permitted within AS/NZS2890.1:2004 (Table 1.1) for permanent users, recognising private car parks typically generate a low turnover and users are generally prepared to accept some inconvenience when entering or leaving a parking space.

In respect to the tandem car parking space access, a three-point turn is allowable based on the Australian Standards for staff car parking requirements.

Within consideration to the preceding, the layout of the car parking spaces are considered to provide convenient and functional car parking opportunities.

Summary

The assessment indicates that the access arrangements and car parking layout have been designed appropriately and in accordance with the requirements of the Yarra Ranges Planning Scheme and/or AS2890.1:2004.

The swept path assessment has been provided within Appendix E of this report.

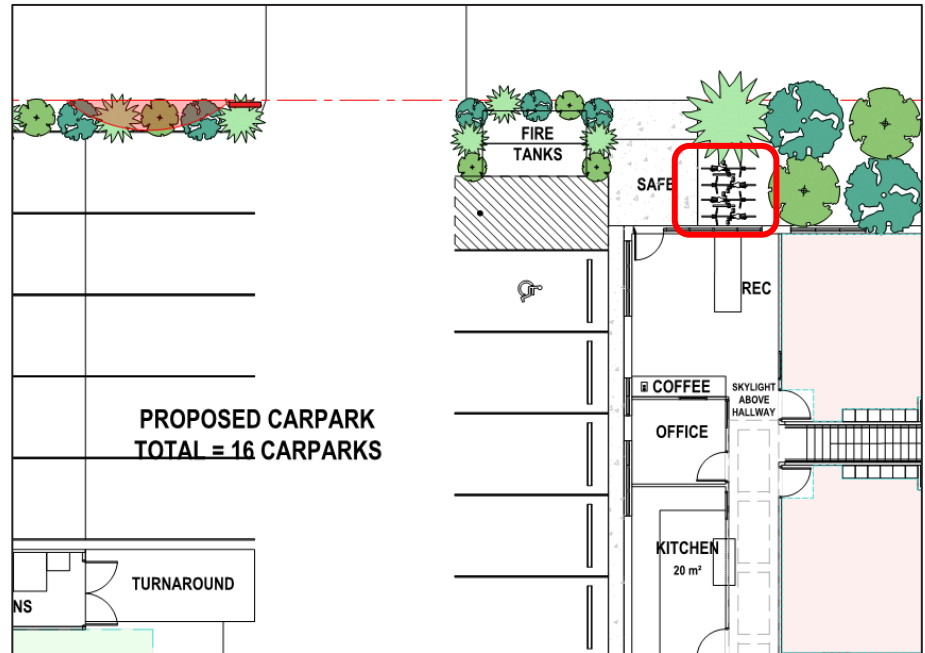
6.1 Clause 52.34 – Bicycle Facilities

Clause 52.34 of the Yarra Ranges Planning Scheme (Bicycle Facilities) does not specify statutory bicycle parking requirements for childcare centre land uses.

Notwithstanding, it is proposed to provide a total of four (4) bicycle parking spaces in order to promote sustainable transport initiatives associated with the development.

The bicycle parking spaces are located within the car parking area, as shown below in the excerpt within Figure 6.1.

Figure 6.1: On-Site Bicycle Parking Spaces



Given the nature of the proposed use, the provision of four (4) on-site bicycle parking spaces is considered adequate to cater for any staff or parent / carer bicycle parking demand and assists with promoting sustainable transport options for the site in lieu of the motor vehicle.

6.2 Bicycle Parking Layout

The bicycle parking layout has been designed in excess of AS 2890.3:2015 - Bicycle Parking, which requires at least 20% of the bicycle parking spaces to be provided in a ground level (horizontal) Bicycle Parking Devices.

All horizontal rails are provided within parking modules that are 1.8m x 0.5m, accessed via 1.5m aisles, conveniently located throughout the site.

Accordingly, it is considered that the bicycle parking has been designed appropriately and in accordance with the relevant sections of AS2890.3:2015.

7 Loading Arrangements:

7.1 Statutory Requirement

Clause 65.01 'Decision Guidelines' of the Yarra Ranges Planning Scheme outlines the provision of loading requirements, and states the following:

"Before deciding on an application or approval of a plan, the responsible authority must consider, as appropriate:

- *The adequacy of loading and unloading facilities and any associated amenity, traffic flow and road safety impacts."*

7.2 Loading and Waste Arrangements

Loading and unloading activities associated with the proposed development will be limited.

Loading activities associated with the development can be undertaken by vans / small trucks. It is anticipated that these can occur appropriately along within a car space outside of peak times.

Waste collection is proposed to be collected on-site by a private waste collector. Details in respect to waste management are provided in Ratio's Waste Management Plan, prepared for the proposed development.

A swept path assessment (Appendix E) was conducted and demonstrated that a mini-rear loader truck can access the site in a forward direction, manoeuvre through the site to the bin room and depart in a forward direction (subject to collection after hours to ensure the adjacent car parking space is free).

Having regard to the above, the loading and waste management outcomes are considered satisfactory.

8.1 Traffic Generation

The *RTA Guide to Traffic Generating Developments* (October 2002) document indicates a peak hourly traffic demand of between 0.7 to 0.8 vehicle trips per child in the AM and PM peak hours.

Additionally, a cross-check has been undertaken with an empirical data source. In this respect, a survey conducted by Ratio Consultants at the existing 'Ariston' childcare centre in Newtown (Geelong) confirms that childcare centres typically generate a peak hourly traffic demand in the order of 0.8 vehicle trips per child during the peak hours.

The childcare centre study also indicated that the peak traffic generation AM and PM hours of childcare centres typically occurs between 8:00am to 9:00am and between 4:45pm and 5:45pm.

Applying a rate of 0.8 vehicle trips per child, the proposed 80-place childcare centre is anticipated to generate approximately 64 vehicle movements (combined for staff & visitors of the childcare centre).

It is also expected that all staff trips will be arrivals in the morning peak and departures in the afternoon peak, whilst parent/carer trips will be evenly split between inbound and outbound during both the morning and afternoon peak hours.

As such, it is expected that the 6 spaces allocated to staff during AM and PM peak times will generate 6 arrivals and 6 departures during the AM and PM peak hours respectively, the remaining 58 anticipated vehicle movements will be evenly split between inbound / outbound movements.

The above traffic generation estimates are considered to be conservative given the pedestrian facilities both on the site and external connections and on-site bicycle parking spaces for the local community.

The resultant anticipated traffic generation associated with the proposal is summarised in Table 8.1.

Table 8.1: Child Care Centre Traffic Generation

	AM Peak	PM Peak
Arriving Trips	35 vph (Including 6 staff)	29 vph
Departing Trips	29 vph	35 vph (Including 6 staff)
Total Trips	64 vph	64 vph

8.2 Traffic Distribution

The majority of traffic generated by childcare centres at peak times is primarily associated with parents dropping off and collecting children before and after work, with the turnover of this activity is typically short.

For the purposes of a conservative assessment, all trips associated with the subject site have been distributed to the David Hill Road / Victoria Avenue intersection.

On that basis, the proposed development is anticipated to generate an additional 64 vehicle movements at the David Hill Road / Victoria Avenue intersection during the AM and PM peak hours.

For the David Hill Road / Victoria Avenue intersection, it is assumed that 50% of trips associated with the subject site will be to/from the west and 50% of trips are assumed to be to/from the east.

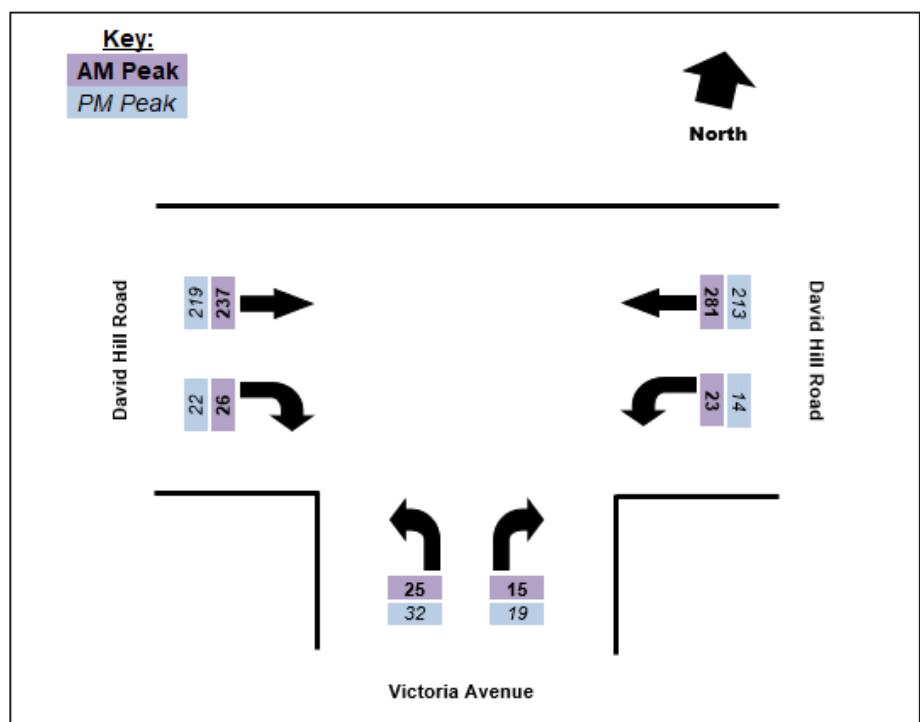
The above assumed distribution reflects the existing traffic flows observed within the traffic survey conducted on Thursday 19 May 2022 between 7:00 am-10:00 am and between 3:00pm-6:00pm.

The AM peak hour distribution identified a 45.8% distribution to the east and a 54.2% distribution to the west. The PM peak hour distribution identified a 50.7% distribution to the east and a 49.3% distribution to the west.

Accordingly, the adopted 50% / 50% distribution is considered to be appropriate.

The resultant anticipated post development peak hour traffic volumes at the David Hill Road / Victoria Avenue intersection are shown in Figure 8.1.

Figure 8.1: Post Development Peak Hour Traffic Volumes



8.3 Intersection Analysis

David Hill Road / Victoria Avenue

The results for the post development peak hour intersection analysis for the David Hill Road / Victoria Avenue intersection are summarised in Table 8.2 and Table 8.3, with full results provided in Appendix F of this report.

Table 8.2: Future AM Peak SIDRA – David Hill Road / Victoria Avenue

Approach	Movement	AM Peak		
		DoS	95%ile Queue (m)	Avg Delay (s)
Victoria Avenue	Left	0.05	2	9
	Right	0.05	2	11
David Hill Road (E)	Left	0.17	0	6
	Through	0.17	0	0
David Hill Road (W)	Through	0.15	2	1
	Right	0.15	2	7
Intersection		0.17		

Table 8.3: Future PM Peak SIDRA – David Hill Road / Victoria Avenue

Approach	Movement	PM Peak		
		DoS	95%ile Queue (m)	Avg Delay (s)
Victoria Avenue	Left	0.06	2	9
	Right	0.06	2	10
David Hill Road (E)	Left	0.12	0	6
	Through	0.12	0	0
David Hill Road (W)	Through	0.14	2	1
	Right	0.14	2	6
Intersection		0.14		

Based on the above, the David Hill Road / Victoria Avenue intersection is expected to continue to operate within 'Excellent' conditions in the AM peak and PM peak, with minimal increases to queues and delays projected.

The preceding analysis indicates that the proposed development will have a negligible impact on the existing conditions of the David Hill Road / Victoria Avenue intersection.

Summary

The proposed access arrangements from the subject site to the adjacent local road network are considered appropriate, noting no access is proposed via David Hill Road (TRZ3).

Having regard to the above analysis and discussion, against the existing traffic volumes in the vicinity of the site, the additional traffic generated by the proposed development could not be expected to compromise the safety and function of the surrounding road network.

9 Conclusion:

Based on the analysis and discussion presented within this report, the following conclusions are made:

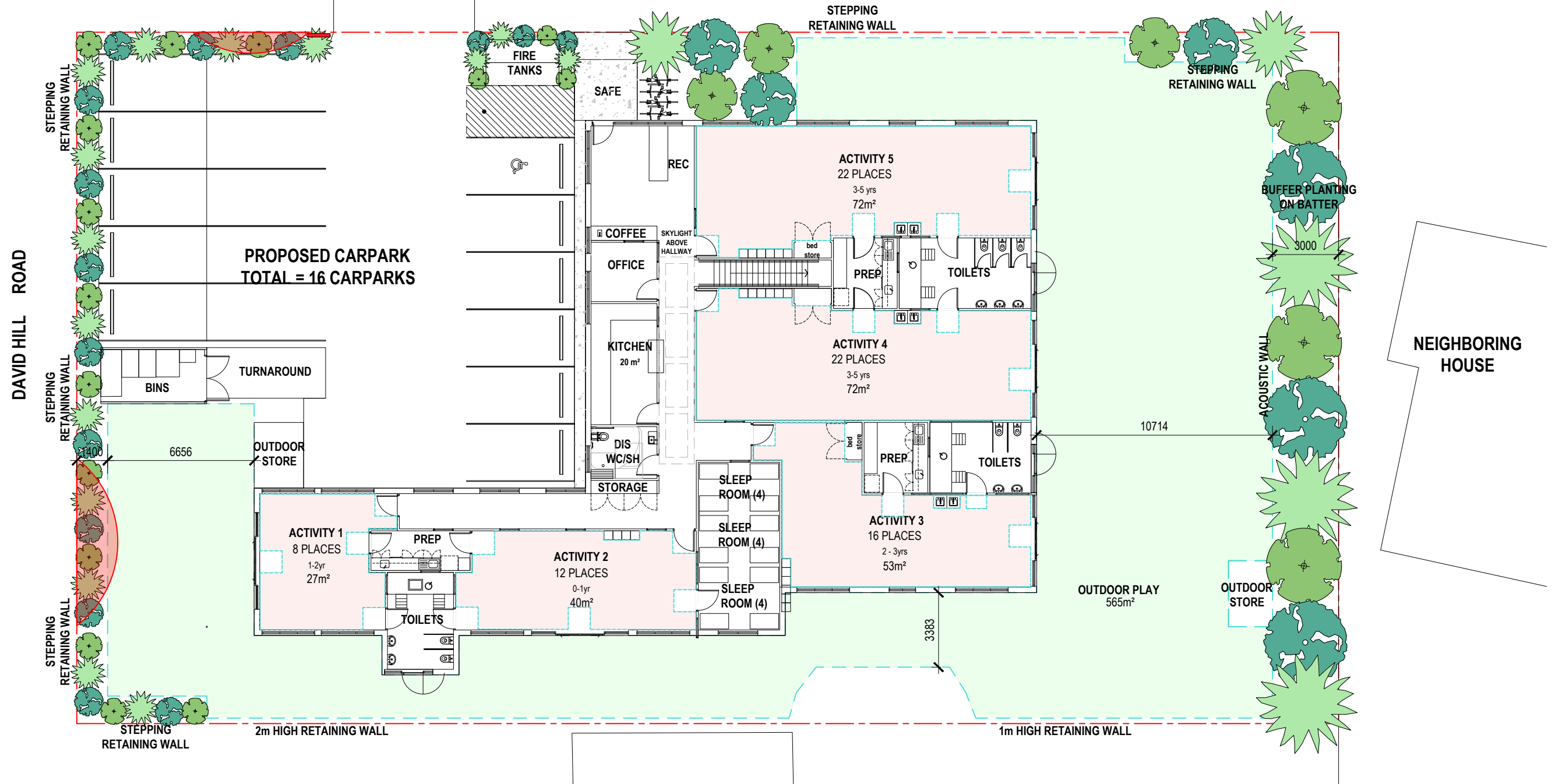
- The proposed development generates a statutory car parking requirement of 17 car parking spaces.
- The proposed provision of 16 on-site car parking spaces is considered satisfactory for the reasons detailed in this report.
- The proposed development does not trigger a statutory requirement for bicycle parking provision for the childcare centre land use. Nevertheless, a total of four bicycle parking spaces are proposed to be provided which is considered satisfactory.
- The proposed access arrangements, car/bicycle parking layout have been designed in accordance with the dimensional requirements of Clause 52.06 of the Yarra Ranges Planning Scheme and/or the relevant sections of the Australian Standard AS2890 series.
- The proposed development is expected to generate up to 64 vehicles in any peak hour.
- The level of traffic generated by the proposed development can be accommodated by the adjacent road network without creating adverse traffic safety or capacity impacts.

Overall, the proposed development has been suitably designed and is not expected to create adverse traffic or parking impacts in the vicinity of the site.



Appendix A Amended Development Plans

SITE DATA		ACTIVITY AREA SCHEDULE									OUTDOOR PLAY AREA SCHEDULE					
SITE AREA	1798sqm	ROOM	PLACES	AGE	STAFF RATIO	STAFF No.	AREA REQ	UNENCUMBERED AREA	ENCUMBERED AREA	TOTAL AREA PROVIDED	ROOMS	PLACES	AREA REQ	UNENCUMBERED AREA	ENCUMBERED AREA	TOTAL AREA PROVIDED
BUILDING AREAS (GFA)	564sqm	ROOM 1	8	0-2	1:4	2	26	27sqm	8sqm	35sqm	ROOM 1	8	560	565sqm	12sqm	577sqm
• Ground	65sqm	ROOM 2	12	2-3	1:4	3	39	40sqm	8sqm	48sqm	ROOM 2	12				
• First		ROOM 3	16	2-3	1:4	4	52	53sqm	8sqm	61sqm	ROOM 3	16				
TOTAL	629sqm	ROOM 4	22	4-5	1:11	2	71.5	72sqm	9sqm	81sqm	ROOM 4	22				
PROPOSED CHILD CARE PLACES	80	ROOM 5	22	3-4	1:11	2	71.5	72sqm	9sqm	81sqm	ROOM 5	22				
SITE COVER	590sqm = 31.3%	TOTALS	80			15	286	290sqm	43sqm	333sqm						
IMPERVIOUS COVER	1000sqm = 55.6%															
REQUIRED CARPARKING	0.22 per place = 17.6 cars required															
PROPOSED CARPARKING	16 Carparks															



Ground Floor Plan

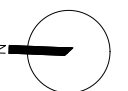
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ON Architecture Pty Ltd abn 71 627 522 043
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CHILD CARE FACILITY
 20 Davids Hill Road, Monbulk

Job No: S429
 Dwg No: SK06.1
 Date: April 2022





Appendix B Traffic Survey Results

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au



Intersection of David Hill Rd and Victoria Ave , Monbulk

GPS -37.876599, 145.413632

Date:	Thu 19/05/22
Weather:	Fine
Suburban:	Monbulk
Customer:	Ratio

North:	N/A
East:	David Hill Rd
South:	Victoria Ave
West:	David Hill Rd

Survey Period	AM:	7:00 AM-10:00 AM
	PM:	3:00 PM-6:00 PM
Traffic Peak	AM:	8:15 AM-9:15 AM
	PM:	3:15 PM-4:15 PM

All Vehicles

Time		East Approach David Hill Rd			South Approach Victoria Ave			West Approach David Hill Rd			Hourly Total	
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
7:00	7:15	0	41	3	0	1	3	0	1	39	266	
7:15	7:30	0	36	0	0	0	2	0	1	24	238	
7:30	7:45	0	36	0	0	0	1	0	2	22	275	
7:45	8:00	0	25	1	0	0	4	0	2	22	369	
8:00	8:15	0	33	0	0	3	1	0	1	22	506	
8:15	8:30	0	50	1	0	0	4	0	4	41	543	Peak
8:30	8:45	0	77	1	0	0	2	0	1	74	497	
8:45	9:00	0	111	3	0	1	2	0	1	73	403	
9:00	9:15	0	43	1	0	0	2	0	2	49	270	
9:15	9:30	0	31	0	0	0	0	0	3	20		
9:30	9:45	0	31	0	0	0	9	1	4	16		
9:45	10:00	0	37	1	0	1	1	0	2	16		
15:00	15:15	0	31	0	0	1	3	0	6	72	455	
15:15	15:30	0	88	0	0	0	5	0	2	46	456	Peak
15:30	15:45	0	46	0	0	2	5	0	3	61	423	
15:45	16:00	0	35	0	0	0	3	1	1	44	409	
16:00	16:15	0	44	0	0	0	1	0	1	68	433	
16:15	16:30	0	49	0	0	0	1	0	2	56	398	
16:30	16:45	0	44	0	0	0	1	2	2	54	390	
16:45	17:00	0	48	1	0	0	1	0	1	57	383	
17:00	17:15	0	24	0	0	1	2	0	3	49	352	
17:15	17:30	0	31	1	0	1	1	0	7	59		
17:30	17:45	0	39	1	0	1	1	0	3	51		
17:45	18:00	0	29	2	0	0	0	0	2	44		

Peak Time		East Approach David Hill Rd			South Approach Victoria Ave			West Approach David Hill Rd			Peak total
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	
8:15	9:15	0	281	6	0	1	10	0	8	237	543
15:15	16:15	0	213	0	0	2	14	1	7	219	456



Appendix C SIDRA Intersection Results (Existing)

SITE LAYOUT

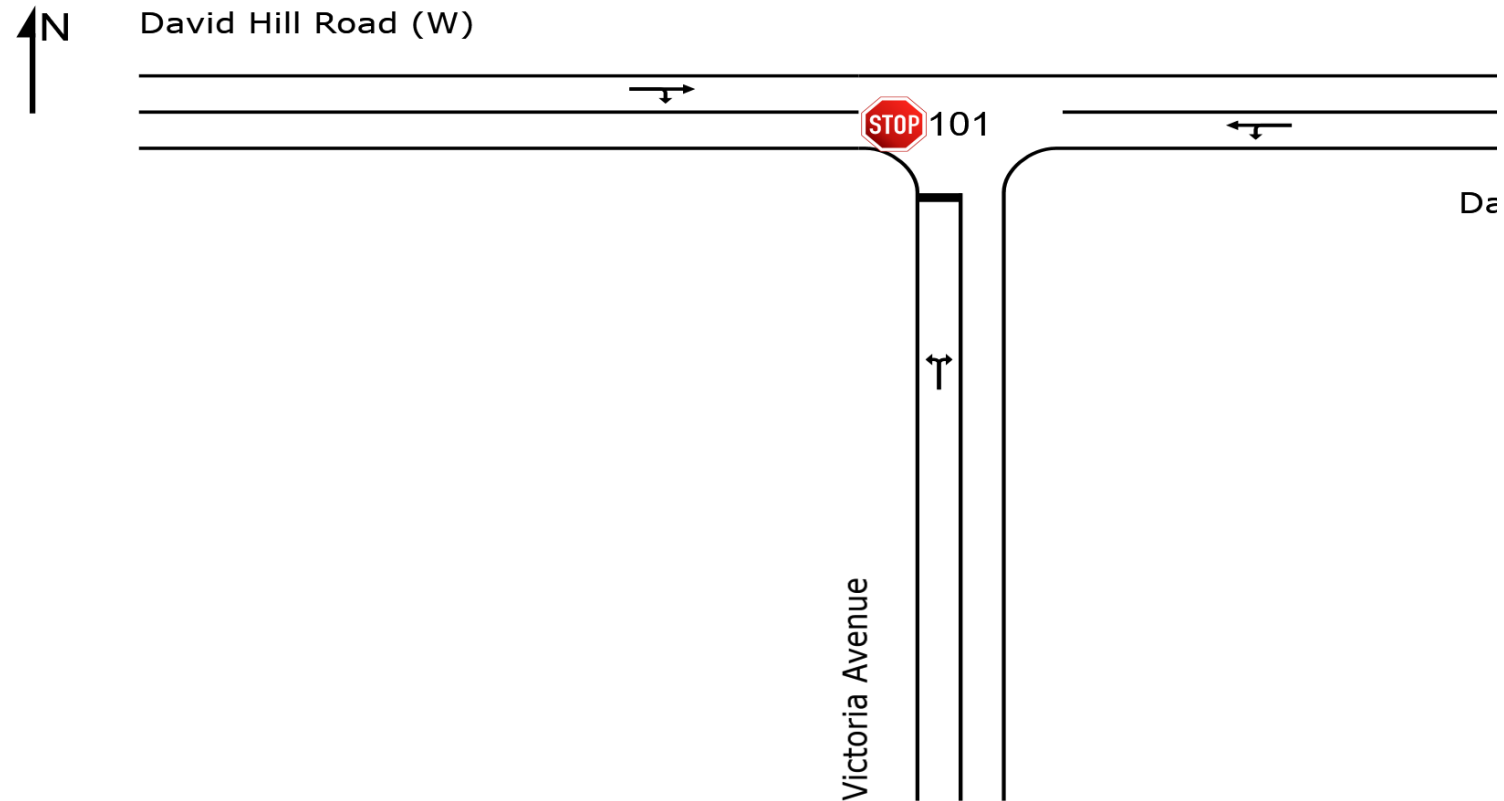
 **Site: 101 [David Hill Road / Victoria Avenue - Existing - AM Peak (Site Folder: General)]**

David Hill Road / Victoria Avenue - Existing - AM Peak

Site Category: (None)

Stop (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [David Hill Road / Victoria Avenue - Existing - AM Peak (Site Folder: General)]

David Hill Road / Victoria Avenue - Existing - AM Peak

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total HV] veh/h %		DEMAND FLOWS [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. Dist] veh m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Avenue														
1	L2	10	0.0	11	0.0	0.012	9.2	LOS A	0.0	0.3	0.37	0.84	0.37	51.4
3	R2	1	0.0	1	0.0	0.012	10.4	LOS B	0.0	0.3	0.37	0.84	0.37	50.9
Approach		11	0.0	12	0.0	0.012	9.3	LOS A	0.0	0.3	0.37	0.84	0.37	51.3
East: David Hill Road (E)														
4	L2	6	0.0	6	0.0	0.155	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.2
5	T1	281	0.0	296	0.0	0.155	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		287	0.0	302	0.0	0.155	0.2	NA	0.0	0.0	0.00	0.01	0.00	59.8
West: David Hill Road (W)														
11	T1	237	0.0	249	0.0	0.134	0.1	LOS A	0.1	0.5	0.03	0.02	0.03	59.7
12	R2	8	0.0	8	0.0	0.134	6.6	LOS A	0.1	0.5	0.03	0.02	0.03	57.4
Approach		245	0.0	258	0.0	0.134	0.3	NA	0.1	0.5	0.03	0.02	0.03	59.6
All Vehicles		543	0.0	572	0.0	0.155	0.4	NA	0.1	0.5	0.02	0.03	0.02	59.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [David Hill Road / Victoria Avenue - Existing - PM Peak (Site Folder: General)]

David Hill Road / Victoria Avenue - Existing - AM Peak

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total HV] veh/h %		DEMAND FLOWS [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. Dist] veh m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Avenue														
1	L2	14	0.0	15	0.0	0.016	8.9	LOS A	0.1	0.4	0.32	0.85	0.32	51.5
3	R2	2	0.0	2	0.0	0.016	9.8	LOS A	0.1	0.4	0.32	0.85	0.32	51.0
Approach		16	0.0	17	0.0	0.016	9.0	LOS A	0.1	0.4	0.32	0.85	0.32	51.5
East: David Hill Road (E)														
4	L2	1	0.0	1	0.0	0.116	5.6	LOS A	0.0	0.0	0.00	0.00	0.00	58.3
5	T1	213	0.0	224	0.0	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		214	0.0	225	0.0	0.116	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
West: David Hill Road (W)														
11	T1	219	0.0	231	0.0	0.123	0.0	LOS A	0.1	0.4	0.03	0.02	0.03	59.7
12	R2	7	0.0	7	0.0	0.123	6.2	LOS A	0.1	0.4	0.03	0.02	0.03	57.5
Approach		226	0.0	238	0.0	0.123	0.2	NA	0.1	0.4	0.03	0.02	0.03	59.6
All Vehicles		456	0.0	480	0.0	0.123	0.5	NA	0.1	0.4	0.02	0.04	0.02	59.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



Appendix D Empirical Car Parking Data

Information of existing (and operating) childcare centres in Croydon has been used to determine the car parking provision (per number of registered places) for each site, as detailed in the table below.

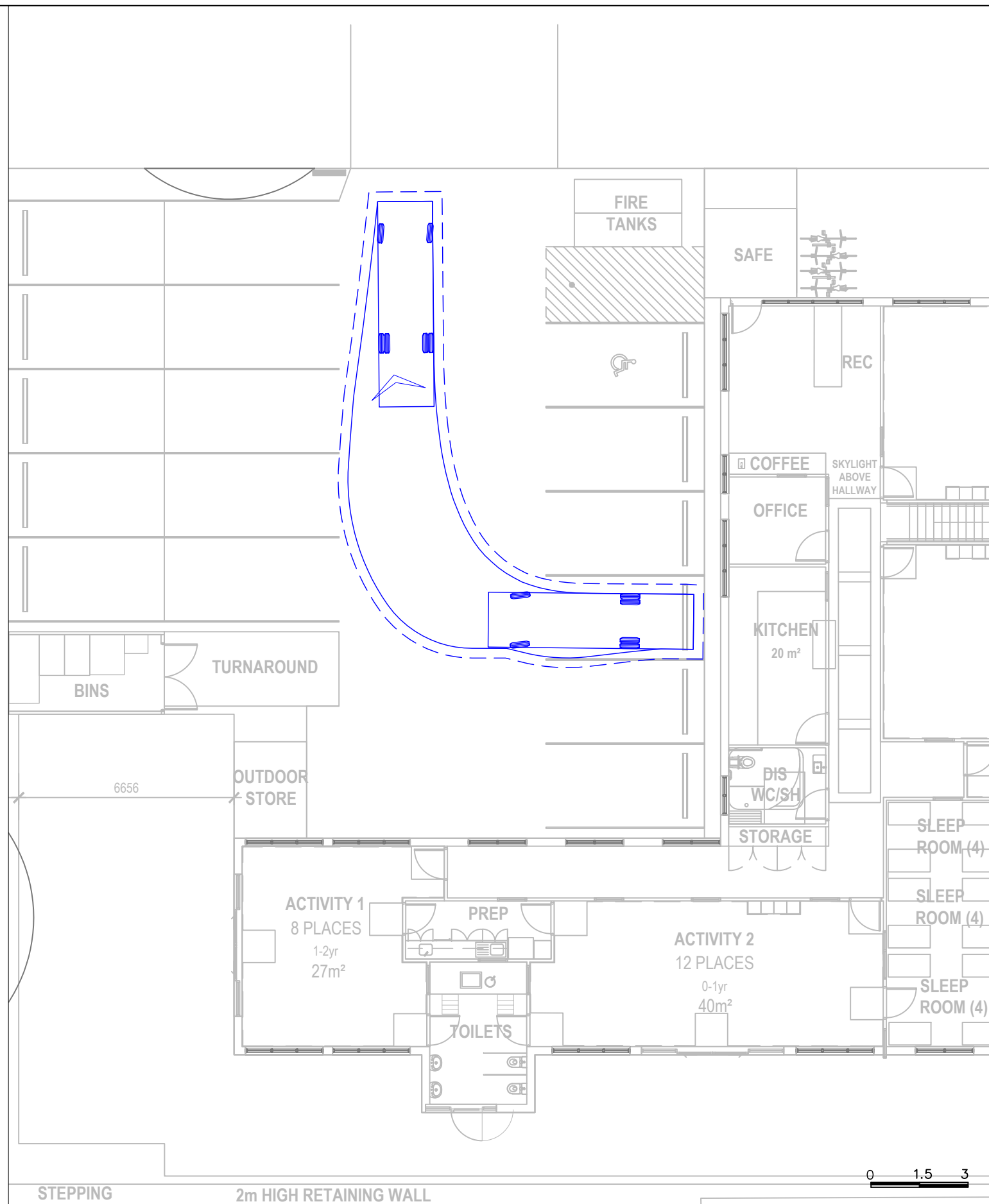
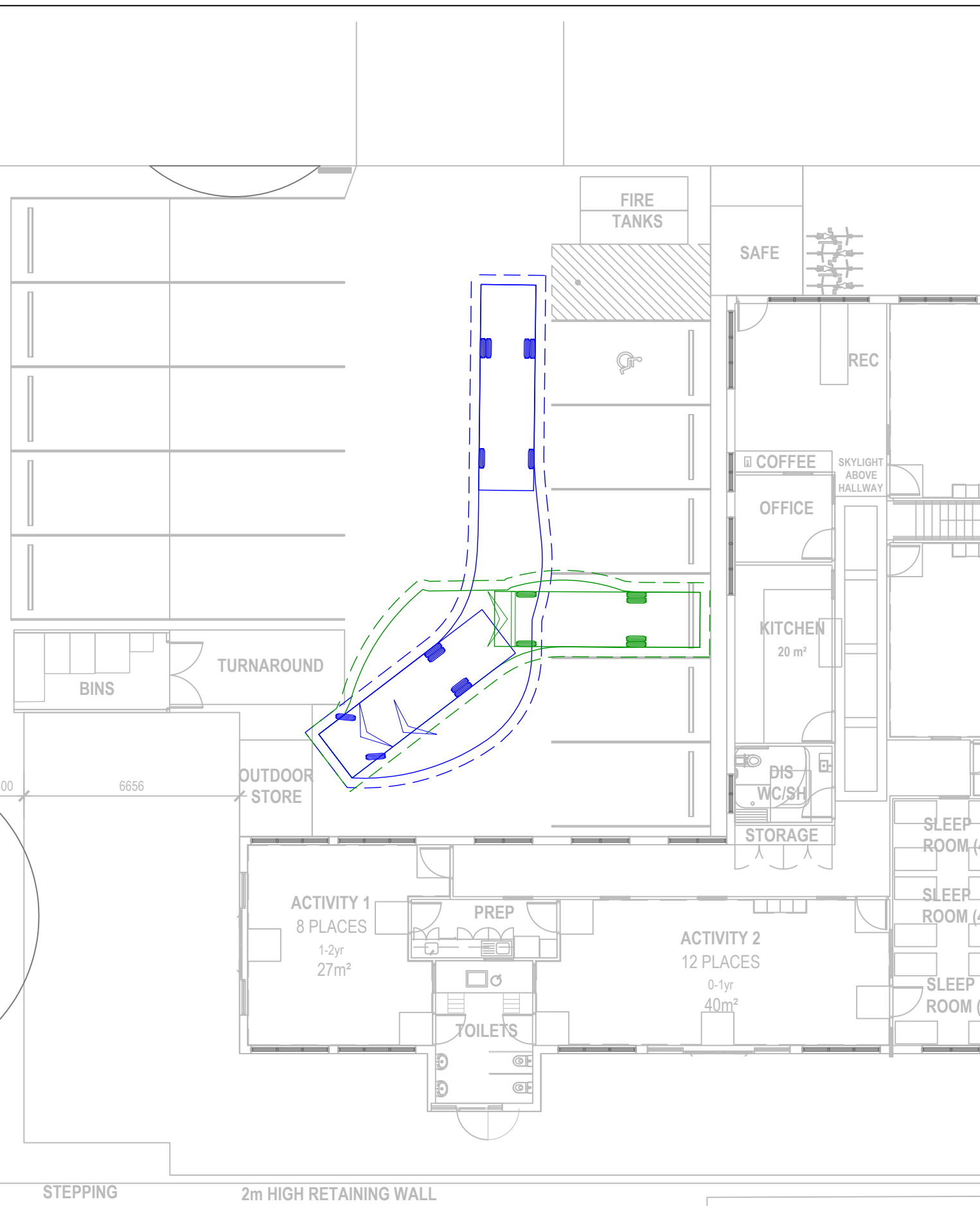
Childcare centre	Address	Registered Places	On-Site Car Parking Space Provision	Car Parking Spaces per Registered Place
Hewish Road Childcare Centre	78 Hewish Road, Croydon	47	10	0.21
Maroondah Kids Early Learning	109 Alto Avenue, Croydon	55	4	0.07
Bright Horizons Australia	156-158 Yarra Road, Croydon	75	13	0.17
Pooh Bear's House	323 Maroondah Highway, Croydon	90	16	0.18
Milestone Kindergarten and Childcare	374 Maroondah Highway, Croydon	120	16	0.13
Dorset Early Learning and Kindergarten	214-216 Dorset Road, Croydon	50	5	0.10
Woodland Education	380 Dorset Road, Croydon	35	11	0.31
Kids Zone Early Childcare Learning Centre	421 Dorset Road, Croydon	50	12	0.24
Average Car Parking Spaces per Registered Place				0.18


The table above indicates that there is an average 0.18 on-site car parking spaces / registered place at existing childcare centres with Croydon.

Appendix E Swept Path Assessment



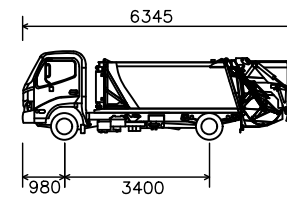
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RATIO CONSULTANTS PTY LTD
 ABN 005 422 104
 8 GWYNNE STREET
 CREMORNE, VICTORIA 3121
 TELEPHONE (03)9429 3111
 FACSIMILE (03)9429 3011

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

Proposed Childcare Development
 20 David Hill Road, Monbulk
 Swept Path Assessment

NOTE:
 1) Base Plan Received on 19/05/2022
 2) Maximum Design Speed 10km/h

RATIO REFERENCE: 19052T - SK02/SD

SHEET No. 1 of 3

SCALE: 1:150@A3

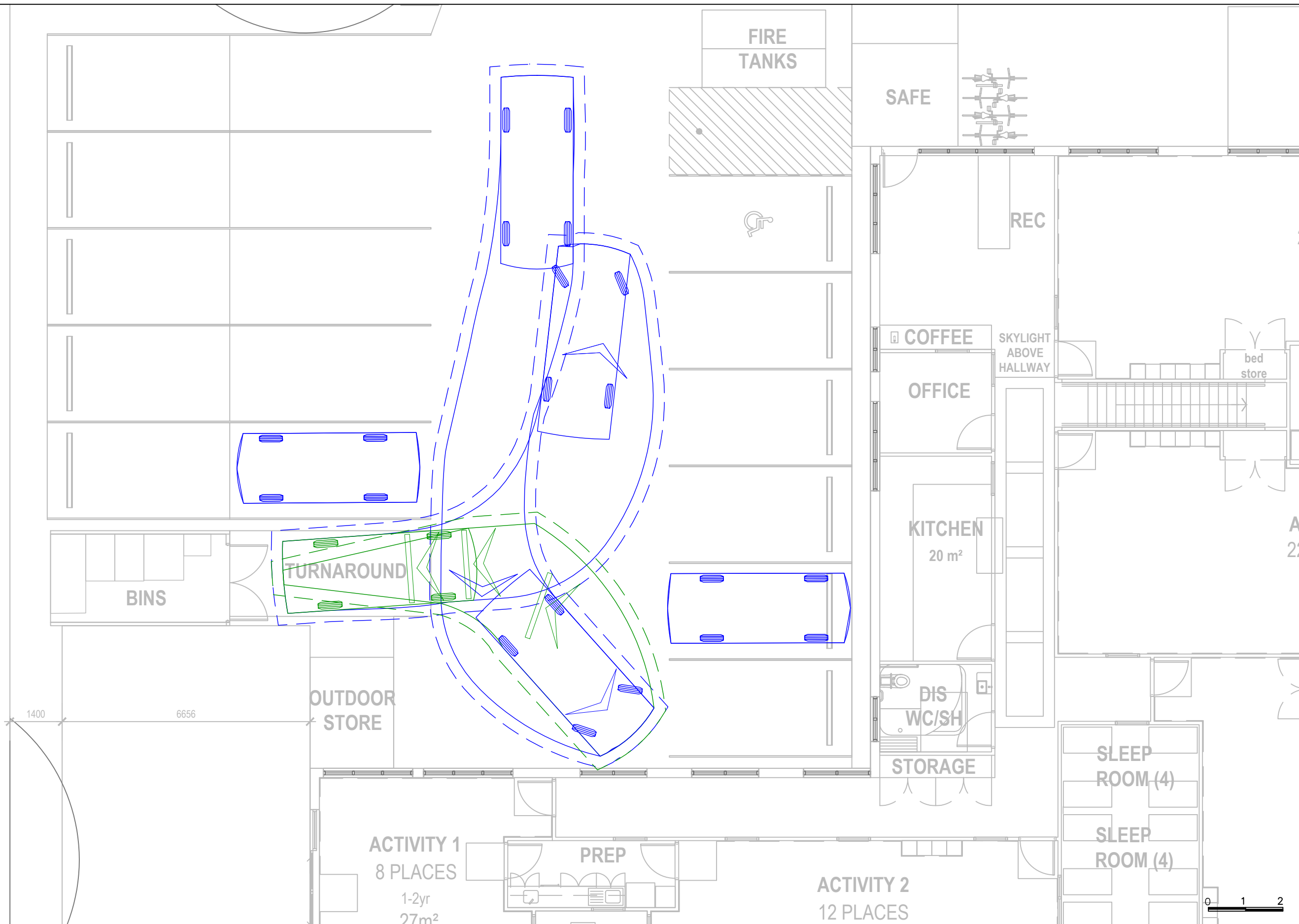
DATE: 28/09/2022



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DAVID HILL ROAD

STEPPING RETAINING WALL



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)

Proposed Childcare Development
20 David Hill Road, Monbulk
Swept Path Assessment

NOTE:
1) Base Plan Received on 19/05/2022
2) Maximum Design Speed 10km/h

RATIO REFERENCE
190521 - SK02/SD

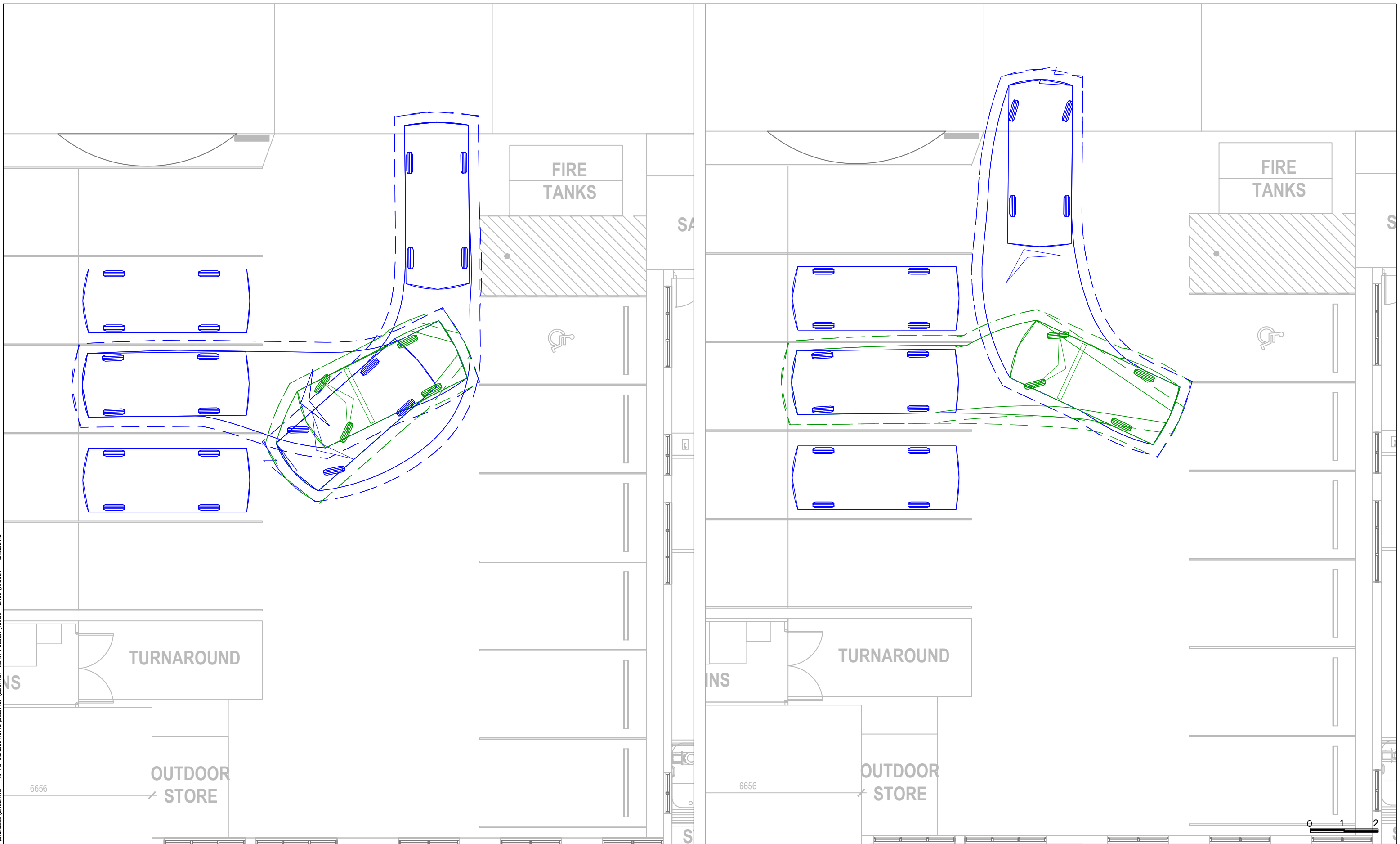
SHEET No.
2 of 3

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DATE
28/09/2022



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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 Childcare Development
 20 David Hill Road, Monbulk
 Swept Path Assessment

NOTE:
 1) Base Plan Received on 19/05/2022
 2) Maximum Design Speed 10km/h

RATIO REFERENCE 19052T - SK02/SD	SHEET No. 3 of 3	SCALE 1:100@A3	DATE 28/09/2022
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Appendix F SIDRA Intersection Results (Post)

SITE LAYOUT

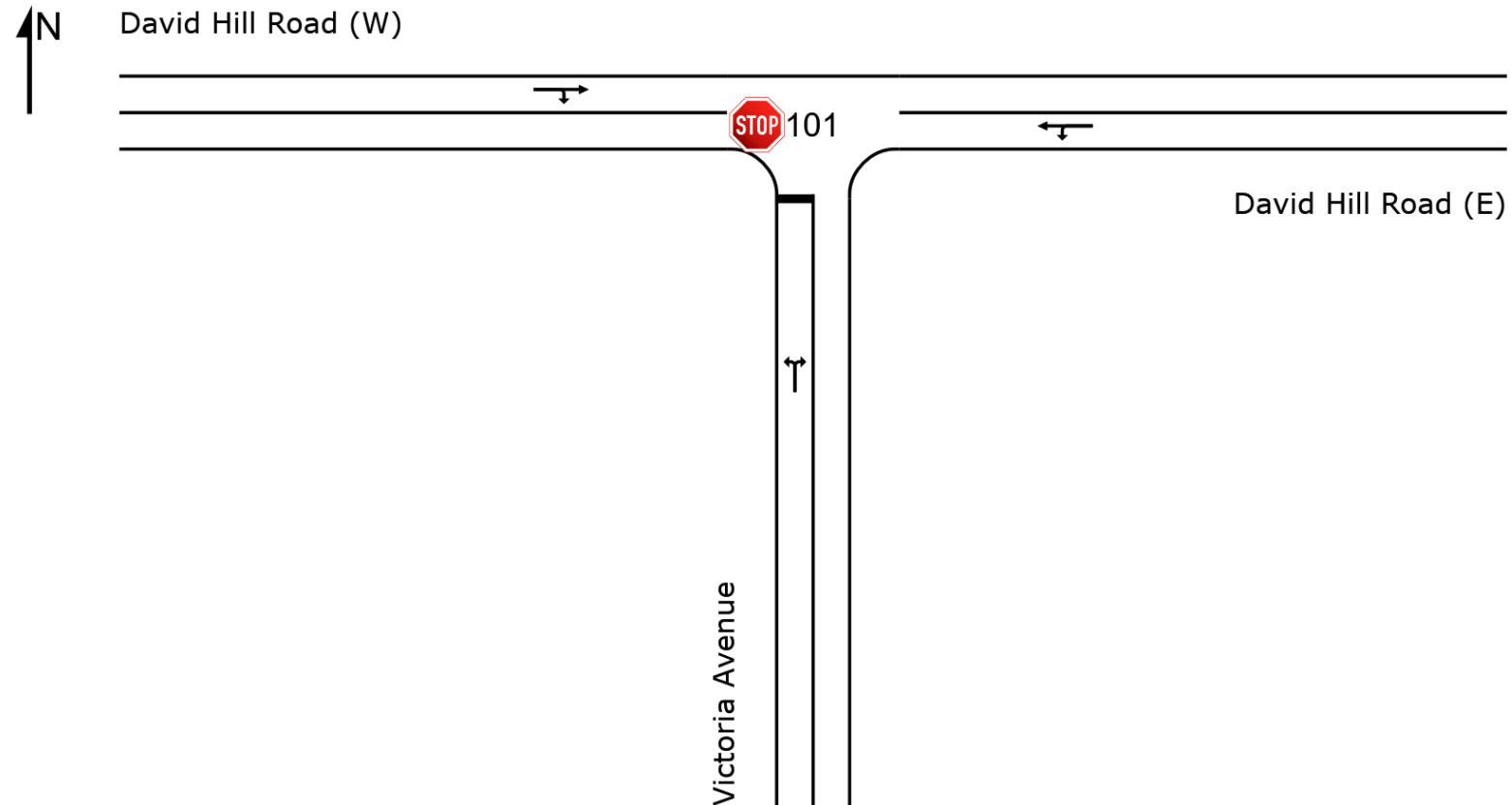
 **Site: 101 [David Hill Road / Victoria Avenue - Future - AM Peak (Site Folder: General)]**

David Hill Road / Victoria Avenue - Existing - AM Peak

Site Category: (None)

Stop (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [David Hill Road / Victoria Avenue - Future - AM Peak (Site Folder: General)]

David Hill Road / Victoria Avenue - Existing - AM Peak

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total HV] veh/h %		DEMAND FLOWS [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. Dist] veh m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Avenue														
1	L2	25	0.0	26	0.0	0.050	9.3	LOS A	0.2	1.2	0.41	0.89	0.41	51.0
3	R2	15	0.0	16	0.0	0.050	10.9	LOS B	0.2	1.2	0.41	0.89	0.41	50.5
Approach		40	0.0	42	0.0	0.050	9.9	LOS A	0.2	1.2	0.41	0.89	0.41	50.8
East: David Hill Road (E)														
4	L2	23	0.0	24	0.0	0.165	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	57.9
5	T1	281	0.0	296	0.0	0.165	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	59.5
Approach		304	0.0	320	0.0	0.165	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.4
West: David Hill Road (W)														
11	T1	237	0.0	249	0.0	0.149	0.2	LOS A	0.2	1.7	0.10	0.06	0.10	59.0
12	R2	26	0.0	27	0.0	0.149	6.7	LOS A	0.2	1.7	0.10	0.06	0.10	56.8
Approach		263	0.0	277	0.0	0.149	0.8	NA	0.2	1.7	0.10	0.06	0.10	58.8
All Vehicles		607	0.0	639	0.0	0.165	1.2	NA	0.2	1.7	0.07	0.11	0.07	58.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [David Hill Road / Victoria Avenue - Future - PM Peak (Site Folder: General)]

David Hill Road / Victoria Avenue - Existing - AM Peak

Site Category: (None)

Stop (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES [Total HV] veh/h %		DEMAND FLOWS [Total HV] veh/h %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. Dist] veh m		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Victoria Avenue														
1	L2	32	0.0	34	0.0	0.058	8.9	LOS A	0.2	1.4	0.35	0.89	0.35	51.3
3	R2	19	0.0	20	0.0	0.058	10.1	LOS B	0.2	1.4	0.35	0.89	0.35	50.8
Approach		51	0.0	54	0.0	0.058	9.4	LOS A	0.2	1.4	0.35	0.89	0.35	51.1
East: David Hill Road (E)														
4	L2	14	0.0	15	0.0	0.123	5.6	LOS A	0.0	0.0	0.00	0.04	0.00	58.0
5	T1	213	0.0	224	0.0	0.123	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	59.6
Approach		227	0.0	239	0.0	0.123	0.4	NA	0.0	0.0	0.00	0.04	0.00	59.5
West: David Hill Road (W)														
11	T1	219	0.0	231	0.0	0.135	0.1	LOS A	0.2	1.3	0.08	0.06	0.08	59.2
12	R2	22	0.0	23	0.0	0.135	6.3	LOS A	0.2	1.3	0.08	0.06	0.08	57.0
Approach		241	0.0	254	0.0	0.135	0.7	NA	0.2	1.3	0.08	0.06	0.08	59.0
All Vehicles		519	0.0	546	0.0	0.135	1.4	NA	0.2	1.4	0.07	0.13	0.07	58.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.