



Traffic Engineering

145 Glenlyon Road, Brunswick
Proposed Bunnings Store
Traffic Impact Assessment



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1 Introduction and Scope

TTM Consulting (Vic) Pty Ltd has been requested by the Applicant to provide a traffic report for a proposed Bunnings Store at 145 Glenlyon Road, Brunswick.

This report reviews the anticipated car parking and traffic implications of the proposed development including consideration of the following :-

- Review the existing conditions at the site and on the surrounding road network,
- Determine the parking demand and requirement that will be subject of the proposal and confirm if the on-site provision is appropriate in the context of the existing conditions,
- An assessment of the car parking layout and proposed access arrangements with reference to Clause 52.06 of the Moreland Planning Scheme; and
- Review the traffic that will be generated by the proposal, confirming that the additional traffic is appropriate in the context of the existing conditions.

This report concludes that there are no traffic or parking grounds which should warrant refusal of the sought planning permit.

2 Existing Conditions

2.1 The Site

The site is located at 145 Glenlyon Road, Brunswick and has an area of 5,395 square metres. It has approximately 60 metres site frontage to Glenlyon Road and 4 metres frontage to Pitt Street. The site is zoned as an Industrial 3 Zone (IN3Z) in the Moreland Planning Scheme and is surrounded by a mix of residential, industrial and commercial uses.



Figure 2.1: Site Location

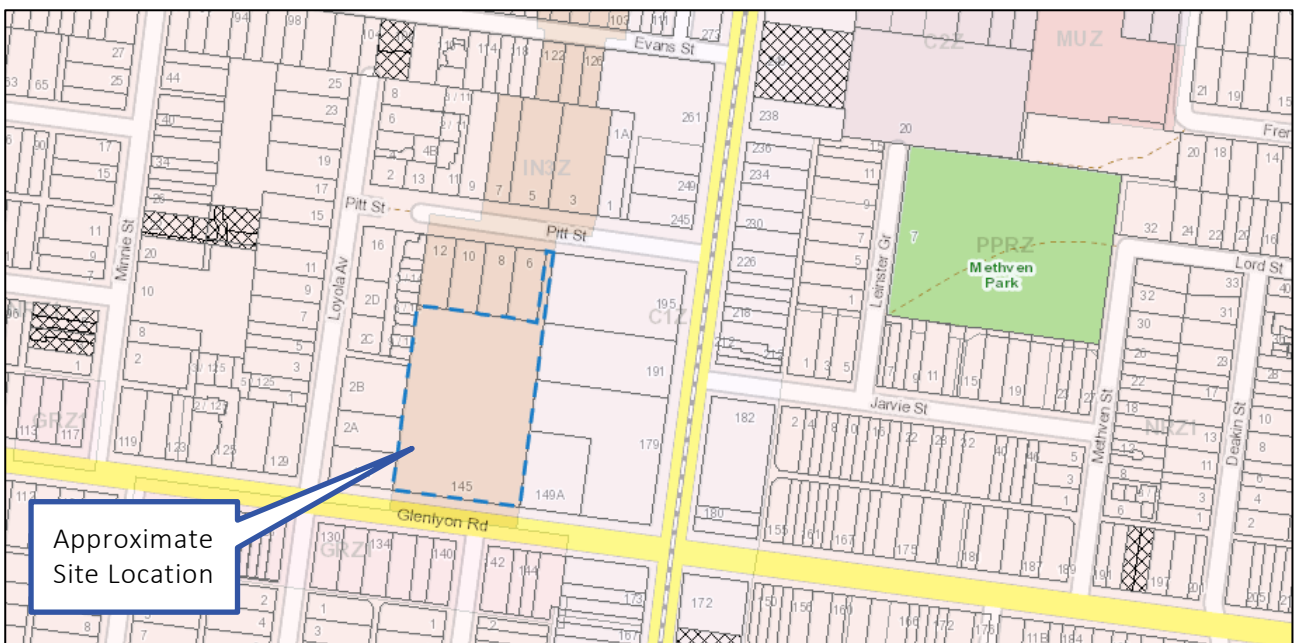


Figure 2.2: Site Zoning

2.2 Road Network

Glenlyon Road is classified as a local road, although it functions as a collector road that accommodates an approximately 14 metres wide carriageway that includes one traffic lane, one bicycle lane and restricted kerbside parking lanes in each direction. The road is provided flaring to accommodate a right and left turn lane at the intersection with Lygon Street approximately 60 metres east of the site. The default speed limit along Glenlyon Road is 60km/h.

Figure 2.3 shows the street view of Glenlyon Road proximate to the site.



Figure 2.3: Glenlyon Road Configuration (Travelling East)

Pitt Street is a local road that accommodates an approximately 14 metres wide carriageway that includes one traffic lane in each direction. A combination of angled and parallel restricted, unrestricted and permit parking is permitted along both sides of the carriageway. Pitt Street is a No Thru Road thus all traffic must enter and exit via Lygon Street. The default speed limit along Pitt Street is 40km/h.

Figure 2.3 shows the street view of Pitt Street proximate to the site.



Figure 2.4: Pitt Street Configuration (Travelling East)

2.3 Local Amenities

The following local amenities are located proximate to the site:

- Numerous commercial, retail and food and drink premises are located along Lygon Street, including Coles Express, Australia Post and Shell all located within 80 metres of the site.
- Numerous parks, recreational facilities and community centres are located within proximate distance to the site, including Methven Park located approximately 184 metres and Fleming Park approximately 400 metres from the site.

2.4 Local Public Transport Services

The subject site is identified as being within the Principal Public Transport Network Area and the following public transport services are within close proximity to the site.

Table 2.1: Local Public Transport Services

| Service | Route No. | Route | Location of Nearest Stop |
|---------|-----------|--|---|
| Bus | #506 | Moonee Ponds – Westgarth Station via Brunswick | Lygon Street approximately 40 metres from the site. |
| Tram | #1 | East Coburg – South Melbourne Beach | Glenlyon Rd/Lygon St approximately 60 metres from the site. |
| | #6 | Moreland – Glen Iris | |
| | #19 | North Coburg – Flinders Street Station | Glenlyon Rd/Sydney Rd approximately 760 metres from the site. |
| Train | - | Upfield Line | Jewell and Brunswick Station approximately 1.02 km from the site. |

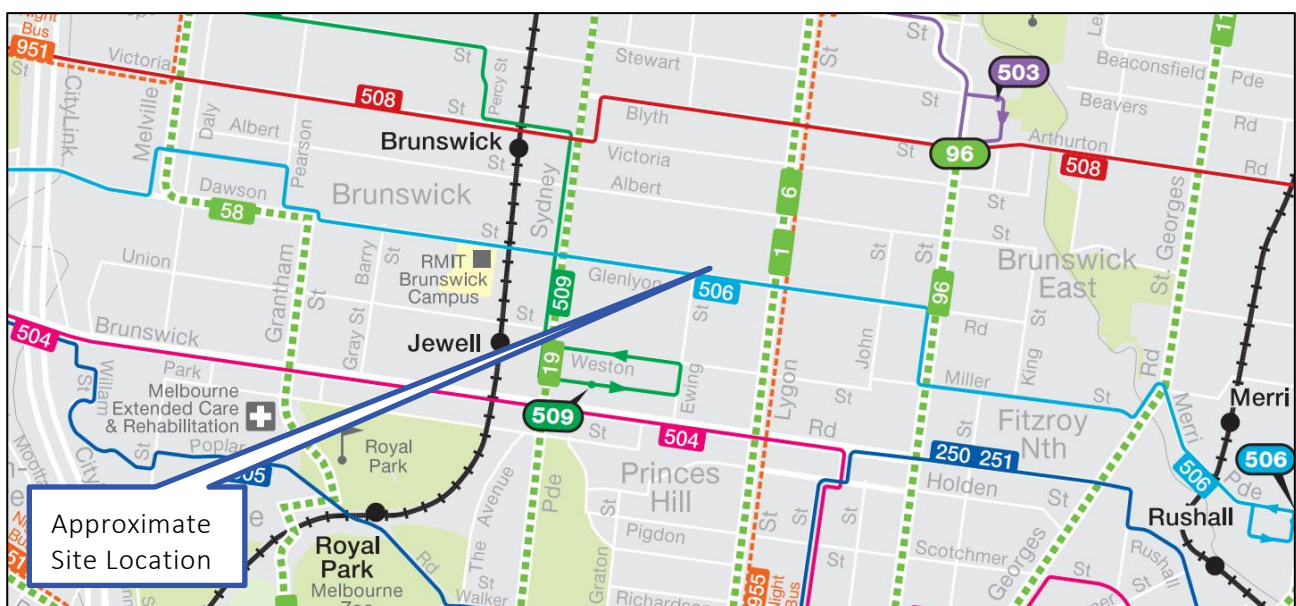


Figure 2.5: Local Public Transport Routes

3 The Proposal

The proposed development involves the construction of a Bunnings Trade Supplies store at 145 Glenlyon Road, Brunswick. The following table summarises the proposed inventory and uses.

Table 3.1: Proposed Inventory

| Item | Inventory |
|--------------------------------|-----------------|
| Bunnings Warehouse | 8,696 sqm |
| • Trade Supplies | 6,522 sqm (75%) |
| • Restricted Retail | 2,174 sqm (25%) |
| On-Site Car Parking Spaces | 250 no. |
| • Staff/Customer | 244 no. |
| • Disabled | 4 no. |
| • Trailer Bay | 2 no. |
| On-Site Bicycle Parking Spaces | 14 no. |

On-site car parking spaces will be located in a basement car park. Vehicular access to both the on-site car parking spaces and the Timber Trade area is provided via the widening of an existing crossover along Glenlyon Road. Loading vehicle access will occur via a new 10 metres wide crossover along Glenlyon Road.

The existing vehicle crossover along Pitt Street will be retained and provide exit for loading and timber trade sales vehicles. This existing accessway will be widened by 2.84 metres to the west, providing a total width of 6.5 metres. It is noted that all these movements will need to turn right onto Pitt Street as Pitt Street is a 'No Thru Road' to the west of the site access.

A copy of the development plans can be seen in Appendix A.

4 Parking Requirements

4.1 Clause 52.06-5 Planning Scheme Requirements

Clause 52.06-5 of the Moreland Planning Scheme outlines the parking requirements for the subject proposal. The number of car parking spaces required is summarised in Table 1 of Clause 52.06-5.

A Bunnings Warehouse comprises two land use categories in the Moreland Planning Scheme, Trade supplies and Restricted retail premises. The relative proportion of these two uses is 75% Trade supplies and 25% Restricted retail premises.

The subject site is identified as being within the Principal Public Transport Network Area and therefore the Column B parking rate applies.

Table 4.1: Recommended Parking Supply Requirement

| Land Use | Council Requirement | Extent | Requirement |
|----------------------------|---|-----------|---------------|
| Trade Supplies | 10% of site area | 5,395 sqm | 22* |
| Restricted Retail Premises | 2.5 spaces to each 100 sqm of leasable floor area | 2,174 sqm | 54 |
| Total | | | 76 no. |

**Assume 25sqm per parking space for the parking space and access aisle*

The Applicant is proposing 250 on-site car parking spaces located within two basement level car parks. Thus the proposal has an on-site parking rate of 1 space per 2.87 square metres of floor area.

Whilst the on-site parking provision is in excess of the Planning Scheme requirement many of the goods sold at a Bunnings Store (including almost all items available from the nursery, bagged goods and timber trade area) are too large to be conveniently transported by anything other than a motor vehicle, thus the on-site parking provision is more reflective of the actual demand that will be generated by a Bunnings Warehouse.

The car parking demand generated by a Bunnings store is known to be considerably higher than the statutory car parking rate specified in Table 4.1, particularly during peak times of the year, notwithstanding that this particular store is located in an inner city location where public transport services are available. The statutory car parking rate should therefore be given limited weight in any assessment of the car parking requirements for the proposal.

The Applicant has made provision for future proofing the site as the development will exist for a long time and demand may increase over that time.

5 Parking and Access Area Design

5.1 Site Access

Site access is summarised in the table below.

Table 5.1: Site Access Arrangement

| Road Name | Location | Access Type |
|---------------|----------------|--|
| Glenlyon Road | Western Access | <ul style="list-style-type: none"> Widen the existing vehicle crossover adjacent to the western boundary to 7.5 metres. The width of the crossover at 7.5 metres provides access as follows :- <ul style="list-style-type: none"> Entry only for customers/staff to the rear timber trade sales area. Entry/exit for customers/staff to the on-site basement car park. |
| | Eastern Access | <ul style="list-style-type: none"> Proposed new 8.3 metre wide crossover. Entry only to be used by service vehicles to access loading area. |
| Pitt Street | Northern Exit | <ul style="list-style-type: none"> Existing crossover to be widened to 6 metres. Existing 3.66 metres accessway runs adjacent to 6 Pitt Street and 195-197 Lygon Street. An additional 2.84 metres width from the adjacent lot (6 Pitt Street) is intended to be used as a carriageway easement in favour of 145 Glenlyon Road. Exit only to be used by service vehicles and customers/staff exiting the rear timber trade sales area via a one-way minimum 6.5 metres wide accessway. All vehicles will turn right onto Pitt Street. |

Both the accesses on Glenlyon Road will require the removal of two (2) existing on-street parking spaces each and widening the access onto Pitt Street will not alter the number of on-street parking spaces.

For the western access, with a crossover width of 7.5 metres, pedestrians will be required to walk across an opening that is wider than the existing crossover. From a traffic perspective this is a more desirable outcome as this access will generate more traffic throughout the day than the existing use, thus the wider opening provides excellent visibility between pedestrians and drivers when vehicles are accessing the site.

5.2 Car Park Layout

The development includes the provision of 250 on-site car parking spaces that will be located across two basement car park levels.

Vehicular access to the basement car park occurs via ramps which are a minimum 6.2 metres wide and accommodates two-way movement. They also have a constant grade of 1:10 and a minimum headroom clearance of 2.51 metres along the length of the ramp.

All parking spaces located within the basement car park are typically dimensioned at 5.5 metres long and 2.6 metres wide and are accessed via a minimum 7 metres wide accessway. Disabled car parking spaces are also

provided with an adjacent shared zone of the same dimensions. These parking spaces comply with Clause 52.06-9 of the Moreland Planning Scheme.

Swept path diagrams have been prepared using AutoTrack showing a 10.93 metre long car and trailer and a the standard 'B99' design vehicle perform ingress/egress manoeuvres and circulate the basement car park and rear timber trade sales area. This vehicle was chosen as it represents the largest possible vehicle that customers would use to access these areas.

The dimensions of these vehicles along with the diagrams can be seen in Appendix B. The diagrams confirm that vehicles can enter and exit the site in a forward direction and successfully manoeuvre through the site.

5.3 Service Vehicle Access

As outlined in Section 5.1, loading will occur via the minimum 6.32 metres wide one-way accessway located along the eastern boundary of the site.

The largest vehicle to pass through the site will be a 19 metres semi-trailer. The vehicle will enter the site via Glenlyon Road from either the east or west and prop within the loading bay area in which the accessway extends to a width of 14.7 metres to allow vehicles to pass through. The vehicles will then exit via the existing crossover on Pitt Street turning right onto Pitt Street only.

However, a large proportion of the service vehicles accessing the site will be up to 12.5 metres long rigid trucks.

The swept path diagrams attached in Appendix B confirm how these vehicles can pass through the site and access the loading area. The diagrams confirm that there is adequate manoeuvring space for service vehicles to access the site.

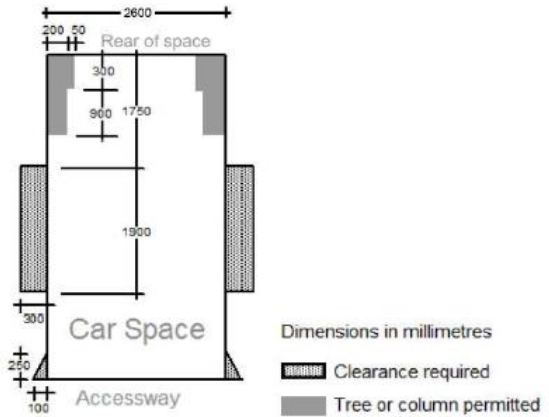
5.4 Response to Clause 52.06-9 Design Standards

Clause 52.06-9 of the Moreland Planning Scheme outlines design criteria for car parking and accessways. The following table provides a response to each of the relevant design criteria.

Table 5.2: Clause 52.06-9 Design Standards

| Clause 52.06-9 design criteria | TTM Response |
|--|------------------------------------|
| <i>Design Standard 1 - Accessways</i> | |
| Be at least 3 metres wide. | Satisfied. |
| Have an internal radius of at least 4 metres at changes of direction or intersection or be at least 4.2 metres wide. | Satisfied. Refer to Appendix B. |
| 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. | Satisfied. |

| Clause 52.06-9 design criteria | TTM Response | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|-----------------|------------------|------------------|----------|-------|-------|-------|-----|-------|-------|-------|-----|-------|-------|-------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|
| Provide at least 2.1 metres headroom beneath overhead obstructions, calculated for a vehicle with a wheel base of 2.8 metres. | Satisfied. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| If the accessway serves 4 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. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Provide a passing area at the entrance at least 6.1 metres wide and 7 metres long if the accessway serves 10 or more car parking spaces and is either more than 50 metres long or connects to a road in a Road Zone. | Satisfied. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Have a corner splay or area at least 50 percent clear of visual obstructions extending at least 2 metres along the frontage road from the edge of an exit lane and 2.5 metres 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 1 lane is provided, or adjacent landscaped areas, provided the landscaping in those areas is less than 900mm in height. | Satisfied. Eastern Access on Glenlyon Road has one exit lane that is provided with compliant pedestrian splays. The Western Access on Glenlyon Road is entry-only and therefore does not require pedestrian splays. The exit-only accessway along Pitt Street is not expected to alter the existing pedestrian splays provided. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| If an accessway to 4 or more car parking spaces is from land in a Road Zone, the access to the car spaces must be at least 6 metres from the road carriageway. | Satisfied. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Design Standard 2 – Car parking spaces | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dimensions of car parking spaces and accessways – Table 2. Table 2: Minimum dimensions of car parking spaces and accessways <table><tr><th>Angle of car parking spaces to access way</th><th>Accessway width</th><th>Car space width</th><th>Car space length</th></tr><tr><td>Parallel</td><td>3.6 m</td><td>2.3 m</td><td>6.7 m</td></tr><tr><td>45°</td><td>3.5 m</td><td>2.6 m</td><td>4.9 m</td></tr><tr><td>60°</td><td>4.9 m</td><td>2.6 m</td><td>4.9 m</td></tr><tr><td rowspan="4">90°</td><td>6.4 m</td><td>2.6 m</td><td>4.9 m</td></tr><tr><td>5.8 m</td><td>2.8 m</td><td>4.9 m</td></tr><tr><td>5.2 m</td><td>3.0 m</td><td>4.9 m</td></tr><tr><td>4.8 m</td><td>3.2 m</td><td>4.9 m</td></tr></table> <i>Note to Table 2: Some dimensions in Table 2 vary from those shown in the Australian Standard AS2890.1- 2004 (off street). The dimensions shown in Table 2 allocate more space to aisle widths and less to marked spaces to provide improved operation and access. The dimensions in Table 2 are to be used in preference to the Australian Standard AS2890.1-2004 (off street) except for disabled spaces which must achieve Australian Standard AS2890.6-2009 (disabled).</i> | Angle of car parking spaces to access way | Accessway width | Car space width | Car space length | Parallel | 3.6 m | 2.3 m | 6.7 m | 45° | 3.5 m | 2.6 m | 4.9 m | 60° | 4.9 m | 2.6 m | 4.9 m | 90° | 6.4 m | 2.6 m | 4.9 m | 5.8 m | 2.8 m | 4.9 m | 5.2 m | 3.0 m | 4.9 m | 4.8 m | 3.2 m | 4.9 m | Satisfied. |
| Angle of car parking spaces to access way | Accessway width | Car space width | Car space length | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Parallel | 3.6 m | 2.3 m | 6.7 m | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 45° | 3.5 m | 2.6 m | 4.9 m | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60° | 4.9 m | 2.6 m | 4.9 m | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90° | 6.4 m | 2.6 m | 4.9 m | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.8 m | 2.8 m | 4.9 m | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 5.2 m | 3.0 m | 4.9 m | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 4.8 m | 3.2 m | 4.9 m | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Clause 52.06-9 design criteria | TTM Response |
|--|--|
| <p>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, other than:</p> <p>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.</p> <p>A structure, which may project into the space if it is at least 2.1 metres above the space.</p> <p>Diagram 1 Clearance to car parking spaces</p>  | Satisfied. |
| Car spaces in garages or carports must be at least 6 metres long and 3.5 metres wide for a single space and 5.5 metres wide for a double space measured inside the garage or carport. | Not Applicable. No garages or carports. |
| Where parking spaces are provided in tandem (one space behind the other) an additional 500 mm in length must be provided between each space. | Not Applicable. No tandem spaces. |
| Where two or more car parking spaces are provided for a dwelling, at least one space must be under cover. | Not Applicable. No dwellings |
| 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 by 500mm. | Satisfied. |
| Design Standard 3 – Gradients | |
| Accessway grades must not be steeper than 1:10 (10 per cent) within 5 metres 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. Refer to Appendix A. |

| Clause 52.06-9 design criteria | TTM Response | | | | | | | | | | | | | |
|--|---|----------------|---------------|------------------|-------------------|-----------|-----------------------|-------------|----------------------------------|-------------------|-----------|-----------------------|-----------|---|
| <p>Ramps (except within 5 metres of the frontage) must have the maximum grades as outlined in Table 3 and be designed for vehicles travelling in a forward direction.</p> <p>Table 3: Ramp gradients</p> <table><tr><th>Type of car park</th><th>Length of ramp</th><th>Maximum grade</th></tr><tr><td rowspan="2">Public car parks</td><td>20 metres or less</td><td>1:5 (20%)</td></tr><tr><td>longer than 20 metres</td><td>1:6 (16.7%)</td></tr><tr><td rowspan="2">Private or residential car parks</td><td>20 metres or less</td><td>1:4 (25%)</td></tr><tr><td>longer than 20 metres</td><td>1:5 (20%)</td></tr></table> | Type of car park | Length of ramp | Maximum grade | Public car parks | 20 metres or less | 1:5 (20%) | longer than 20 metres | 1:6 (16.7%) | Private or residential car parks | 20 metres or less | 1:4 (25%) | longer than 20 metres | 1:5 (20%) | <p>Satisfied.</p> <p>Refer to Appendix A.</p> |
| Type of car park | Length of ramp | Maximum grade | | | | | | | | | | | | |
| Public car parks | 20 metres or less | 1:5 (20%) | | | | | | | | | | | | |
| | longer than 20 metres | 1:6 (16.7%) | | | | | | | | | | | | |
| Private or residential car parks | 20 metres or less | 1:4 (25%) | | | | | | | | | | | | |
| | longer than 20 metres | 1:5 (20%) | | | | | | | | | | | | |
| <p>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 meters to prevent vehicles scraping or bottoming.</p> <p>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.</p> | <p>Satisfied.</p> <p>Refer to Appendix A.</p> | | | | | | | | | | | | | |

The proposed development satisfies all sections of the relevant design criteria outlined in Clause 52.06-9 of the Planning Scheme.

6 Traffic Generated by the Proposal and its Impact

6.1 Likely Subject Site Traffic Generation

Guidance on the traffic generation for a Bunnings Warehouse use is provided by surveys undertaken at an existing Bunnings Warehouse development located at 266 Darebin Road, Fairfield (Bunnings Fairfield) at the following times:

- Bunnings Fairfield:
 - Saturday 3rd August 2019 – 11am-2pm

The surveys recorded the number of vehicles entering and exiting both of the Bunnings car parks. The table below summarises the survey results.

Table 6.1: Traffic Survey Results

| Location | Peak Period | Vehicle Movements | | |
|--|------------------------------------|-------------------|-----|-------|
| | | In | Out | Total |
| Bunnings Fairfield 266 Darebin Road, Fairfield | Weekend Lunchtime Peak 12pm-1pm | 121 | 118 | 379 |

Bunnings Fairfield was chosen as it will operate similar to the proposed Bunnings Warehouse at 145 Glenlyon Road, Brunswick East. This site is located in a built-up urban area and is similar in size being considered on the smaller end of Bunnings Warehouse developments.

6.2 Glenlyon Road/Lygon Street Intersection

TTM Consulting has utilised Traffic Signal Volume Data from the Victorian Government Database for the Glenlyon Road/Lygon Street intersection located approximately 65 metres east of the site.

The traffic count data was extracted for the peak periods outlined below:

- Weekend Lunchtime Peak: 12noon-1pm

The following image outlines the existing peak hour traffic volumes. The data does not show any left or right turn movements from Lygon Street and therefore these values have been manually inputted based on conservative estimates.

Analysis has been undertaken using the intersection analysis software Sidra, to determine the 95th percentile queue length of the intersection. The results can be seen below.

Table 6.3: 95th Percentile Queue Length at Glenlyon Road/Lygon Street Intersection

Site: 145 Glenlyon Road, Brunswick
Reference: 10839R8561.DOC

The service vehicle access to the site is located 60 metres from the intersection and the customer/staff vehicle access to the site is located 115 metres from the intersection. The analysis above shows that the queue lengths along the western leg of Glenlyon Road will be upto 64 metres during the Weekend Lunchtime period.

Therefore, the queuing along Glenlyon Road will not impact vehicle access into the subject site.

6.3 145 Glenlyon Road Site Access Intersection

Utilising the traffic generation determined in Section 6.1 and the volume data analysed in Section 6.2, further Sidra analysis has been undertaken for the customer/staff vehicle access onto Glenlyon Road located adjacent to the western boundary of the site.

The following table provides a summary of the Sidra outputs for the peak period assessed.

Table 6.4: SIDRA Analysis for 145 Glenlyon Road Site Access

| | Degree of Saturation | 95 th Percentile Queue Length |
|------------------------|----------------------|--|
| Weekend Lunchtime Peak | | |

The above output from the Sidra analysis confirms that the additional traffic generated by the proposed Bunnings Warehouse will have no impact on the road network and any queueing that occurs is relatively short in length.

At peak times the 85th percentile queue length for vehicles turning right into the site from Glenlyon Road is 2 vehicles and similarly the 85th percentile queue length for vehicle exiting the site to turn right is 2 vehicles.

6.4 Overall Summary Of Traffic Impact

Following a review of the existing traffic conditions on Glenlyon Road along the site frontage and the traffic generated by similar size Bunnings Centres in Fairfield. The additional traffic generated by the proposal can be adequately accommodated within the surrounding network with impacts summarised as follows :

- Analysis of the existing traffic signals at the intersection of Glenlyon Road and Lygon Street confirms that the 85th percentile queue length peaks during the weekend lunchtime period with a queue length of upto 64 metres. The development plan proposes two accesses onto Glenlyon Road at 60 metres (loading bay access only) and 115 metres (main access). Thus traffic queued on Glenlyon Road at Lygon Street traffic signals may extend beyond the loading access on the very odd occasion but will not impact on the main access into the site which is 55 metres further west.
- For the main access (western access) onto the site, the right turn entry and right turn exit movements are the most critical movements as they require adequate gaps in the traffic flow to allow these movements to occur. The analysis confirms that at peak times the 85th percentile queue length for vehicles turning right into the site from Glenlyon Road is 2 vehicles and similarly the 85th percentile queue length for vehicle exiting the site to turn right is 2 vehicles. This queue length is well within acceptable design criteria for the access conditions from a collector road (Glenlyon Road).

7 Bicycle Parking

Table 1 in Clause 52.34-3 of the Moreland Planning Scheme outlines the number of bicycle spaces required for various land uses. However the subject proposal does not fall specifically into any of the listed uses.

Identifying the proposed development as a 'Trade Supplies' category would require it to be nested under the 'Retail premises group'. This results in the following bicycle parking requirement.

Table 7.1: Bicycle Parking Requirements

| Land Use | | Parking Scheme Requirement Rate | Inventory | Requirement |
|--------------|----------|--|-----------|---------------|
| Retail | Employee | 1 space to each 300 sqm of leasable floor area | 8,696 sqm | 29 no. |
| | Customer | 1 space to each 500 sqm of leasable floor area | 8,696 sqm | 17 no. |
| Total | | | | 46 no. |

TTM considers this an excessive requirement for bicycle parking particularly given that many of the goods sold at a Bunnings Store (including almost all items available from the nursery, bagged goods and timber trade area) are too large to be conveniently transported by bicycle.

The Applicant is proposing to provide 14 bicycle parking spaces with 10 located adjacent to the western access on Glenlyon Road and 4 located within Basement Level 1. This will easily accommodate any staff members who may choose to cycle to/from work and the likely minimal customer bicycle parking demand.

8 Summary and Conclusions

The proposed development involves the construction of a Bunnings Warehouse Trade Supplies store at 145 Glenlyon Road, Brunswick.

The analysis of the development is summarised as follows:

- The Applicant is proposing 250 on-site parking spaces which is equivalent to 2.87 spaces per 100 sqm LFA which is considered appropriate.
- The additional traffic generated by the development can be appropriately accommodated within the existing road network and whilst some queuing may occur when vehicles enter/exit the site, the queue lengths are well within acceptable limits.
- The site access and on-site car parking layout is designed in accordance with design criteria of Clause 52.06-9 of the Planning Scheme.
- The provision of 14 on-site bicycle parking spaces is appropriate to service the development.

The proposed development is appropriate from a traffic engineering perspective.

TTM Consulting (Vic) Pty Ltd



Nathan Paul
Traffic Engineer

Record

| No. | Author | Reviewed/Approved | Description | Date |
|-----|---------|-------------------|------------------------------------|------------|
| 1. | N. Paul | D. Hancox | Original Report | 23/04/2020 |
| 2. | N. Paul | D. Hancox | Amendment | 05/05/2020 |
| 3. | N. Paul | D. Hancox | Updates to summary and conclusions | 08/05/20 |
| 4. | N. Paul | D. Hancox | Updates to Council RFI | 22/7/20 |

Appendix A Development Plans

PROPOSED BUNNINGS WAREHOUSE

145 GLENLYON RD BRUNSWICK EAST



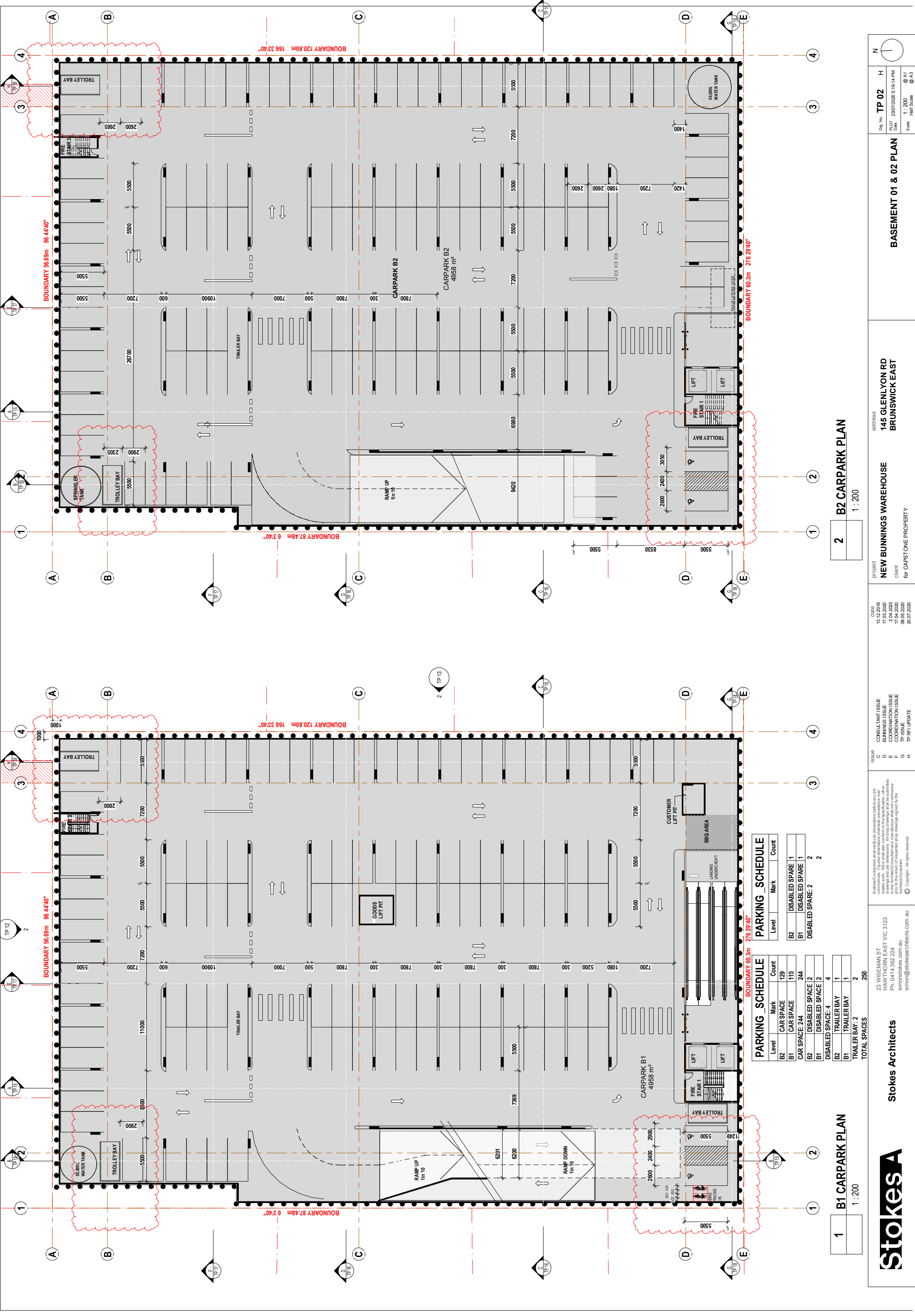
| GROSS AREA SCHEDULE | | |
|------------------------------|----------------------|--|
| Name | Area | |
| MAIN ENTRY | 233 m ² | |
| MAIN WAREHOUSE GROUND LEVEL | 1857 m ² | |
| MAIN WAREHOUSE L1 | 2603 m ² | |
| WAREHOUSE AREA | 4892 m ² | |
| TIMBER TRADE SALES | 1855 m ² | |
| TIMBER TRADE SALES | 1855 m ² | |
| OUTDOOR NURSERY | 781 m ² | |
| NURSERY AREA | 781 m ² | |
| BAGGED GOODS | 1113 m ² | |
| BAGGED GOODS | 1113 m ² | |
| MEZZANINE OFFICE & AMENITIES | 255 m ² | |
| | 255 m ² | |
| BUNNINGS | 8696 m ² | |
| CARPARK B1 | 4958 m ² | |
| CARPARK B2 | 4958 m ² | |
| CARPARK ENTRY | 502 m ² | |
| LOADING | 659 m ² | |
| LOADING | 381 m ² | |
| CARPARK | 11458 m ² | |
| CARPARK | 11458 m ² | |

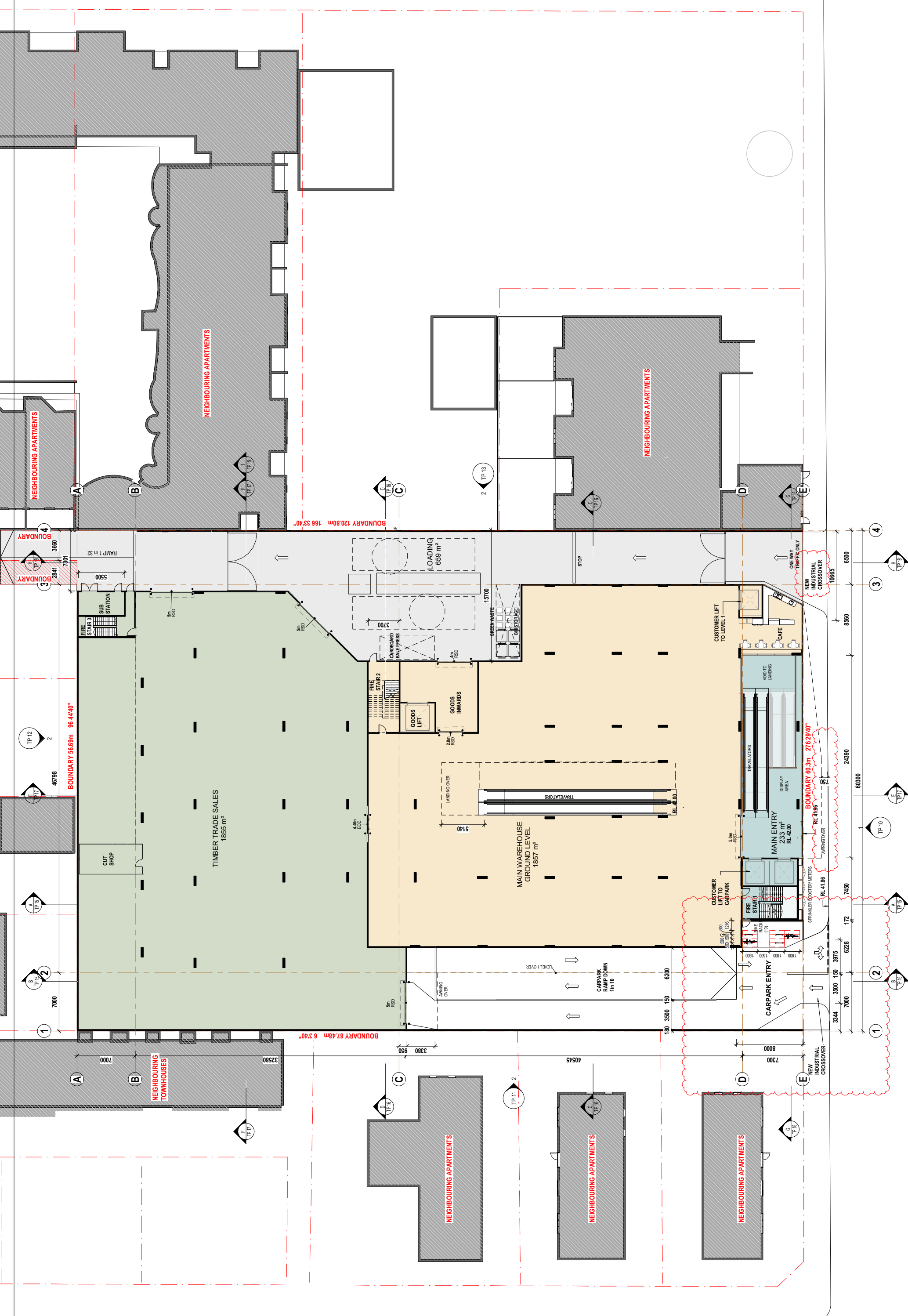
| NET LETTABLE AREA | | |
|-------------------------|---------------------|--|
| Name | Area | |
| BAGGED GOODS NLA | 1118 m ² | |
| ENTRY NLA | 63 m ² | |
| MAIN WAREHOUSE GRND NLA | 1702 m ² | |
| MAIN WAREHOUSE L1 NLA | 2401 m ² | |
| NURSERY NLA | 770 m ² | |
| TRADE SALES NLA | 1733 m ² | |
| RETAIL AREA 6 | 7847 m ² | |
| OFFICE L1 NLA | 253 m ² | |
| INTERNAL 1 | 253 m ² | |
| Grand total 7 | 8100 m ² | |

| PARKING SCHEDULE | | | |
|------------------|----------------|-------|--|
| Level | Mark | Count | |
| B2 | CAR SPACE | 129 | |
| B1 | CAR SPACE | 115 | |
| CAR SPACE | | 244 | |
| B2 | DISABLED SPACE | 2 | |
| B1 | DISABLED SPACE | 2 | |
| DISABLED SPACE | | 4 | |
| B2 | TRAILER BAY | 1 | |
| B1 | TRAILER BAY | 1 | |
| TRAILER BAY | | 2 | |
| TOTAL SPACES | | 250 | |
| B2 | DISABLED SPARE | 1 | |
| B1 | DISABLED SPARE | 1 | |
| DISABLED SPARE | | 2 | |

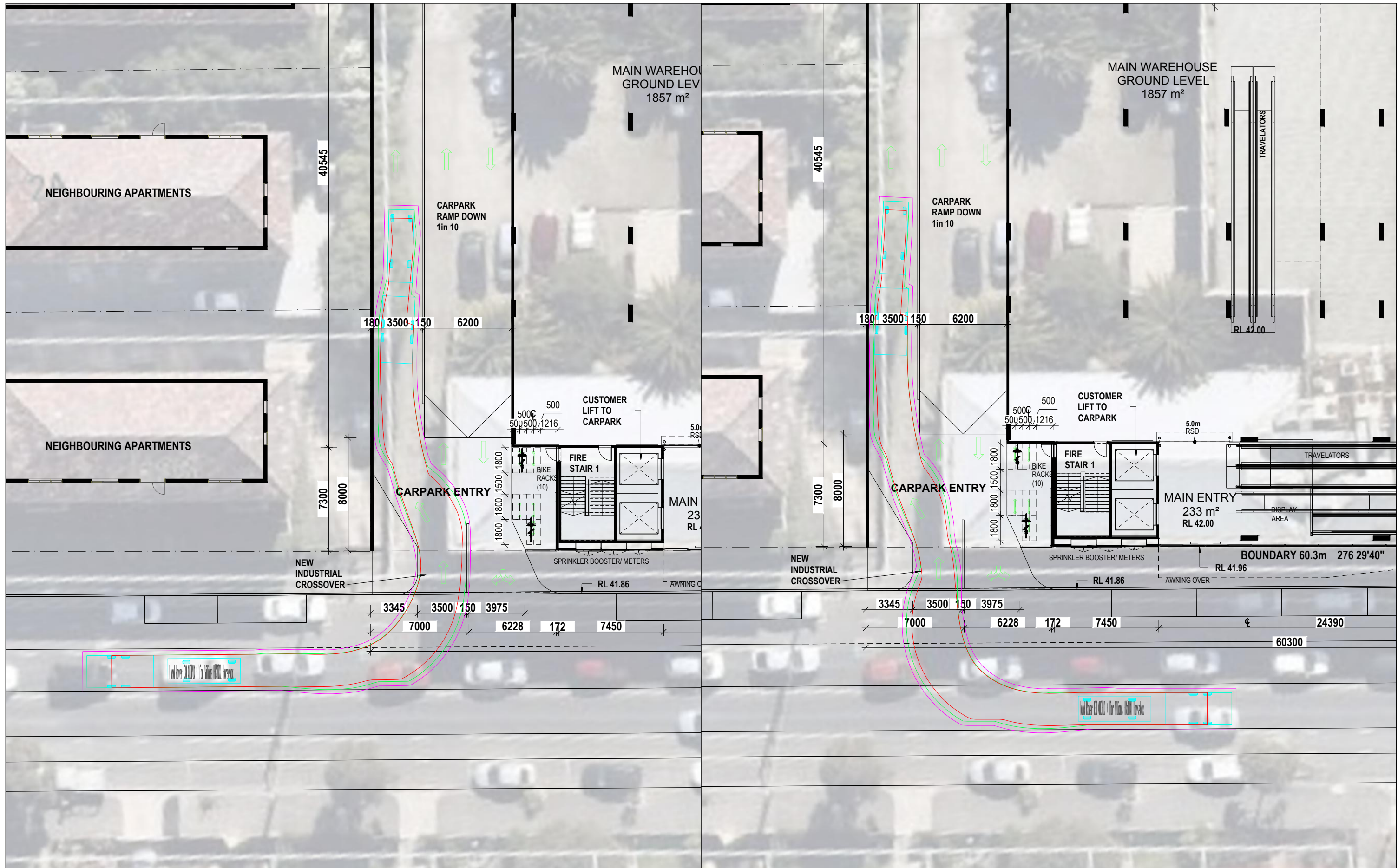
| AREA SUMMARY | | | |
|-----------------------|----------|--|--|
| SITE AREA | 5395sqm | | |
| EXISTING BUILDING NLA | 5000 sqm | | |
| PROPOSED BUILDING NLA | 8100 sqm | | |

| DRAWING SCHEDULE | | |
|------------------|----------------------------|--|
| TP 00 | SURVEY | |
| TP 01 | SITE PLAN | |
| TP 02 | BASEMENT 01 & 02 PLAN | |
| TP 03 | PROPOSED GROUND FLOOR PLAN | |
| TP 04 | PROPOSED LEVEL 01 PLAN | |
| TP 05 | PROPOSED ROOF PLAN | |
| TP 10 | SOUTH ELEVATION | |
| TP 11 | WEST ELEVATION | |
| TP 12 | NORTH ELEVATIONS | |
| TP 13 | EAST ELEVATION | |
| TP 15 | SECTIONS | |
| TP 16 | SECTIONS | |
| TP 17 | SECTIONS | |
| TP 18 | SECTIONS | |
| TP 19 | NEIGHBOUR SECTIONS | |
| TP 20 | 9AM SHADOWS | |
| TP 21 | 10AM SHADOWS | |
| TP 22 | 11AM SHADOWS | |
| TP 23 | 12PM SHADOWS | |
| TP 24 | 1 PM SHADOWS | |
| TP 25 | 2PM SHADOWS | |
| TP 26 | 3PM SHADOWS | |
| TP 27 | PERSPECTIVES | |
| TP 28 | PERSPECTIVES | |
| TP 29 | PERSPECTIVES | |





Appendix B Swept Path Diagrams



Wheel path

Vehicle Overhang

Vehicle Overhang + 300mm Clearance

Swept path diagram prepared using AutoTrack v19

Land Rover 130 (HCPU) + Ifor Williams HB510XL Horsebox

| | |
|-----------------------------|---------|
| Overall Length | 10.930m |
| Overall Width | 2.300m |
| Overall Body Height | 2.820m |
| Min Body Ground Clearance | 0.164m |
| Max Track Width | 2.298m |
| Lock-to-lock time | 4.00s |
| Curb to Curb Turning Radius | 7.500m |

Acoustics Data Traffic Waste

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PROPOSED BUNNINGS WAREHOUSE, 145 GLENLYON ROAD, BRUNSWICK

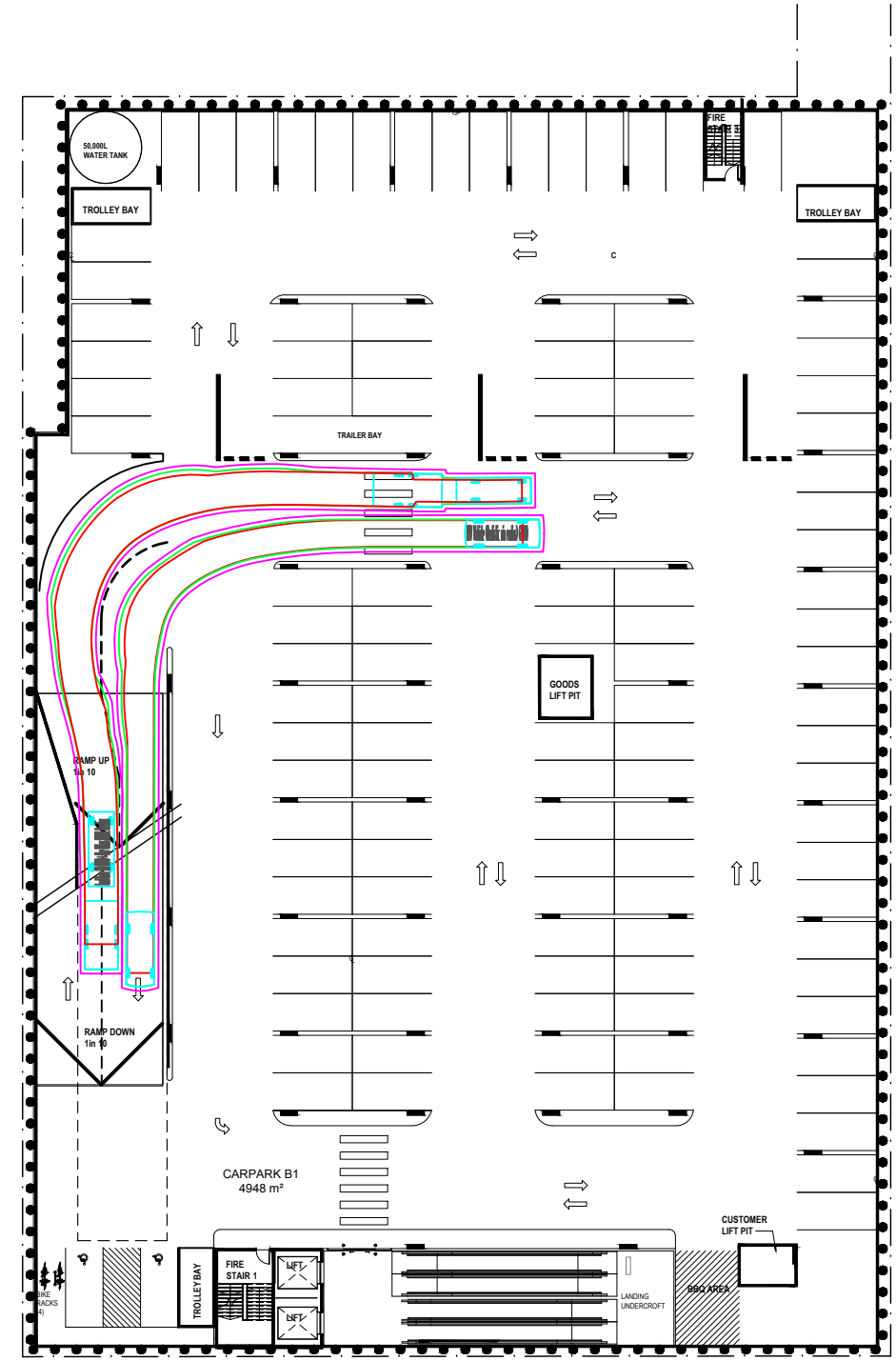
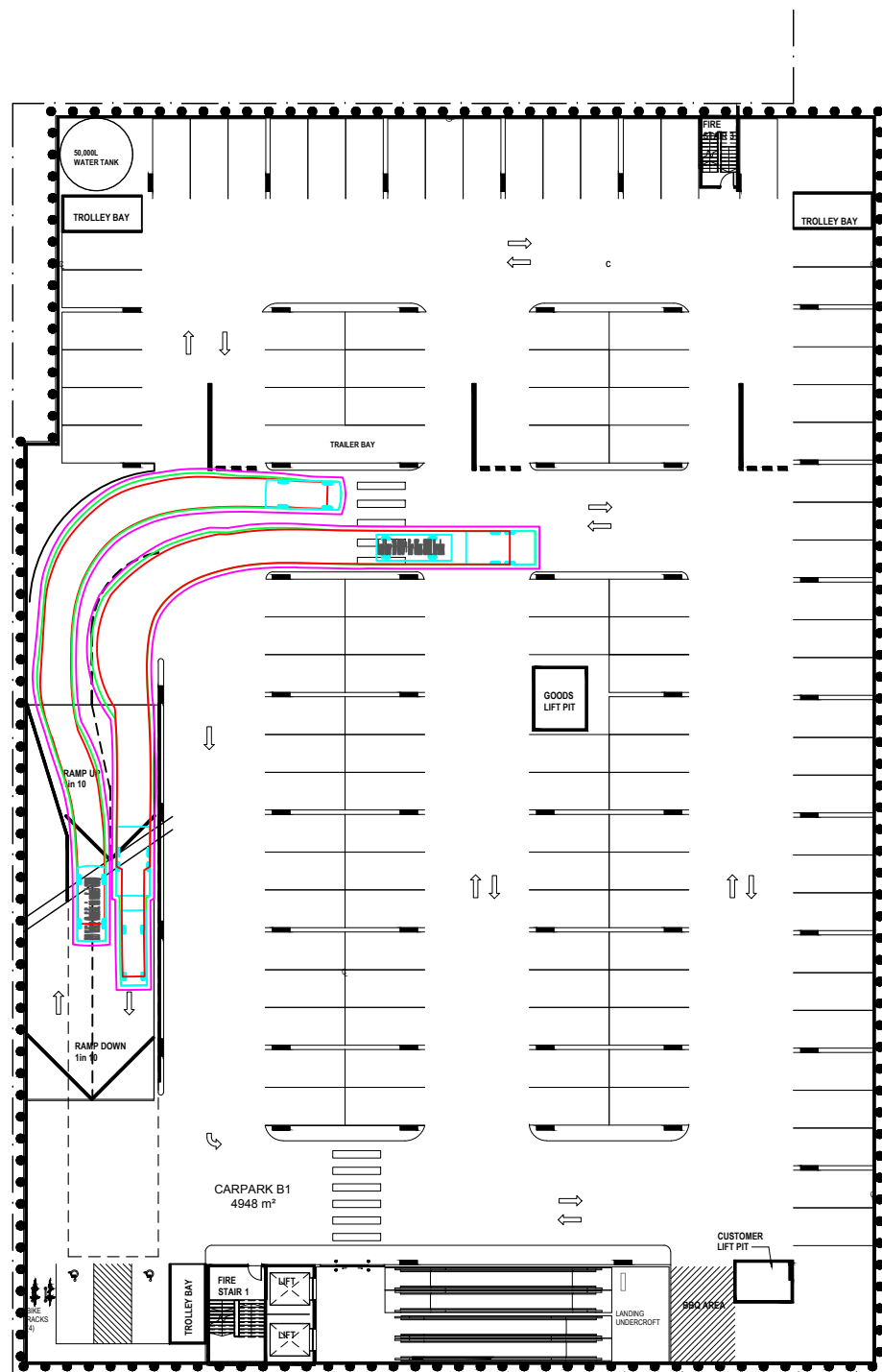
SWEPT PATH DIAGRAMS

Scale 1:250 @ A3

Drawing No : 10839-05

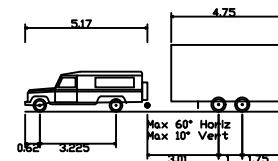
Sheet No : 7 Issue : A

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| A | NP | 13/07/20 | Original Issue |
| Issue/Appd | Date | Comments | |



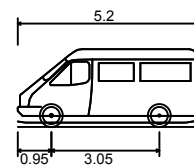
Swept path diagram prepared using AutoTrack v19

- Wheel path
- Vehicle Overhang
- Vehicle Overhang + 300mm Clearance



Land Rover 130 (HCPU) + Ifor Williams HB510XL Horsebox

Overall Length 5.17m
Overall Width 2.300m
Overall Body Height 2.820m
Min Body Ground Clearance 0.164m
Max Track Width 2.298m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 7.500m



B99 Vehicle (Realistic min radius) (2004)

Overall Length 5.200m
Overall Width 1.940m
Overall Body Height 1.527m
Min Body Ground Clearance 0.120m
Track Width 1.840m
Lock to Lock Time 4.00sec
Curb to Curb Turning Radius 6.250m

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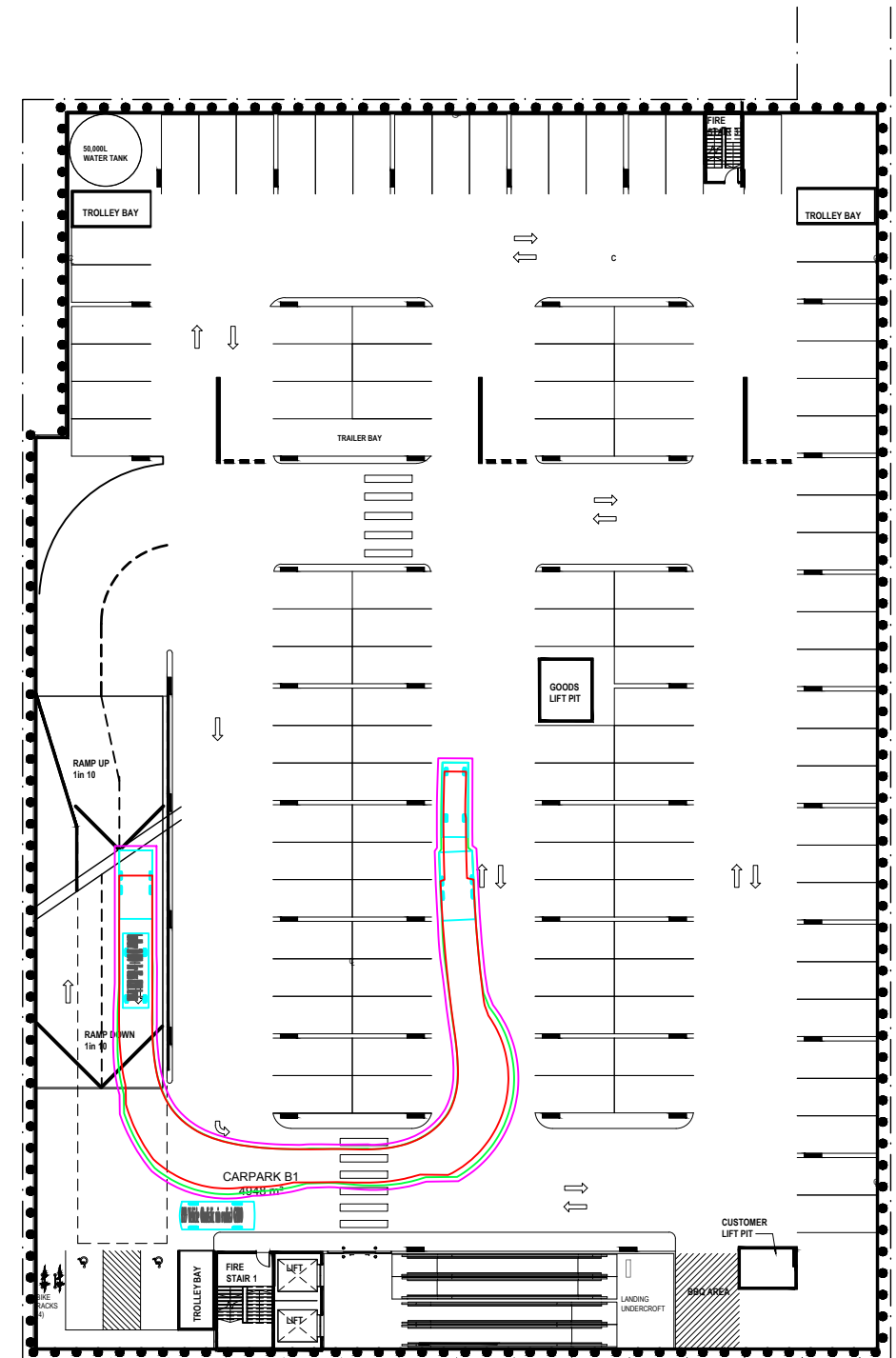
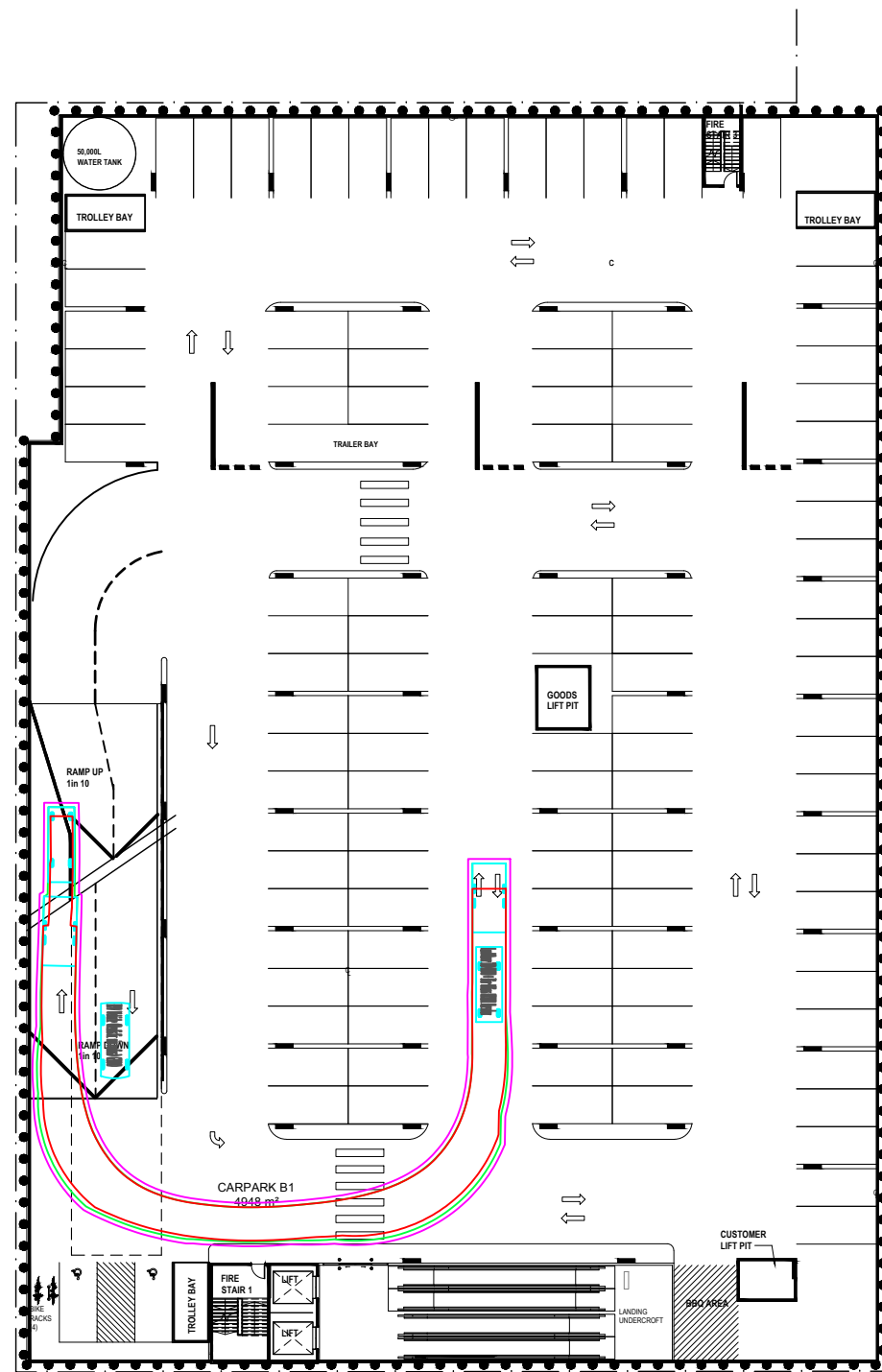
**PROPOSED BUNNINGS
WAREHOUSE,
145 GLENLYON ROAD,
BRUNSWICK
SWEPT PATH DIAGRAM**

Scale 0 5 10
1:500 @ A3

Drawing No : 10839-05

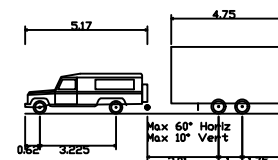
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| Issue | Appd | Date | Comments |
|-------|------|----------|----------------|
| A | NP | 20/04/20 | Original Issue |



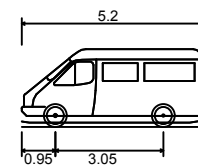
Swept path diagram prepared using AutoTrack v19

- Wheel path
- Vehicle Overhang
- Vehicle Overhang + 300mm Clearance



Land Rover 130 (HCPU) + Ifor Williams HB510XL Horsebox

| | |
|-----------------------------|---------|
| Overall Length | 10.930m |
| Overall Width | 2.300m |
| Overall Body Height | 2.220m |
| Min Body Ground Clearance | 0.164m |
| Max Track Width | 2.298m |
| Lock-to-lock time | 4.008 |
| Curb to Curb Turning Radius | 7.500m |



B99 Vehicle (Realistic min radius) (2004)

| | |
|-----------------------------|---------|
| Overall Length | 5.200m |
| Overall Width | 1.940m |
| Overall Body Height | 1.527m |
| Min Body Ground Clearance | 0.120m |
| Track Width | 1.840m |
| Lock to Lock Time | 4.00sec |
| Curb to Curb Turning Radius | 6.250m |

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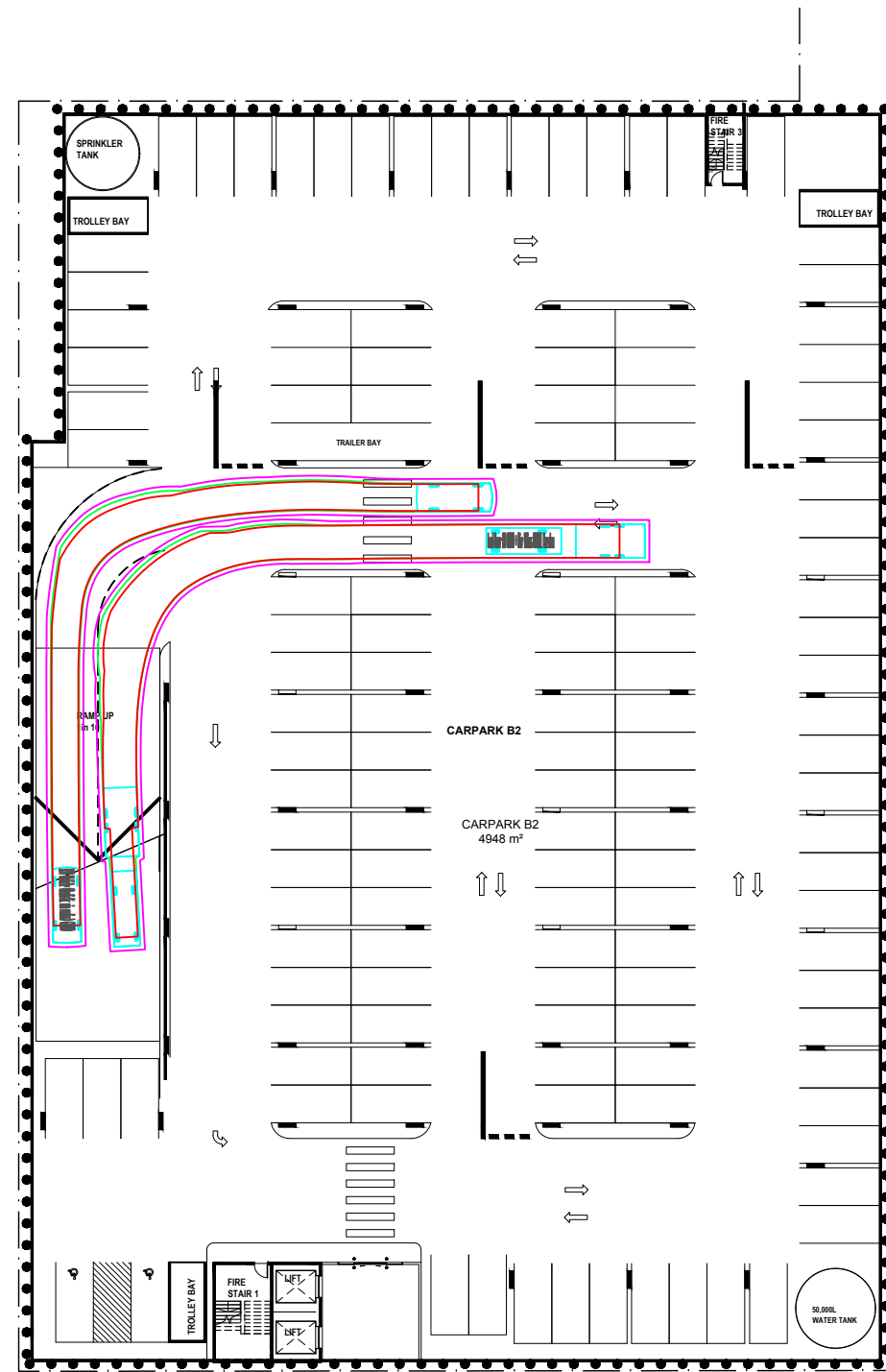
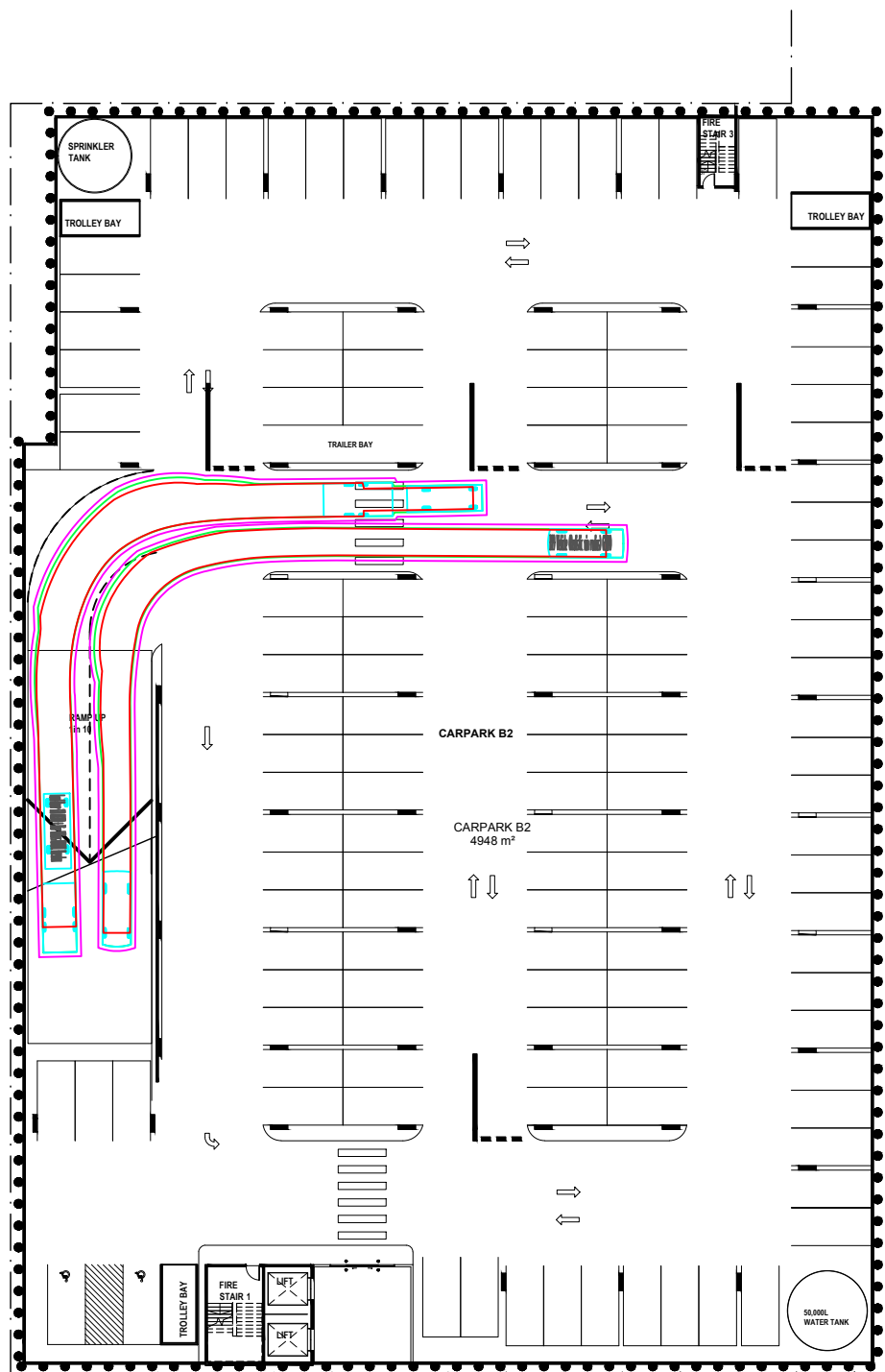
**PROPOSED BUNNINGS
WAREHOUSE,
145 GLENLYON ROAD,
BRUNSWICK
SWEPT PATH DIAGRAM**

Scale 0 5 10
1:500 @ A3

Drawing No : 10839-05

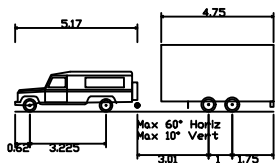
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| Issue/Appd | Date | Comments | |



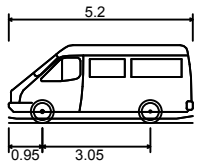
Swept path diagram prepared using AutoTrack v19

- Wheel path
- Vehicle Overhang
- Vehicle Overhang + 300mm Clearance



Land Rover 130 (HCPU) + Ifor Williams HB510XL Horsebox

| | |
|-----------------------------|--------|
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| Overall Width | 2.300m |
| Overall Body Height | 2.820m |
| Min Body Ground Clearance | 0.164m |
| Max Track Width | 2.298m |
| Lock-to-lock time | 4.00s |
| Curb to Curb Turning Radius | 7.500m |



B99 Vehicle (Realistic min radius) (2004)

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| Min Body Ground Clearance | 0.120m |
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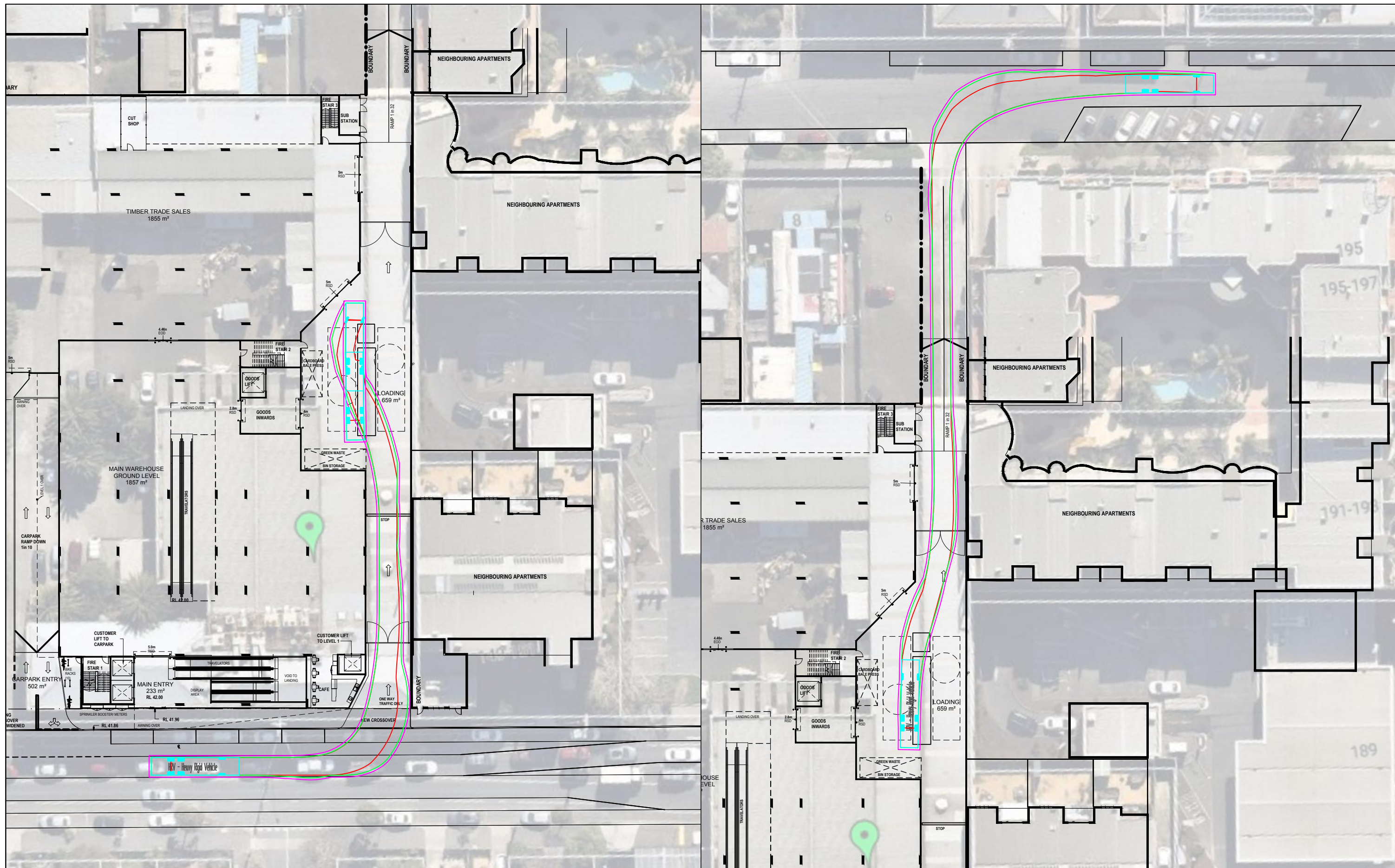
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**PROPOSED BUNNINGS WAREHOUSE,
 145 GLENLYON ROAD,
 BRUNSWICK
 SWEPT PATH DIAGRAM**

Scale 0 5 10
 1:500 @ A3

Drawing No : 10839-05
 Sheet No : 6 Issue : A

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| | | | |
| A | NP | 20/04/20 | Original Issue |
| Issue/Appd | Date | Comments | |



Wheel path

Vehicle Overhang

Vehicle Overhang + 300mm Clearance

Swept Path Diagram Prepared using AutoTrack v19

HRV - Heavy Rigid Vehicle (See Note...)

| | |
|-----------------------------|---------|
| Overall Length | 12.500m |
| Overall Width | 2.500m |
| Overall Body Height | 3.933m |
| Min Body Ground Clearance | 0.150m |
| Track Width | 2.500m |
| Lock to Lock Time | 6.00sec |
| Curb to Curb Turning Radius | 12.500m |

PROPOSED BUNNINGS WAREHOUSE, 145 GLENLYON ROAD, BRUNSWICK

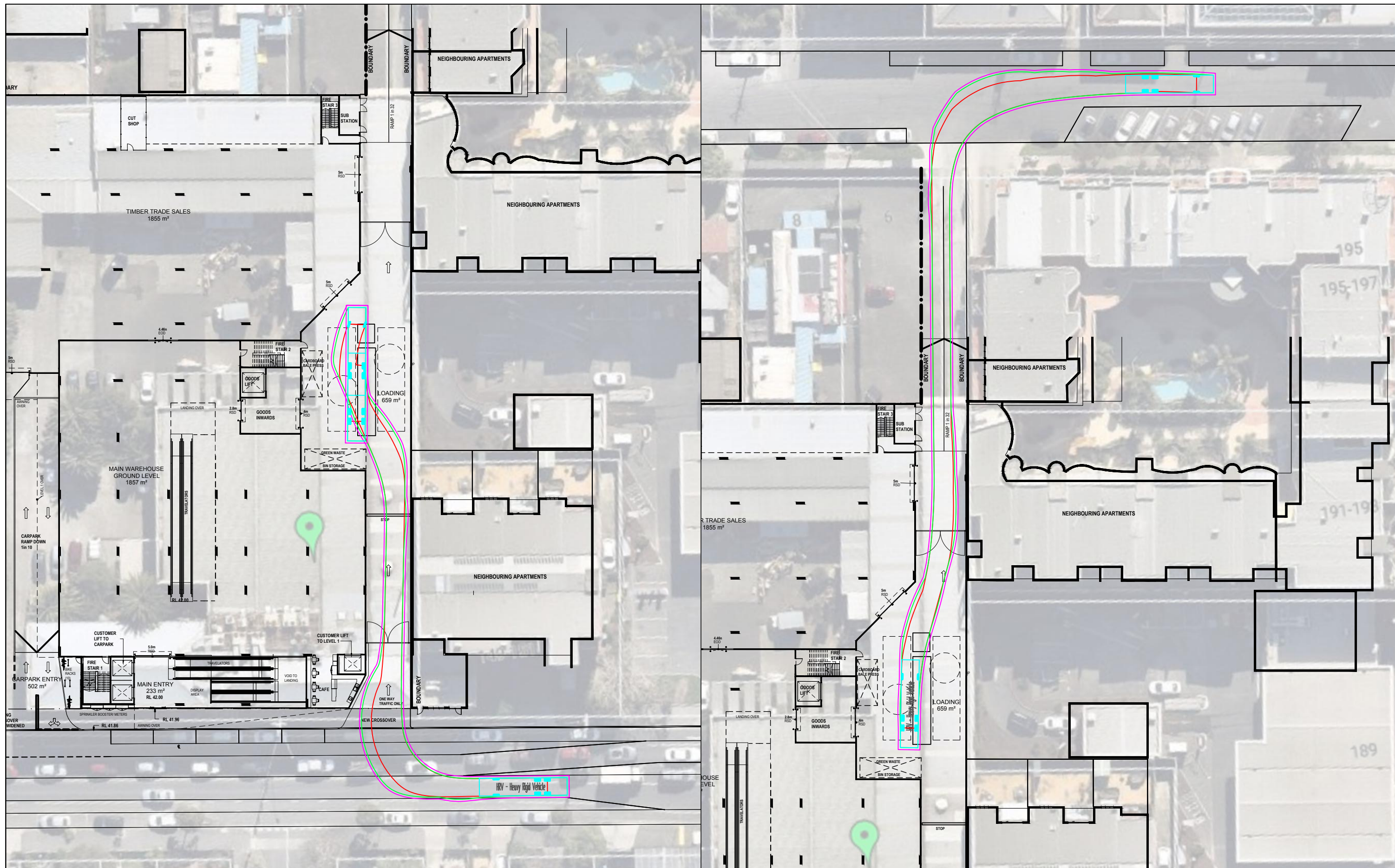
SWEPT PATH DIAGRAMS

Scale 1:500 @ A3

Drawing No : 10839-05

Sheet No : 11 Issue : A

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| A | NP | 20/04/20 | Original Issue |
| Issue | Appd | Date | Comments |



Wheel path

Vehicle Overhang

Vehicle Overhang + 300mm Clearance

Swept Path Diagram Prepared using AutoTrack v19

HRV - Heavy Rigid Vehicle (See Note...)

| | |
|-----------------------------|---------|
| Overall Length | 12.500m |
| Overall Width | 2.500m |
| Overall Body Height | 3.933m |
| Min Body Ground Clearance | 0.150m |
| Track Width | 2.500m |
| Lock to Lock Time | 6.00sec |
| Curb to Curb Turning Radius | 12.500m |

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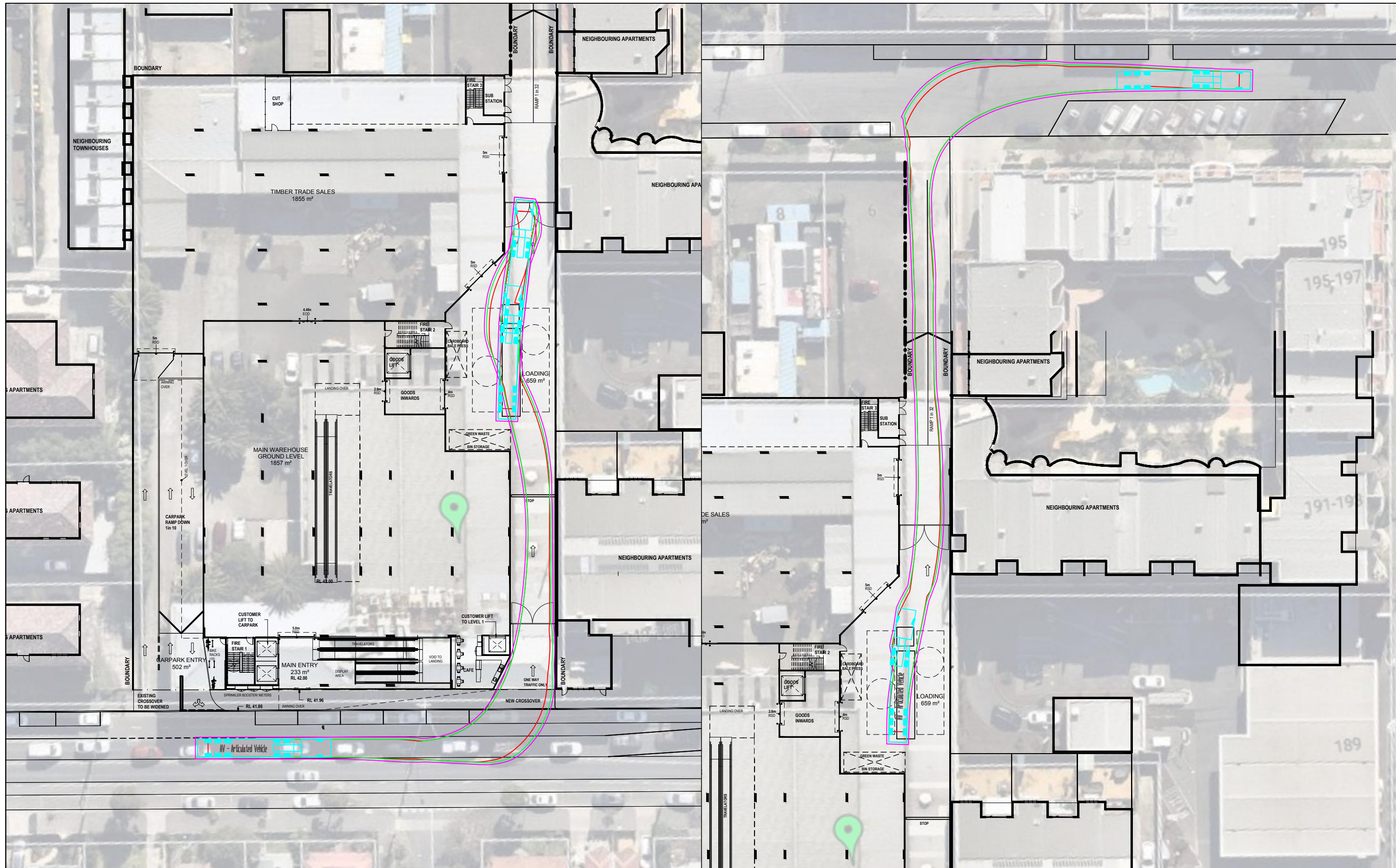
SWEPT PATH DIAGRAMS

Scale 1:500 @ A3

Drawing No : 10839-05

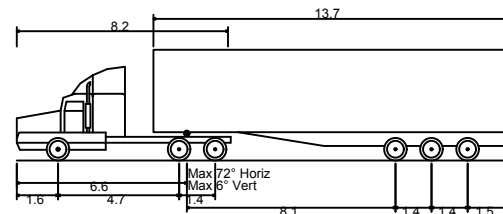
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| Issue | Appd | Date | Comments |

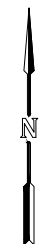


- Wheel path
- Vehicle Overhang
- Vehicle Overhang + 300mm Clearance

Swept path diagram prepared using AutoTrack v19



AV - Articulated Vehicle (See Note ...)
Overall Length 19.000m
Overall Width 2.500m
Overall Body Height 4.301m
Min Body Ground Clearance 0.418m
Track Width 2.500m
Lock to Lock Time 6.000sec
Curb to Curb Turning Radius 12.500m



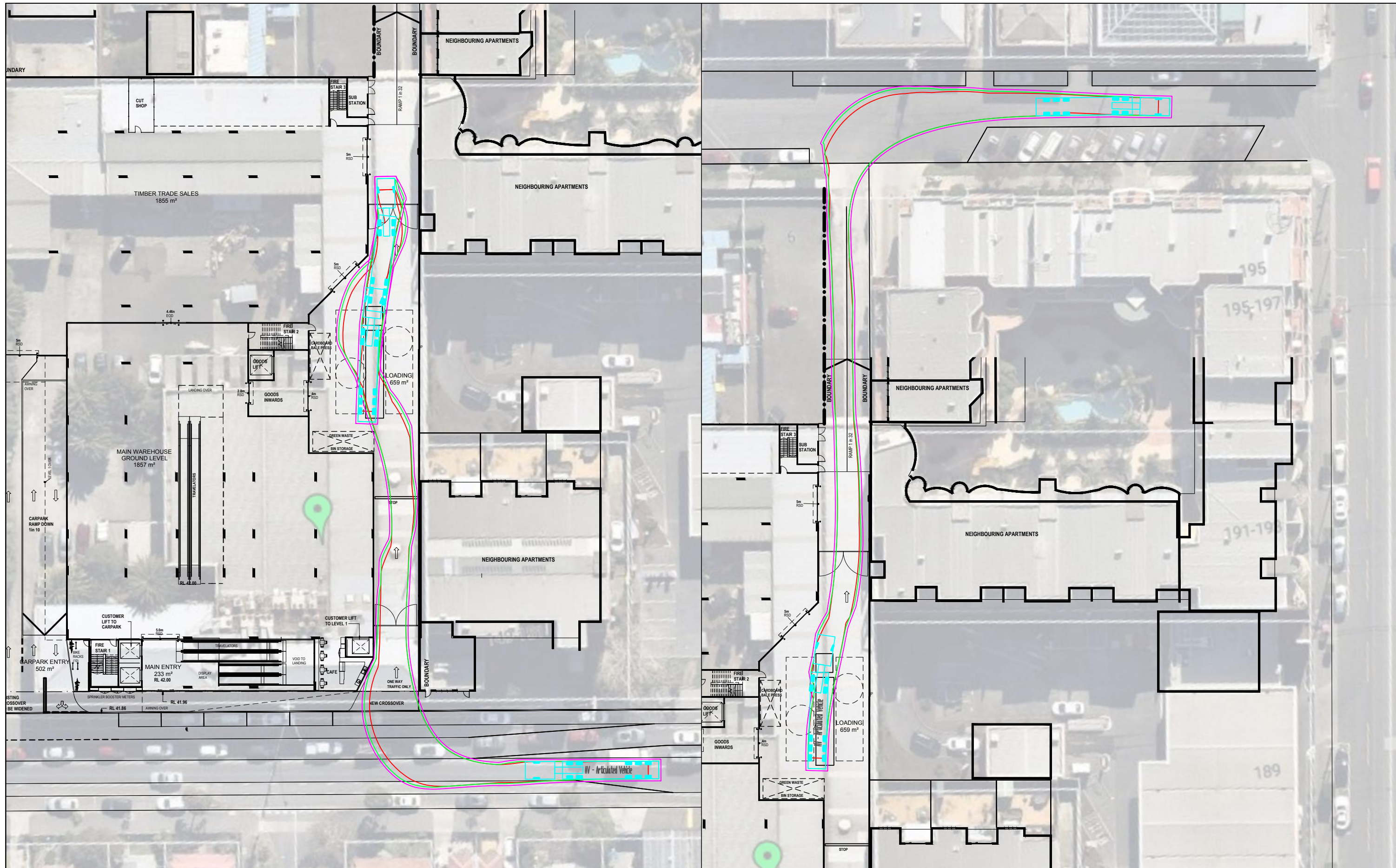
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SWEPT PATH DIAGRAM**

Scale
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1:500 @ A3

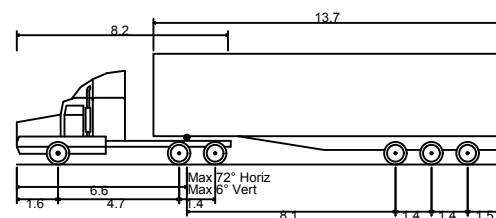
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Sheet No : 13 Issue : A

| Issue | Appd | Date | Comments |
|-------|------|----------|----------------|
| A | NP | 20/04/20 | Original Issue |



- Wheel path
- Vehicle Overhang
- Vehicle Overhang + 300mm Clearance

Swept path diagram prepared using AutoTrack v19



AV - Articulated Vehicle (See Note ...)
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SWEPT PATH DIAGRAM**

Scale
0 5 10
1:500 @ A3

Drawing No : 10839-05
Sheet No : 14 Issue : A

| Issue | Appd | Date | Comments |
|-------|------|----------|----------------|
| A | NP | 20/04/20 | Original Issue |