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Issued via email: s 9(2)(a)

Dear Gemma

ODERINGS RESIDENTIAL DEVELOPMENT

East Cape Consulting (ECC) has been engaged by Oderings Garden Centres Limited to prepare a Transportation Assessment Report (TAR) for the proposed redevelopment of their existing site on Brookvale Road, Havelock North.

This report describes the site location and existing transport environment. It then assesses the additional travel demand generated by the redevelopment assesses the ability of the network to accommodate that demand.

Three recommendations are made; revise the proposed layout of the dwelling shown on Lot 3 to allow adequate space for vehicles to manoeuvre on the site; ensure pedestrian visibility splays (see Figure 20) where the footpath is adjacent to the lot boundary; and provide a shared pedestrian / cyclist path along the length of the Brookvale Road site frontage.

1. Site Location

Oderings is located at 57 Brookvale Road, approximately 1.5km north-east of the Havelock North town centre. The site is on the northern side of Brookvale Road, on the corner of the Romanes Drive/Brookvale Road roundabout. The site location and surrounding area are shown as Figure 1 and Figure 2 below.

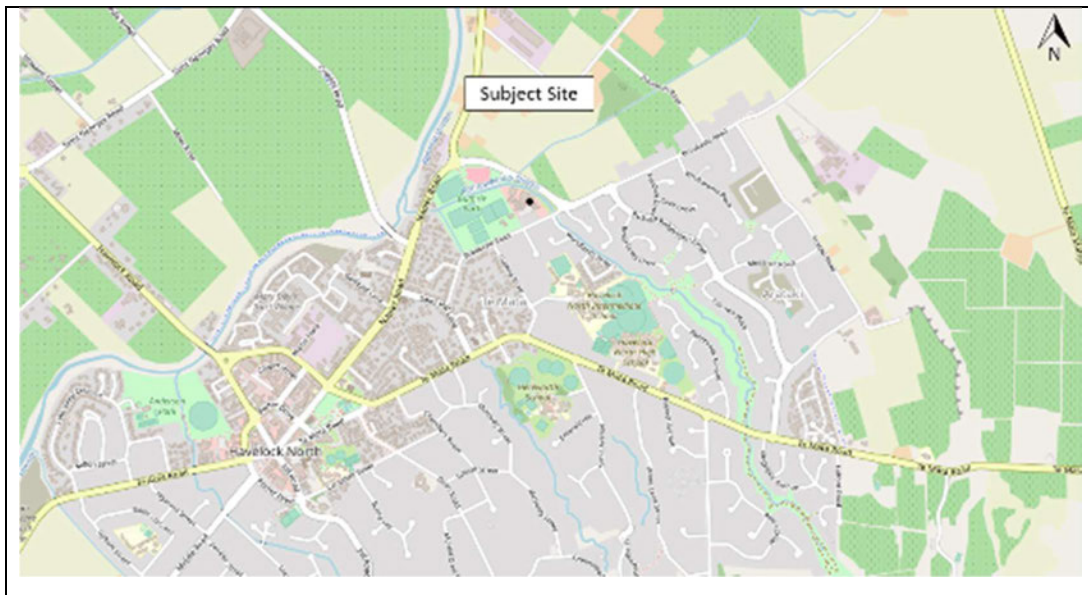


Figure 1 – Site Location (Base Map Source: Open Street Maps)



Figure 2 – Aerial View (Base Map Source: HDC IntraMaps)

The site has an area of approximately 2 Hectares (ha). It is surrounded by Guthrie Park on its north and west sides. Guthrie Park provides public open space, sports fields and a bike track. There is an established residential area to the south and an emerging residential area (within the Brookvale Structure Plan area) to the east. Vehicle access is taken from Brookvale Road.

The site is zoned Plains Production Zone (PPZ) by the Hastings District Council (HDC) Operative District Plan (ODP). It is surrounded by a combination of Open Space, Residential and Deferred Residential Zones. The zoning context is shown as Figure 3.



Figure 3 – ODP Zoning (Base Map Source: HDC IntraMaps)

2. Existing Transport Network

2.1 Road Hierarchy

The site is surrounded by Romanes Drive to the east and Brookvale Road to the south.

Romanes Drive is classified as primary collector in the HDC ODP road hierarchy. Its role is to provide a strategically important link between areas of activity within a community. It provides a connection between the north-eastern areas of Havelock North and the State Highway network, via Napier Road.

Brookvale Road is classified as a secondary collector road. Its role is to provide local connectivity and be a locally preferred route. Brookvale Road provides an east-west connection between north-eastern areas of Havelock North and the town centre.

2.2 Existing Road Network

Brookvale Road is formed to a width of approximately 7m along the site frontage. It provides one traffic lane in each direction separated by a painted centreline. The southern side has an urban treatment including a footpath and kerb and channel. The northern (site) side of the road has a grass berm only as shown in Figure 4.



Figure 4 – Brookvale Road Looking West (Site On Right)

Side road intersections including those with Woodlands Drive and Legorne Lane are either Give Way controlled or unmarked priority intersections, through which Brookvale Road has priority.

Brookvale Road is generally straight and flat in this area and operates with a 50km/h posted speed limit. On-street parking is unrestricted on both sides of the road.

Romanes Drive is sealed to a width of approximately 12m. It provides one traffic lane in each direction and has on-road cycle lanes on both sides of the road. There is also an off-road path on the western side. The posted speed limit is 50km/h. The existing road frontages are shown as Figure 5.

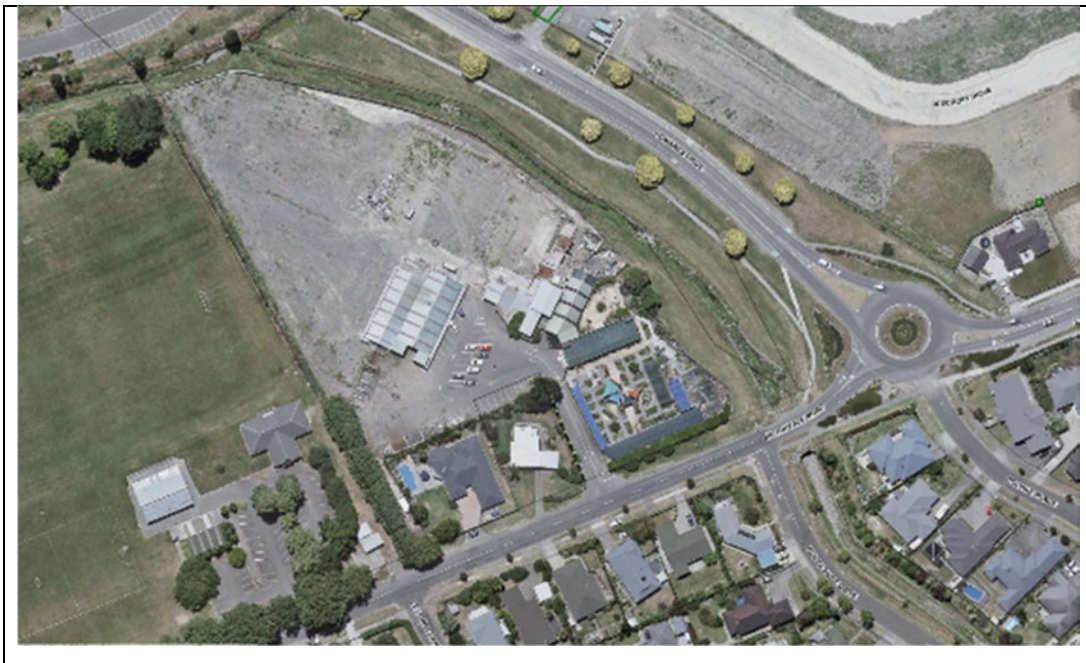


Figure 5 – Site and Road Frontages (Base Map Source: HDC IntraMaps)

Brookvale Road meets Romanes Drive and Bourke Place at a four-leg roundabout. This roundabout provides a single circulating carriageway of approximately 8m around a 20m diameter roundabout island.

Figure 5 also shows the existing site access, which is on Brookvale Road approximately 100m west of the roundabout and 60m west of the Woodlands Drive intersection. The access is marked as a Give Way intersection and provides one entry and one exit lane. No access is provided to Romanes Drive.

2.3 Walking and Cycling

Walking and cycling catchments of up to 20 minutes around the subject site are shown as Figure 6 and Figure 7 below.

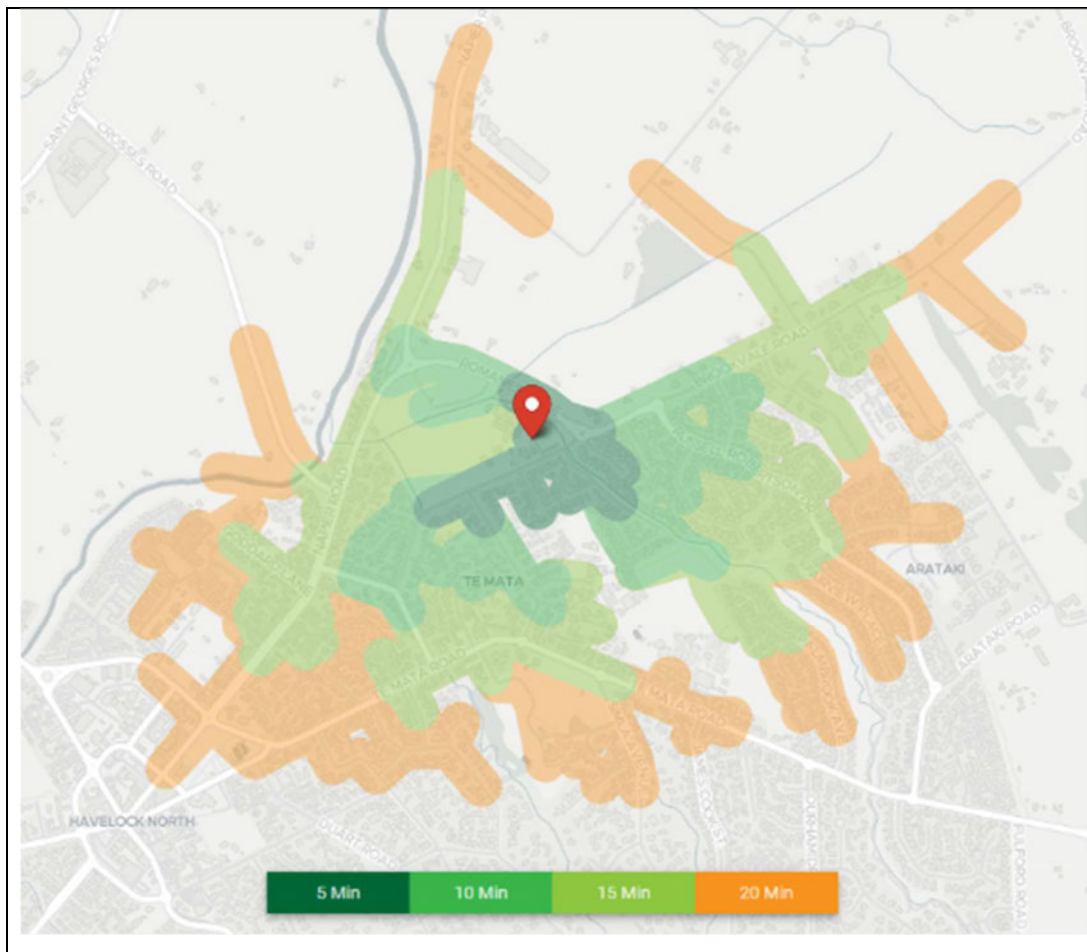


Figure 6 – Walking Catchment (Source: Targomo)

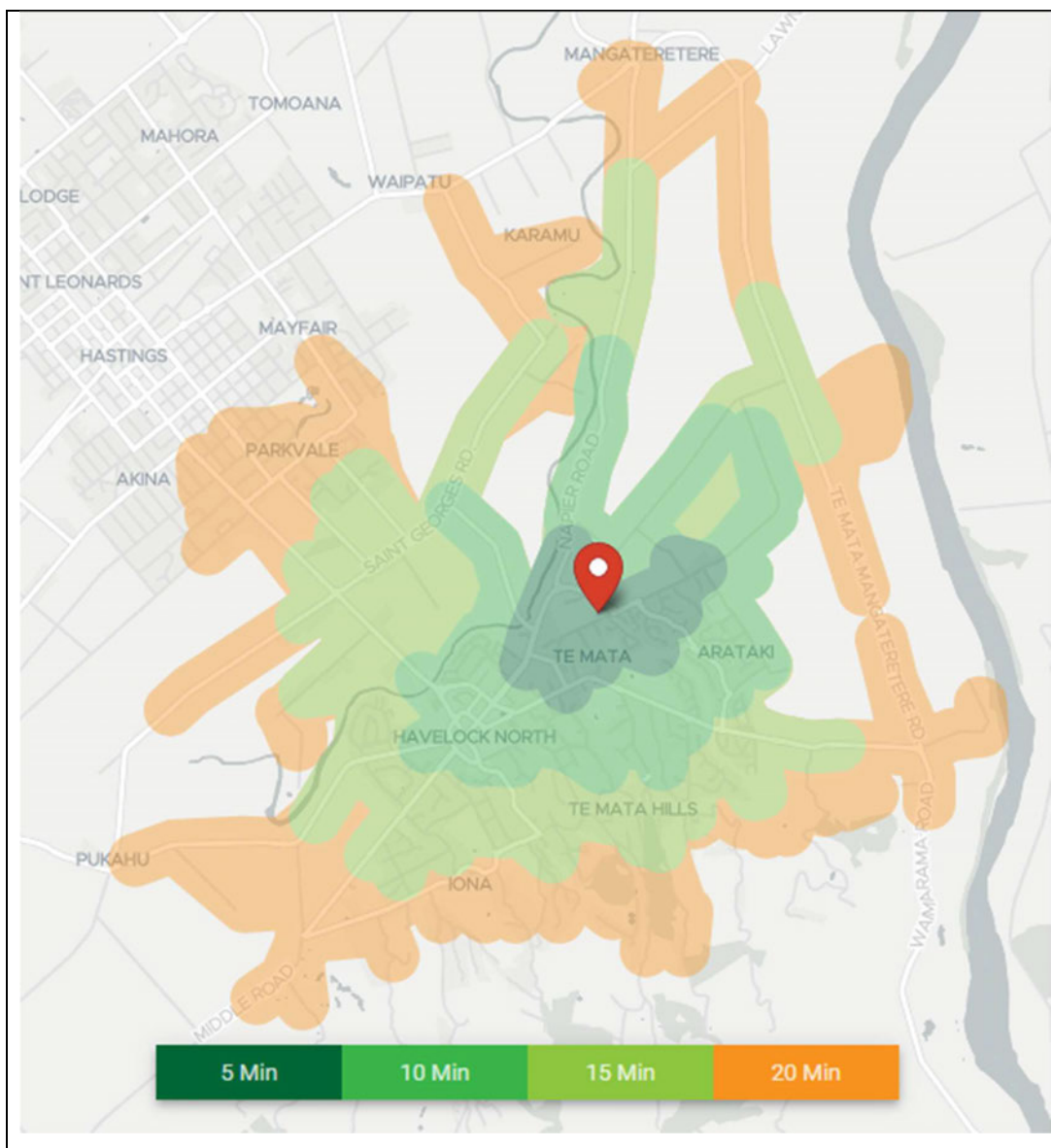


Figure 7 – Cycling Catchment (Source: Targomo)

The 20-minute walking catchment extends to the eastern edge of the town centre and captures a range of local destinations and facilities. These include open space areas, primary, intermediate, and secondary schools, churches and local shops. The 20-minute cycle catchment covers all of Havelock North and the southern part of Hastings.

A footpath is provided on the southern side of Brookvale Road. A path is also provided on the northern side, beyond Guthrie Park. Surrounding roads have footpaths on one or both sides.

The on-road cycle lanes and the off-road path on Romanes Drive are part of the ‘i-Way City Routes’. These connect north to other routes on Napier Road and Crosses Road.

2.4 Public Transport

The nearest existing bus stops to the site are on Te Mata Road, approximately 750m or a 10 minute walk from the site.

The 11 (Commuter Express (Havelock North to Napier and vice versa) and 21 (Hastings and Havelock North Loop) services call at these stops.

3. Traffic Volumes

3.1 Daily Volumes

The Mobileroad website, which sources information from Council road maintenance databases, gives the following daily traffic volumes, in vehicles per day (vpd), for roads in the area:

■ Romanes Drive	4,525 vpd
■ Brookvale Road (west of Romanes Drive)	2,529 vpd
■ Bourke Place	60 vpd
■ Woodlands Drive	201 vpd
■ Legorne Lane	178 vpd

3.2 Intersection Turning Movements

ECC arranged manual turning movement counts at the Romanes Drive/Brookvale Road/Bourke Place roundabout on Thursday 3 March 2022. The surveyed volumes were seasonally adjusted using the factors in Waka Kotahi Research Report 453 (RR453) to represent the fifth busiest week of the year.

The surveys were conducted for a 90-minute period during the morning (AM), 7:30am-9:00am and evening (PM), 4:00-5:30pm peak periods. These periods were selected based on review of tube count data from the area. The AM and PM peak hour movements at the intersection are summarised below as Figure 8.

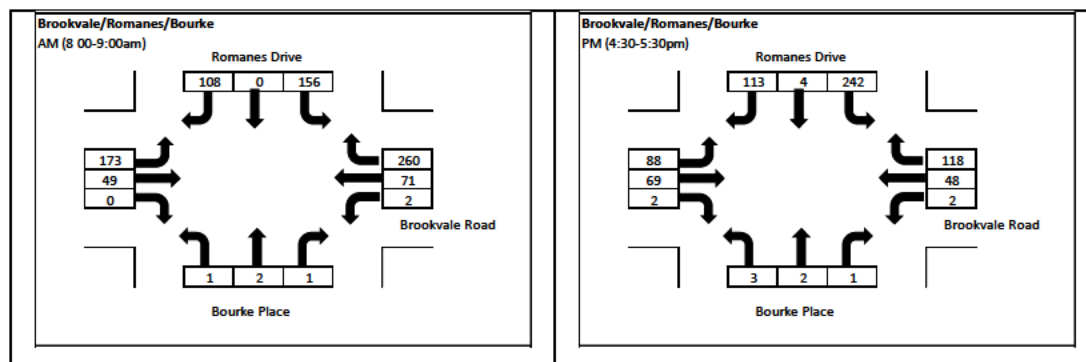


Figure 8 – Intersection Volumes (All Vehicles)

The surveys showed that:

- The roundabout volume is 823 vph during the AM peak and 692 vph during the PM peak;

- Heavy commercial vehicles (HCV) make up 2.8% of the AM peak volume and 0.7% of the PM peak volume.
- The volume along the Brookvale Road site frontage is 402 vph in the AM peak and 323 vph in the PM peak.
- The directional distribution slightly favours eastbound movement in the AM (55%) and westbound movement in the PM (51%).

4. Road Safety

The road safety history of the area was reviewed using the Waka Kotahi Crash Analysis System (CAS). The search covered the Brookvale Road and Romanes Drive frontages of the site and the following intersections:

- Romanes Drive/Brookvale Road roundabout;
- Brookvale Road/Woodlands Drive.
- Brookvale Road/Legorne Lane;
- The Oderings access.

Data was extracted for the five-year period 2017 to 2021 inclusive, as well as any available data from 2022.

One crash was reported. This occurred midway along the Romanes Drive frontage of the site and was associated with construction works on the opposite side of the road. The crash did not result in injury.

Overall, the road safety history does not indicate any underlying issues with the road network in this area.

5. Planned Future Transport Network

5.1 Brookvale Structure Plan

Land on the opposite side of Romanes Drive is part of the Brookvale Structure Plan (BSP). The intended future land use pattern and transport network in this area are shown below as Figure 9.

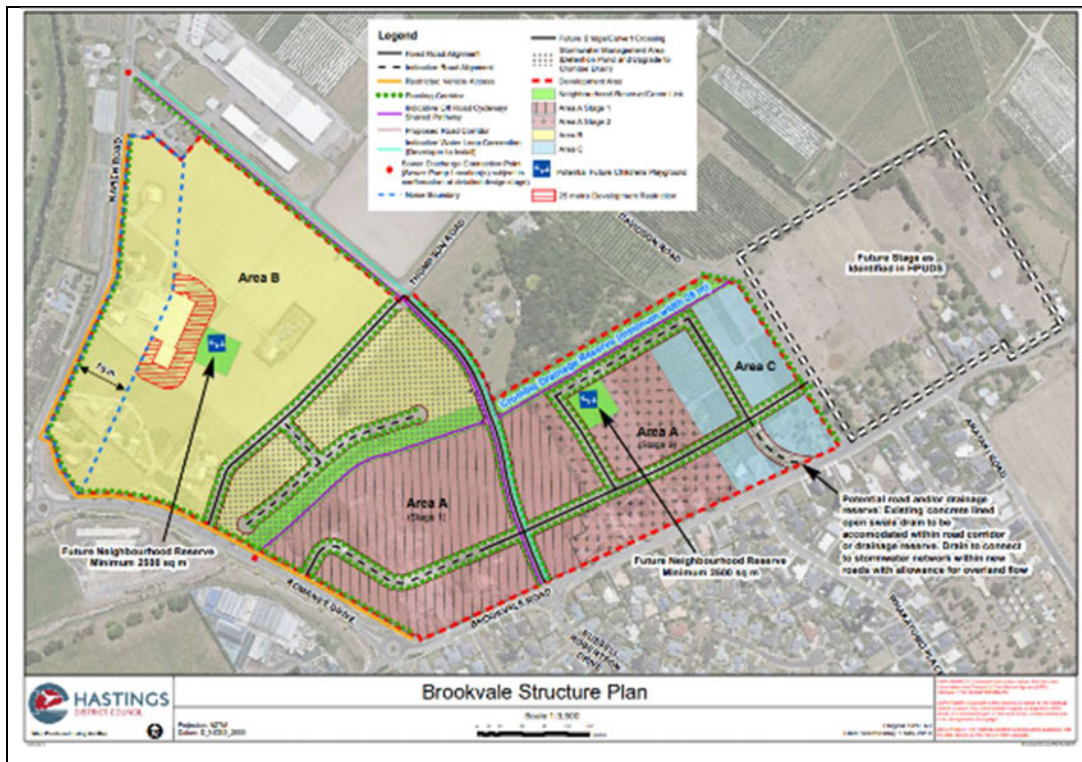


Figure 9 – Brookvale Structure Plan (Source: HDC)

The planned land use is staged residential development with a supporting network of open space. The transport network that will support the BSP includes:

- An extension of Russell Robertson Drive to Thompson Road;
- Two new local road corridors connecting from Romanes Drive to the east; and
- Intersection upgrades at Napier Road/Thompson Road and Thompson Road/Russell Robertson Drive.

Walking and cycling paths are included on the new transport corridors and through the central Crombie drainage reserve.

5.2 Future Traffic Volumes & Intersection Performance

The Transportation Assessment Report¹ prepared for the BSP was provided to ECC by HDC. This report assessed the traffic generating potential of the overall BSP and assigned those trips to the surrounding network. The expected additional movements at the Romanes Drive/Brookvale Road roundabout are shown below as Figure 10.

¹ Brookvale Residential Development, Proposed Subdivision, Havelock North. Traffic Structure Plan Investigations, TDG, February 2018

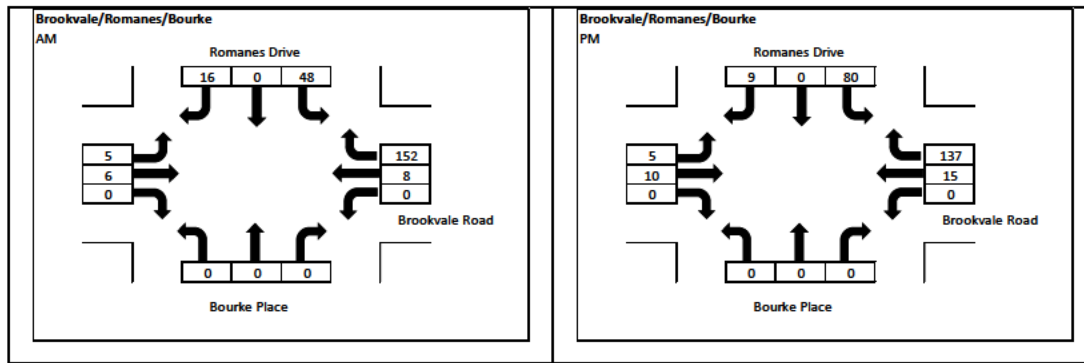


Figure 10 – BSP Generated Movements (All Vehicles)

The assessment expected that the BSP would:

- Add 235 vph to the roundabout during the peak, an increase of 29% (compared to the volumes surveyed by ECC);
- Add 256 vpd to the roundabout during the PM peak, an increase of 37% on the surveyed volumes.
- Add 35-39 vph to the volume on the Brookvale Road frontage of the site at peak times.

The assessment modelled the operation of the existing roundabout in SIDRA software and concluded that it could accommodate the increased traffic movements. This assessment used based volumes collected in 2017, combined with the volumes presented above as Figure 9.

ECC repeated this analysis, replacing the 2017 base volumes with the more recent 2021 surveyed volumes presented as Figure 7. The modelling, outputs of which are included in Attachment 1, showed that the roundabout is expected to operate at Level of Service (LOS) A, during both peak hours. This confirms the conclusion of the Structure Plan assessment in relation to this intersection.

6. Proposed Development

6.1 Land Uses

The proposed redevelopment of Oderings will retain the garden centre and replace the existing nursery areas with 35 residential lots. In total, 4,850m² of the site will be retained for commercial use and 14,250m² will be converted to residential use. The proposed layout is shown as Figure 11.



Figure 11 – Proposed Development (Prepared by Development Nous)

6.2 Access and Parking

Two lots (1 and 34) are proposed to have direct property access to Brookvale Road. All other lots and the existing garden centre will be accessed via the existing entry road which will be reconfigured.

The garden centre will have a central parking area with 43 parking spaces, including two accessible spaces. This carpark and the residential lots will be accessed via the existing access road, which will follow a loop around the site.

Walking routes are provided throughout the site to provide access to the individual lots and the garden centre, and link with the existing paths on Romanes Drive and in Guthrie Park. The planned routes and path types are shown as Figure 12 and Figure 13.

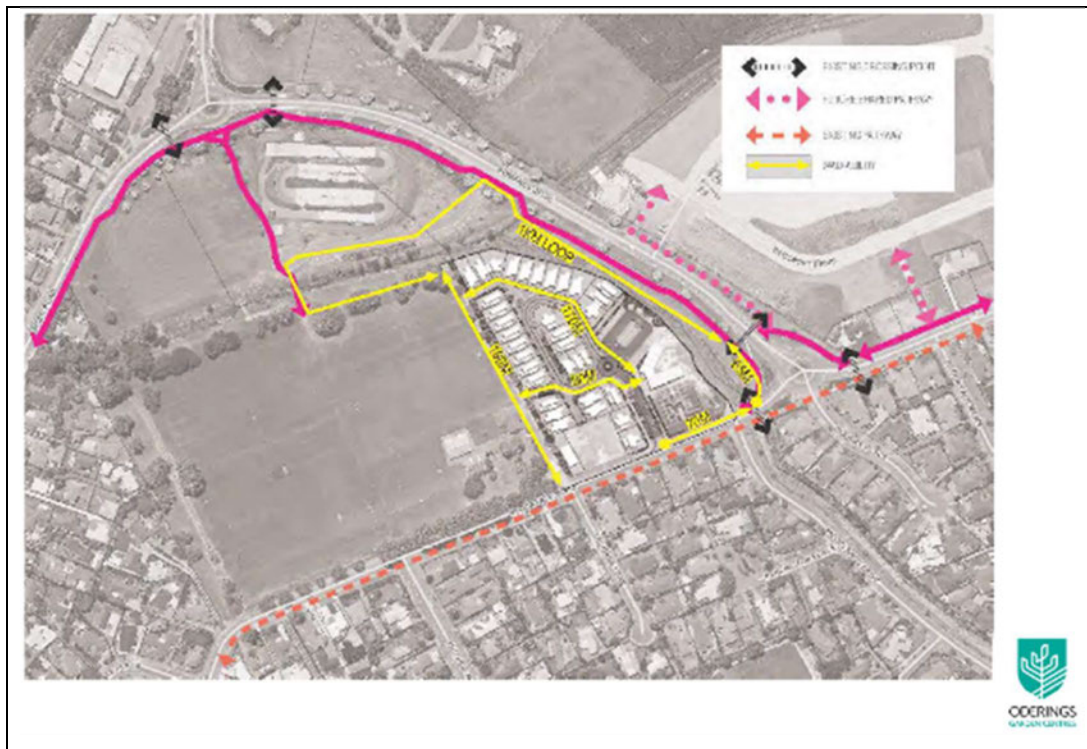


Figure 12 – Walking Routes (Prepared by Development Nous)

The paths are provided as a combination of dedicated paths and slow-speed shared spaces, as shown on Figure 12 below.



Figure 13 – Path Types (Prepared by Development Nous)

6.3 Road Cross Sections

The existing access is proposed to be formed as an 18m wide corridor, with a 7m wide carriageway and paths on both sides. The proposed cross-section is shown below as Figure 14.

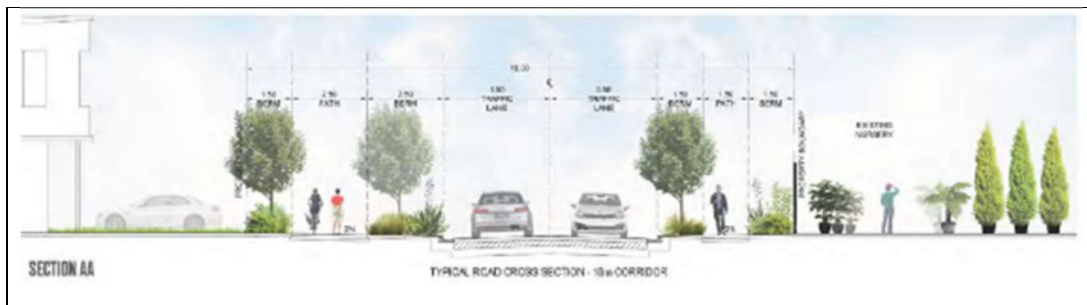


Figure 14 – Entry Road Cross-Section (Prepared by Development Nous)

The loop road is proposed to have an 11m road width with a 6m carriageway and path on one side. Some sections of on-street parallel parking are included. Cross-sections for the loop road with and without parking are shown as Figure 15 and Figure 16.

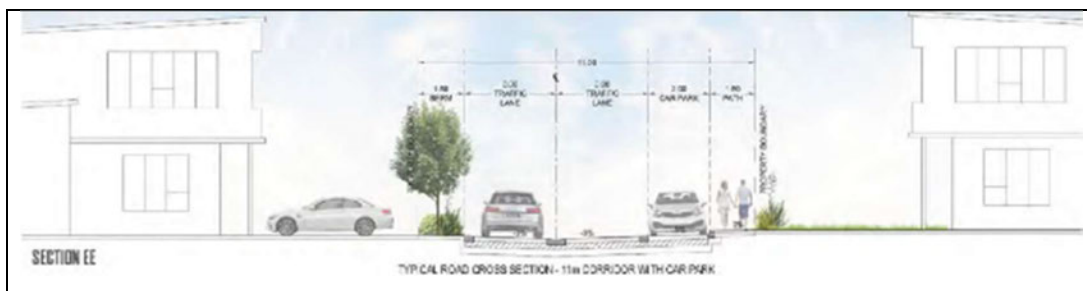


Figure 15 – Loop Road Cross-Section with Parking (Prepared by Development Nous)

It is noted that the footpath abuts the lot boundary in this cross-section.

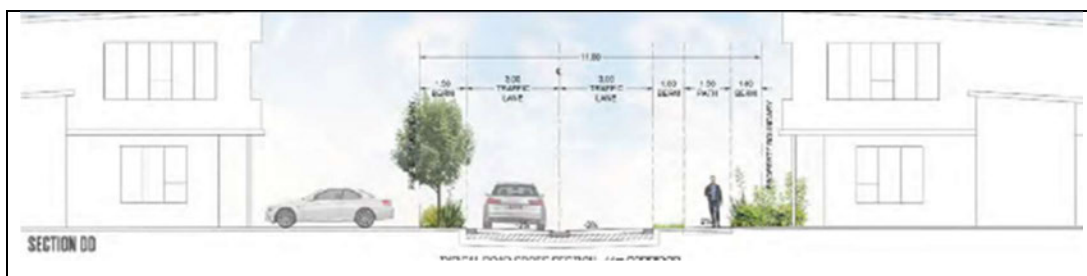


Figure 16 – Loop Road Cross-Section without Parking (Prepared by Development Nous)

An 8m wide shared access driveway typology is also proposed to serve 5 or 6 lots. This cross-section includes a 4.5m carriageway width which will accommodate vehicle, pedestrian and cycle access in a shared environment. The cross-section is shown as Figure 17.

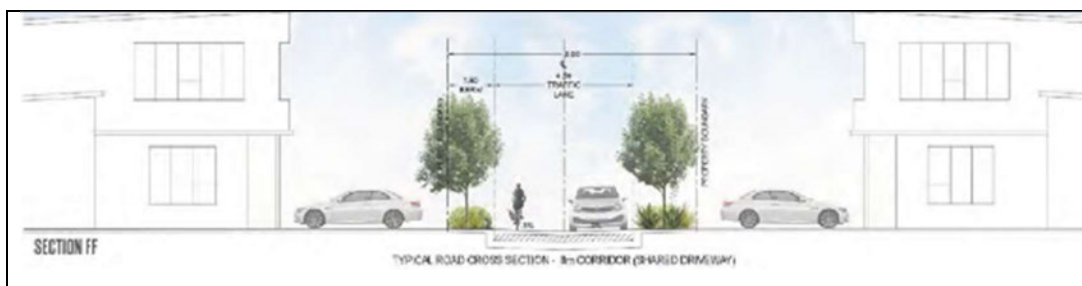


Figure 17 – Shared Access Driveway Cross-Section (Prepared by Development Nous)

A similar cross-section, with 4.0m wide carriageway, is proposed to serve the 3 lots (Lots 7-9) alongside the garden centre car park.

6.4 Loading and Servicing

The site has been designed to accommodate:

- A 11.5m large rigid truck circulating around the residential area. This represents a furniture removal/delivery truck, which will occasionally visit the site. It is noted that a rubbish collection vehicle, which will regularly visit the site, is smaller; and
- An 8m medium rigid truck accessing the garden centre car park.

The swept paths of these vehicles are included as Attachment 1.

Various other swept paths have been checked² and layout adjustments made where needed to accommodate the manoeuvres as shown in Figure 18.



Figure 18 – Lots 7-9 and Lots 30-34 Vehicle Tracking

The proposed layout of the dwelling shown on Lot 3 requires some minor adjustment to allow vehicles to manoeuvre on the site.

² Using the B85 vehicle as defined by AS/NZS2890.1-2004 Off-street car parking

7. Trip Generation

According to RR453, the 50th percentile trip generation rates for garden centres are:

- 14.1 vph/100m² of gross floor area (GFA) at peak times; and
- 82.2 vpd/100m² of GFA over the day.

The existing GFA of the garden centre (that is to be retained) is approximately 500m² and on this basis it is estimated to generate:

- 71 vph at peak times; and
- 411 vpd over the course of the day.

It is likely that the peak of the garden centre activity will occur at the weekend whereas residential activities typically peak on weekdays. Conservatively, these two peaks have been combined.

The residential lots have been assessed as generating 0.9 vph/household during the peak hours of the day and 8.2 vpd/household over the course of the day (the 85th percentile outer suburban residential rate from RR453). The resulting total trip generation from the proposed development is summarised in Table 1.

Land Use	Size	Units	Peak Hour		Daily	
			Rate	Trips (vph)	Rate	Trips (vpd)
Garden Centre	500	m ² GFA	14.1	71	82.2	411
Residential	35	Lots	0.9	32	8.2	287
TOTAL	-	-	-	103	-	699

Table 1 – Traffic Generation Estimate

In total, the proposed development is expected to generate 699 vpd (IN+OUT) including 103 vph (IN+OUT) during the peak hours of the day.

This analysis is particularly conservative in relation to the peak hour estimate. Residential activities typically peak during the morning and evening commuter peaks (around 8-9am and 4-5pm). At these times, the garden centre can reasonably be expected to be operating below its own peak, which is more likely to occur around the middle of the day.

The above trip generation assessment will produce a robust assessment of driveway and network effects.

8. Trip Distribution

Figure 19 presents the expected internal distribution and the expected daily volume on each section of internal road. This is based on how many lots rely on each section of road, either for direct access or as a route to and from Brookvale Road.



Figure 19 – Internal Distribution and Number of Lots Served³

The Figure shows that the shared access driveways accommodate 3-6 lots each. The loop road (11m wide) serves up to 19 lots on any one section, carrying up to 156 vpd. The entry road, which serves the garden centre and 33 residential lots carries 682 vpd. The remaining two lots generate movements directly onto Brookvale Road.

New trips (generated by the residential lots) have been distributed to the surrounding network using the existing movement patterns in the area. The existing trip generation of Oderings (the garden centre and nursery functions) is already captured in the existing traffic surveys so no additional allowances are required. Conservatively, no reductions have been made for the parts of the Oderings activities that are being replaced by residential activities.

The expected distribution of new residential trips at the site driveway and through the Brookvale Road/Romanes Drive roundabout for the AM and PM weekday peaks are shown as Figure 20 and Figure 21.

³ Lots 10, 14, 15, 16, 17 and 18 are assumed to rely evenly on the two sides of the loop road (i.e. 50% of their traffic movements use each side).

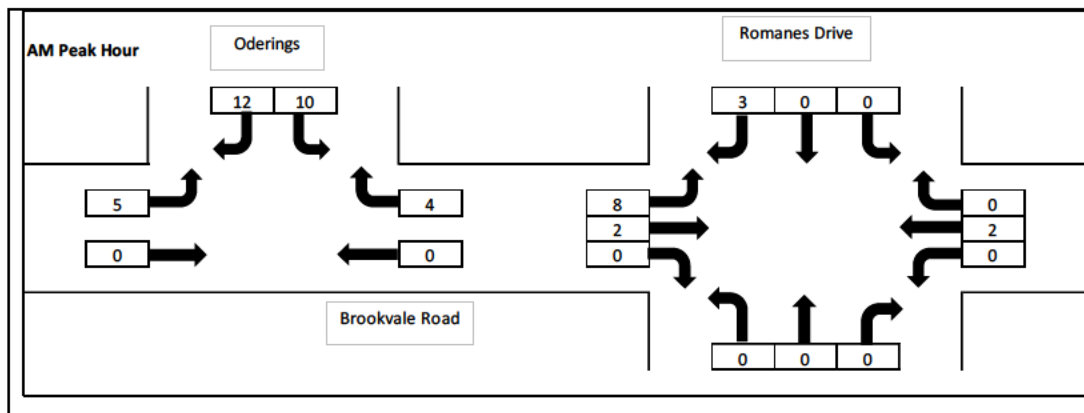


Figure 20 – Development Generated Intersection Movements (AM Peak)

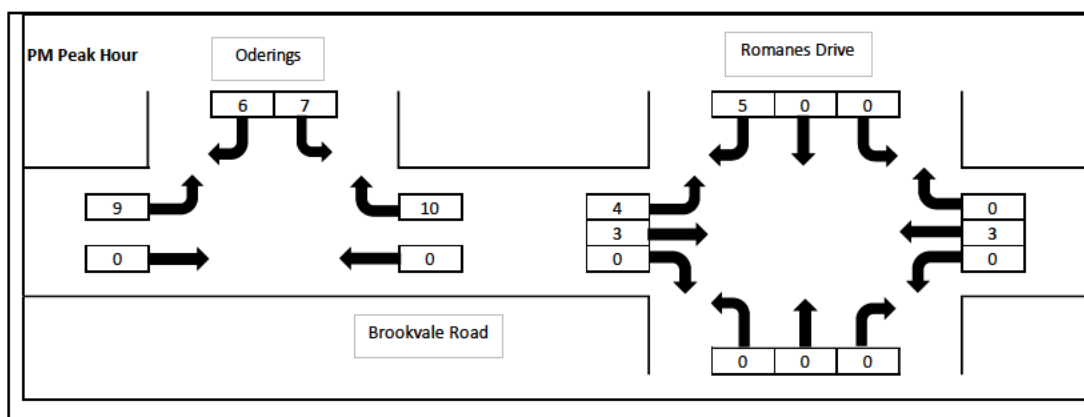


Figure 21 – Development Generated Intersection Movements (PM Peak)

9. Assessment of Effects

9.1 Network Effects

The residential activities are expected to add an additional 35 vph to the network at peak times of the day. Approximately half of these are expected to travel to and from the east, using the Brookvale Road/Romanes Drive roundabout.

This roundabout was modelled in SIDRA intersection analysis software using the expected volumes post-development of the Brookvale Structure Plan (BSP) area as a starting point. These future base volumes were estimated by adding the ECC survey data from 2022 to the increments estimated in the BSP assessment. The addition volumes from the Ouderings development were then added to these.

The SIDRA analysis, which is included at Attachment 2, shows that the roundabout operates with LOS A or B for all movements, and LOS A overall.

Beyond this intersection, and to the west on Brookvale Road the incremental volumes distribute to multiple routes and are unlikely to have any noticeable effect on the operation of the network.

9.2 Walking and Cycling Effects

The proposed site layout appropriately provides for walking and cycling with a combination of dedicated paths and shared spaces. The shared space environment starts north and west of the internal roundabout so it will be important (as proposed) to provide a clear visual distinction between these two types of environments.

The site layout provides a high degree of permeability, creating connections between the established garden centre, the future residential community, Guthrie Park and the two road frontages.

A footpath (plus kerb and channel) is also proposed along the Brookvale Road site frontage, which addresses an existing gap in the walking network in this area. It is recommended that this path be widened to facilitate pedestrians and cyclists (a shared path) to accommodate school children travelling between Te Mata Primary School (via Legorne Lane) and the BSP area.

In some areas the proposed footpath is located alongside the lot boundary which could reduce intervisibility between drivers and pedestrians. In these locations a larger pedestrian splay is recommended, as shown in Figure 20⁴, to mitigate this potential safety issue.

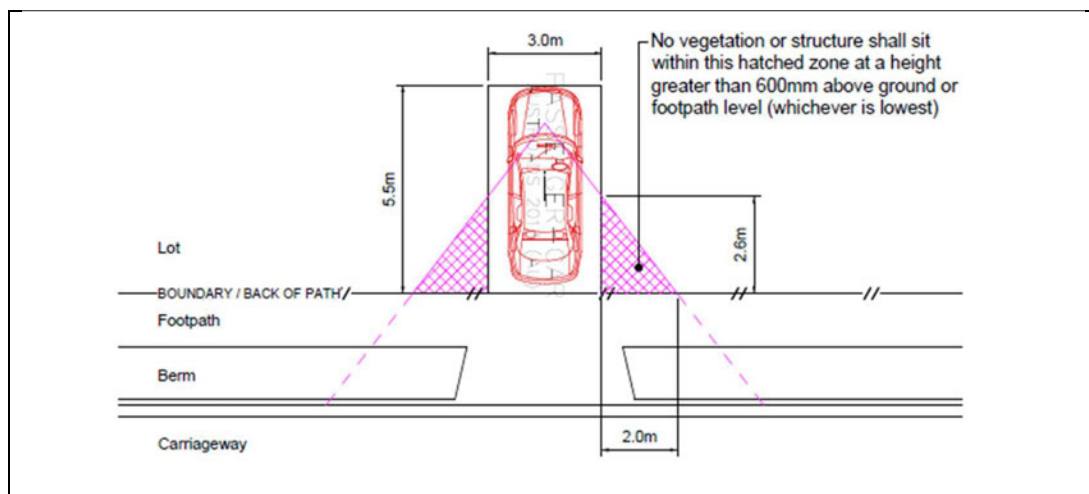


Figure 20 – Pedestrian Visibility Splay: Footpath On Boundary

Overall, the proposed development layout appropriately provides for internal and external walking and cycling movement.

9.3 Parking

According to RR453, a garden centre with a GFA of 500m² would typically generate parking demand for between 16 and 30 vehicles at the 50th and 85th percentile levels. The proposed parking area includes 43 parking spaces and is therefore able to accommodate the expected level of demand.

Each of the residential lots is expected to have appropriate size to accommodate on site parking if desired, noting that there is no longer a minimum requirement in the ODP.

Eight on-street parking spaces are also proposed on the internal road network. This equates to a rate of one space per 4.4 dwellings, which is an appropriate level of parking supply for visitor parking in a residential setting.

⁴ Based upon Appendix 73 “Pedestrian Visibility Splay” from the HDC ODP

Overall, the proposed development has an appropriate level of parking to support its likely parking demands on site, without potential reliance on off-site areas.

9.4 Road Safety

Other than two that front Brookvale Road, the proposed residential development will take access from a single established vehicle access to Brookvale Road. This access can provide appropriate sight distance in both directions and has no evident safety issues, based on its historic performance.

The internal transport network has been designed to create a low-speed environment for vehicles, with the minimum practical footprint provided for vehicle manoeuvring. Changes in surface treatments indicate an increasingly pedestrianised environment as users move further into the site and transition from the commercial garden centre environment to the residential and recreational environment at the rear and side of the site.

The horizontal alignment of the internal roads and use of a mini roundabout at the garden centre carpark also limit vehicle operating speeds.

A pedestrian crossing is provided on the entry road to the main garden centre entry and a high degree of permeability for pedestrians and cyclists is provided throughout the site.

Overall, the design and its transport provisions are assessed as appropriately and safely accommodating the new residential demands.

10. DISTRICT PLAN COMPLIANCE

The following table sets out the compliance of the proposed residential development against the relevant rules of the HDC District Plan, Section 26.1. The garden centre has not been assessed as it is an existing activity.

Rule	Requirement	Compliance
26.1.6A	Access	
1	Access to Property	
a	Every owner or occupier shall provide a legal, safe and effective vehicular access to any activity undertaken on a site, and required parking or loading areas from an existing, formed legal road, to enable vehicles to enter the site, except where the site has Designated Retail Frontage (see Appendix 30) or where the site is within the Flaxmere Commercial Zone.	Complies. Safe and effective vehicle access is provided to accommodate all expected vehicle types, including rigid trucks up to 11.5m long.
b	There shall be a maximum of one vehicle crossing per property within the Residential Zone. Where a property is bordered by 2 or more the vehicle access to the property shall be from the lower category road. The category of the road will be determined by its Road Hierarchy status in Appendix 69 or traffic volumes when hierarchy status is equal.	Complies. Site is not in the Residential Zone. Site has two road frontages and takes access from the lower category road only.
c	The minimum legal widths for private access are contained in Table 26.1.6.1-1 below. Private access to properties shall allow the safe passage from the edge of the road to the legal boundary of the lot for a single site or household unit. For two or more sites or household units	Does not comply. See Discussion below this Table.

	or for any Right of Way, formation of the access to the activity undertaken on the site is required in compliance with Table 26.1.6.1-1.	
2	Distance of Vehicle Accesses from Road Intersections	
b	In the Plains Production Zone: Vehicle access to any property shall be sited a minimum of 100 metres from an intersection of a State Highway.	Complies. There are no State Highway Intersections within 100m.
26.1.6B	Safe Sightline Distances	
1	Intersections shall be located to ensure that Safe Sightline Distances are maintained. Note: For vehicle accesses fronting a Local, Collector or Arterial Route (as defined in the Roading Hierarchy in Appendix 69) compliance with Austroads Standards is deemed an acceptable means of compliance. The minimum sight distance required for 50km/h roads is 90m.	Complies. At least 90m can be achieved in both directions from the existing access.
26.1.6C	Loading	
a	<p>(i) Every owner or occupier who proposes to construct or substantially alter, reconstruct or add to a building on any site, or change the activity carried out on the site shall provide a Loading Space. The Loading Space shall provide for the suitable or efficient accommodation of any loading or fuelling of vehicles which are likely to arise from the use of any building or activity carried out on the site, except where a service lane is designated or provided, or where the site has Designated Retail Frontage (see Appendix 30). Separate Loading Spaces shall be provided for each occupier of the site if there are more than one. The Loading Space shall be additional to the parking required in Table 26.1.6.1-4.</p> <p>(ii) Every Loading Space, together with access, shall be designed so that it is not necessary to reverse vehicles either on to or off the street. The Loading Space shall not be stacked or located within vehicle manoeuvring areas.</p> <p>(iii) The provision of a Loading Space in respect of any site may be made as part of the side and/or rear yard space, but not as part of the front yard space of that site.</p> <p>(iv) The method of loading shall ensure that the footpath or access to adjacent properties shall remain clear at all times and ensure traffic safety is maintained on the roads.</p>	<p>N/A</p> <p>There is no loading requirement for residential activities.</p>
b	Design of Loading Spaces	
	<p>The design of Loading Spaces and the layout adopted will depend on the area and shape of the land available, the purpose for which loading is required, and the functional design of the building. The layout shall be of sufficient size to accommodate the following design vehicles:</p> <p>(i) Activities requiring loading facilities or servicing from heavy vehicles: A "Single Unit Bus / Truck" as defined in the "Austroads Design Vehicles and Turning Path Templates Guide" AP-G34-13, Austroads, 2013 - refer to Appendix 73 for the dimensions of this vehicle.</p> <p>(iii) The following minimum dimensions are provided as a means of compliance: Retail activities, offices, manufacturing premises and similar must have a minimum length of 8.5 metres and a minimum width of 3 metres.</p>	<p>N/A</p> <p>No loading requirement for residential activities.</p>

26.1.6D	Parking	
3	Parking Spaces for People with Disabilities	No requirement for residential lots. The Garden Centre parking area provides two accessible spaces, which meets the requirement for a parking area with 21-50 spaces.
5	Design and Construction of Parking Areas	
a	<u>Vehicle Dimensions:</u> All parking spaces and access and manoeuvring areas, including ramps shall be of a sufficient size and suitable layout to accommodate a passenger vehicle" as defined in the "Austroads Design Vehicles and Turning Path Templates Guide" AP-G34-13, Austroads, 2013 - refer to Appendix 72 for the dimensions of this vehicle.	Complies. Appropriate design vehicle tested.
c	<u>(b) Parking Spaces for Residential Activities.</u> Parking spaces for Residential Activities in any Residential zone shall have minimum internal dimension of 3.0m width and 5.0m length.	Complies. Site is not in a Residential zone but each lot includes a 3.0m wide by 5.5m long car parking bay.
	<u>(c) General Design and Construction Details</u> All public and required parking areas, and any outdoor display areas (such as car, caravan or boat sales yards) shall comply with the following general requirements:	Compliance expected.
	(i) Parking areas in any Commercial or Industrial Zone shall be formed and sealed with an all-weather surface.	
	(ii) Parking areas shall be designed and constructed to ensure that stormwater runoff from the parking area does not adversely affect adjoining property.	
	(iii) Parking areas, together with access and turning space, shall be designed to ensure that vehicles negotiate the parking area at a safe speed and are not required to reverse either on to or off a street, provided that this requirement shall not apply in any Residential Zone where a single accessway serves not more than two residential buildings. Vehicles using the parking area shall only enter or leave the site by the accessway.	
	(iv) Where a public or non-residential parking area is within or adjoins a Residential Zone, a 1.8 metre high, fully enclosed screen shall be erected or a landscape strip of a minimum width of 5 metres adjoining the boundary or the Residential Zone shall be provided. These requirements may be reduced or waived with the consent of the adjoining neighbour.	
	(v) A reservoir space shall be provided within public car parks to prevent vehicles queuing on the street.	
	(vi) Provision shall be made for the illumination of access drives and pedestrian areas within public car parks. Such illumination is to be directed away from adjoining residentially zoned sites.	
	(vii) Non-residential parking spaces required to be sealed by standard 26.1.6.D.5(c)(i) shall be marked out and where there is a separate requirement for staff parking such spaces shall be clearly identified.	
26.1.7A	ACCESS	
1	Vehicle Standing Bay	Can comply. Site is not in a Residential Zone but all lots are shown with

	(a) Residential Zones. In all Residential Zones, a 5m long Vehicle Standing Bay shall be located within the Vehicle Access to all garages and carports and notional garage spaces.	driveway standing bays 3.0m wide and 5.5m long.
26.1.7B	INFRASTRUCTURE TO SUPPORT ALTERNATIVE TRANSPORT MODES	
1	<p>Bicycle Spaces Where on-site car parking is required provision shall also be made for purpose built bicycle stands on site. These shall be provided at a rate of 1 bicycle stand per 5 carpark spaces that are required except for supermarkets where the ratio shall be 1 bicycle stand per 20 carpark spaces that are required.</p> <p>The bicycle stands shall meet the following requirements:</p> <p>(a) They shall be securely attached to a wall or the ground and shall support the bicycle frame.</p> <p>(b) Each cycle stand shall be adequately spaced to allow a cyclist to manoeuvre and attach a bicycle to the stand.</p> <p>(c) They shall allow the bicycle to be secured.</p> <p>(d) They shall be visible and signposted.</p>	<p>N/A</p> <p>No requirement for residential activities.</p>

Table 2 – District Plan Assessment (Proposed Residential Lots)

The Table shows that the proposed development can comply with the relevant Rules of the ODP, other than in relation to private access widths.

The proposal includes a range of road typologies including an 18m wide corridor for the main entry road, reducing to 11m on the loop road, and further reducing when serving only a limited number of lots.

The swept path analysis described at Section 6.4 confirms that the proposed layout is functional and can accommodate the needs of rubbish collection vehicles, occasional heavy vehicle demands such as removalists, and light vehicles moving around the site and to/from individual properties. The layout also provides for areas of on-street parking for visitors and contractors at a ratio of 1 per 5 dwellings.

The site design includes a range of dedicated walking and cycling paths and shared spaces and can appropriately accommodate the needs of these modes. Other road corridor functions including utility services are addressed in other parts of the Application.

Overall, it is concluded that whilst the proposed road cross-sections are a departure from the typical ODP standards, they can appropriately accommodate the needs of the new residential lots, combined with the established garden centre.

11. Conclusions

Oderings proposes to redevelop their site at 57 Brookvale Road, Havelock North. The proposed development will retain the garden centre and replace the existing nursery areas with 35 residential lots. In total 4,850m² of the site will be retained for commercial use and 14,250m² will be converted to residential use.

A network of internal roads and paths will accommodate walking, cycling and vehicle demands including rubbish collection and servicing of the garden centre. These are designed to connect the development with Guthrie Park to the west and the garden centre to the east and provide for easy walking/cycling access between them.

Two residential lots will have direct access to Brookvale Road and the remainder will share the existing, reconfigured, access road with the garden centre.

The incremental traffic generation from the new residential lots is expected to have a negligible effect on the operation of the surrounding road network, which has been assessed including planned development in the adjacent Brookvale Structure Plan area.

A footpath is proposed on the northern side of Brookvale Road, along the site frontage, to connect the existing and proposed activities with the broader walking and cycling network in Havelock North.



The proposed internal road cross-sections are a departure from the District Plan standards but have been shown to appropriately accommodate the needs of light and heavy vehicles, as well as pedestrians and cyclists.

The individual lots are expected to provide on-lot parking and additional on-street parking is also proposed on the internal road network. The garden centre will have a parking area for 43 vehicles including two accessible parking spaces near the entry. These provisions are expected to accommodate the parking demands generated by the activity on the site without overspill parking effects.

Three recommendations are made; revise the layout of the dwelling proposed on Lot 3 to allow adequate space for vehicles to manoeuvre on the site; ensure pedestrian visibility splays (see Figure 20) where the footpath is adjacent to the lot boundary; and provide a shared pedestrian / cyclist path along the length of the Brookvale Road site frontage.

Overall, it is assessed that the proposed development layout is appropriate for its traffic and parking needs, and it can be accommodated by the existing, and future planned, transport network in the area.

Yours sincerely,

Anna Wilkins (CMEngNZ)  Principal Engineer East Cape Consulting Limited	George Eivers (CMEngNZ, CPEng, IntPE)  Principal Engineer / Director East Cape Consulting Limited
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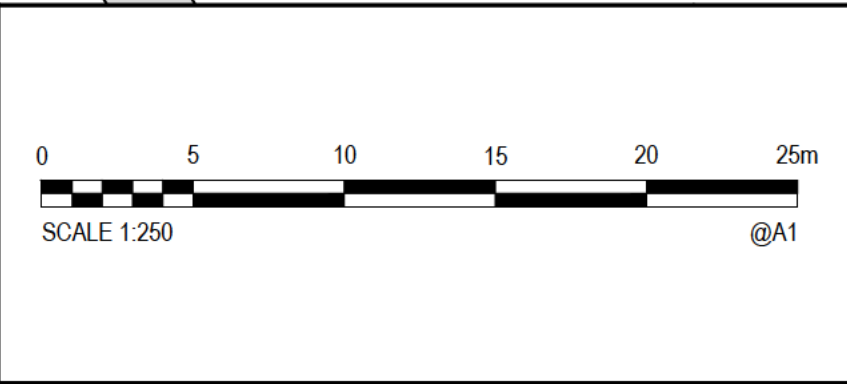
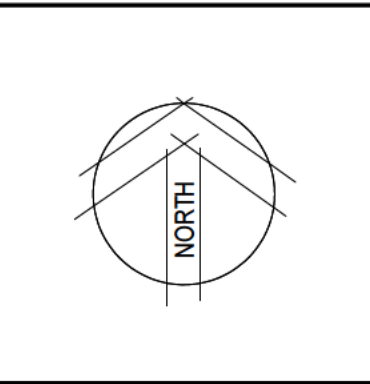
Attachment 1 – Vehicle Swept Paths (Prepared by Development Nous)

Attachment 2 – SIDRA Summaries

CAD File: H20200141_0derings hmk_TRACKING EXPORT BASE.dwg DATE PLOTTED: 15 September 2022 4:04 pm BY: DYLAN LEWIS



Rev	Date	Description	Appd	Issued
4	15/09/2022	FOR APPROVAL	GG	DL
3	14/09/2022	FOR APPROVAL	GG	DL
2	04/04/2022	PRELIMINARY - FOR COORDINATION	GG	GG
1	15/03/2022	PRELIMINARY	GG	GG

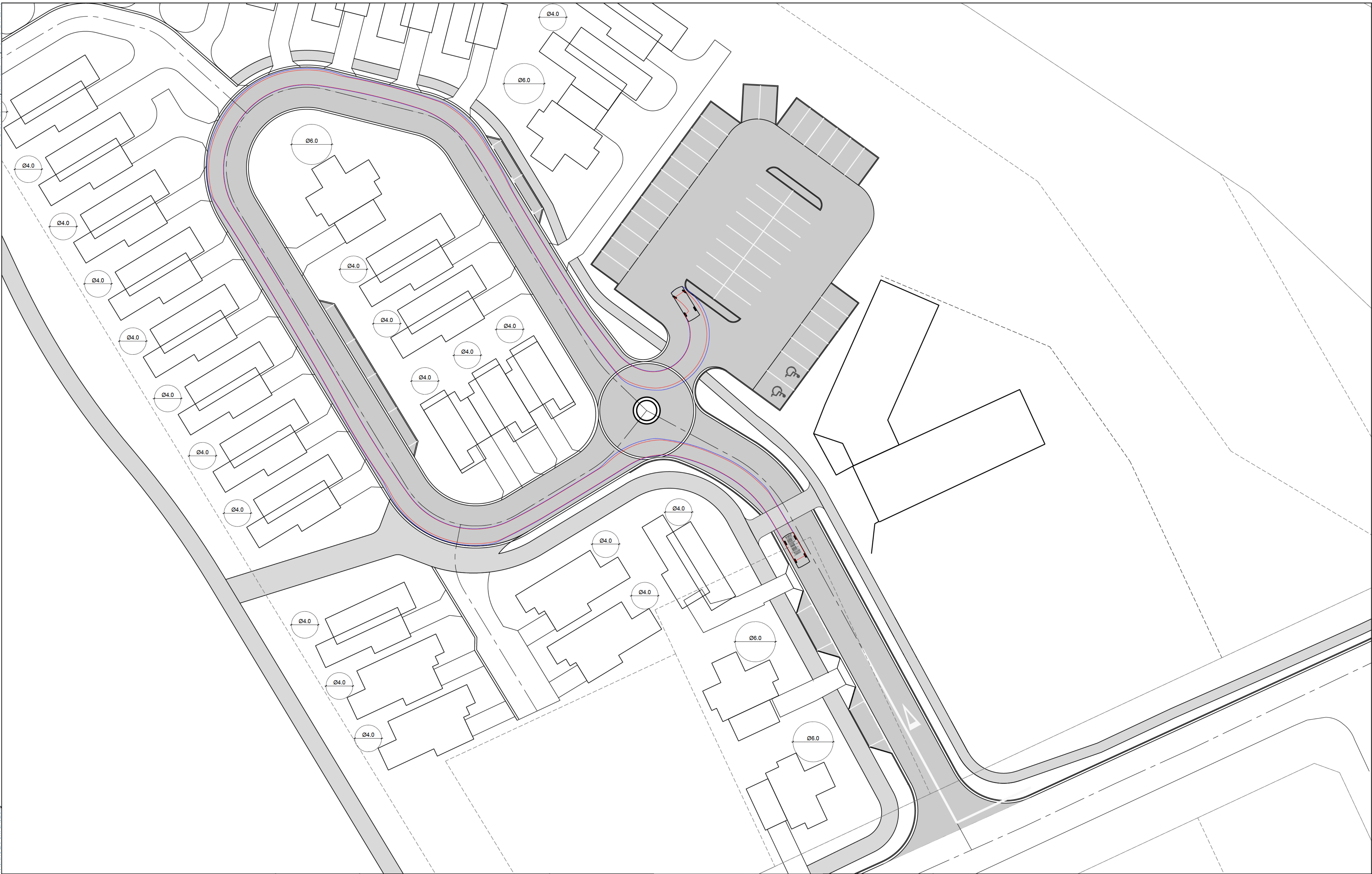


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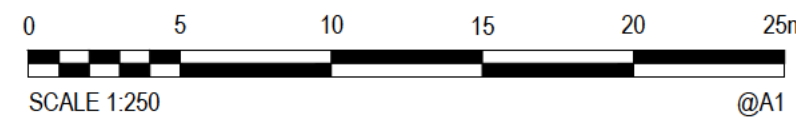
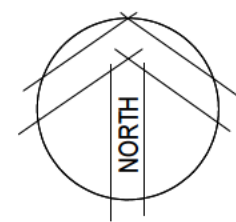


Fieldworked	Date	Client
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Drawn	Date	Project
GG/HSD/L	15/03/2022	ODERINGS NURSERY
Checked	Date	HAVELOCK NORTH
KRC	15/03/2022	
Designed	Date	Title
GG	15/03/2022	VEHICLE TRACKING - SHEET 1 OF 6
Approved	Date	8M RIGID VEHICLE

Status	FOR INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION PURPOSES		
Datum	Council Ref.	Scale	Size
HB2000		1:250	A1
Drawing Number	Revision		
H20200141_VT_001	4		



3	14/09/2022	FOR APPROVAL	GG	D/L
2	04/04/2022	PRELIMINARY - FOR COORDINATION	GG	GG
1	15/03/2022	PRELIMINARY	GG	GG
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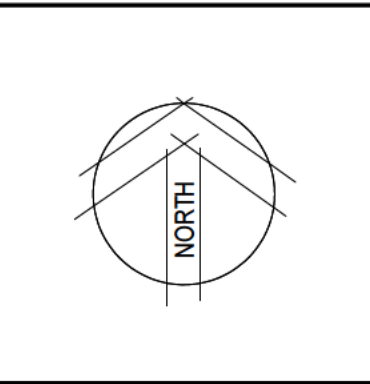


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Checked KRC	Date 15/03/2022	HAVELOCK NORTH				
Designed GG	Date 15/03/2022	Title				
Approved	Date	VEHICLE TRACKING - SHEET 2 OF 6 99 PERCENTILE VEHICLE	Datum HB2000	Council Ref.	Scale 1:250	Size A1
			Drawing Number H20200141_VT_002			Revision 3

CAD File: H20200141_01.odg Date Plotted: 15 September 2022 4:05 pm By: DYLAN LEWIS



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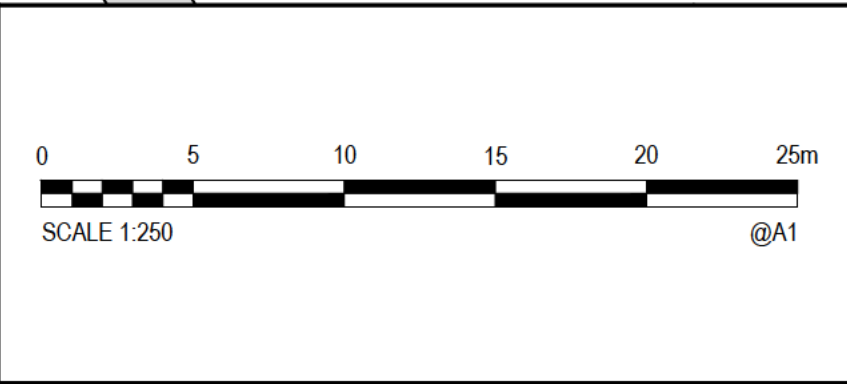
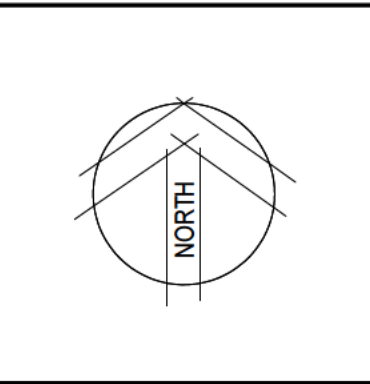
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Drawn	Date	Project
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Checked	Date	HAVELOCK NORTH
KRC	15/03/2022	
Designed	Date	Title
GG	15/03/2022	VEHICLE TRACKING - SHEET 3 OF 6
Approved	Date	99 PERCENTILE VEHICLE

Status	FOR INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION PURPOSES		
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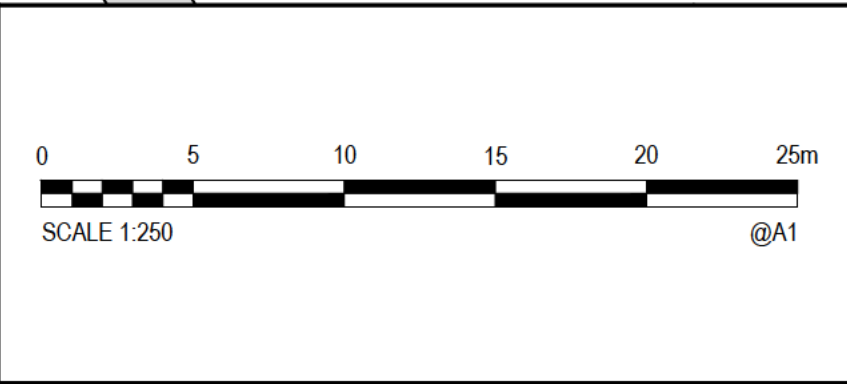
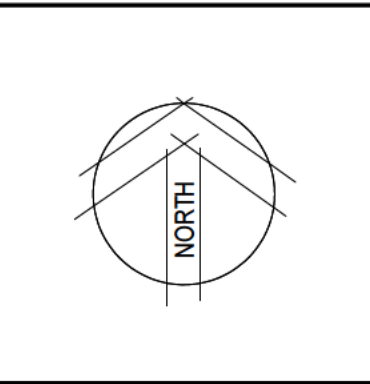
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Designed	GG	Date	HAVELOCK NORTH
Approved		Date	Title
		Date	VEHICLE TRACKING - SHEET 4 OF 6
			99 PERCENTILE VEHICLE

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Checked	KRC
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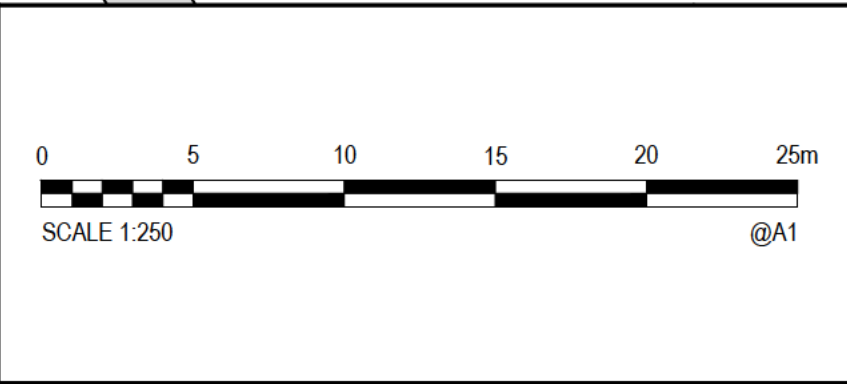
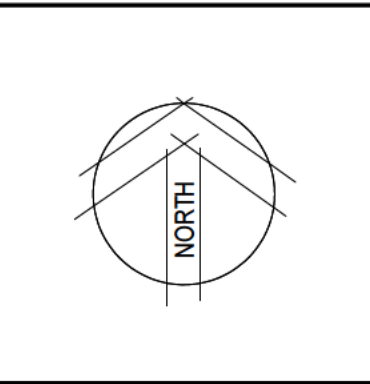
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Date	Project
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Date	HAVELOCK NORTH
15/03/2022	Title
Date	VEHICLE TRACKING - SHEET 5 OF 6
15/03/2022	11M RIGID VEHICLE

Status	FOR INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION PURPOSES			
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Date	Client
TBC	ODERINGS
Date	Project
15/03/2022	ODERINGS NURSERY
Date	HAVELOCK NORTH
15/03/2022	Title
Date	VEHICLE TRACKING - SHEET 6 OF 6
15/03/2022	11M RIGID VEHICLE

Status	FOR INFORMATION ONLY NOT TO BE USED FOR CONSTRUCTION PURPOSES			
Datum	Council Ref.	Scale	Size	
HB2000		1:250	A1	
Drawing Number	Revision			
H20200141_VT_006	1			

SITE LAYOUT

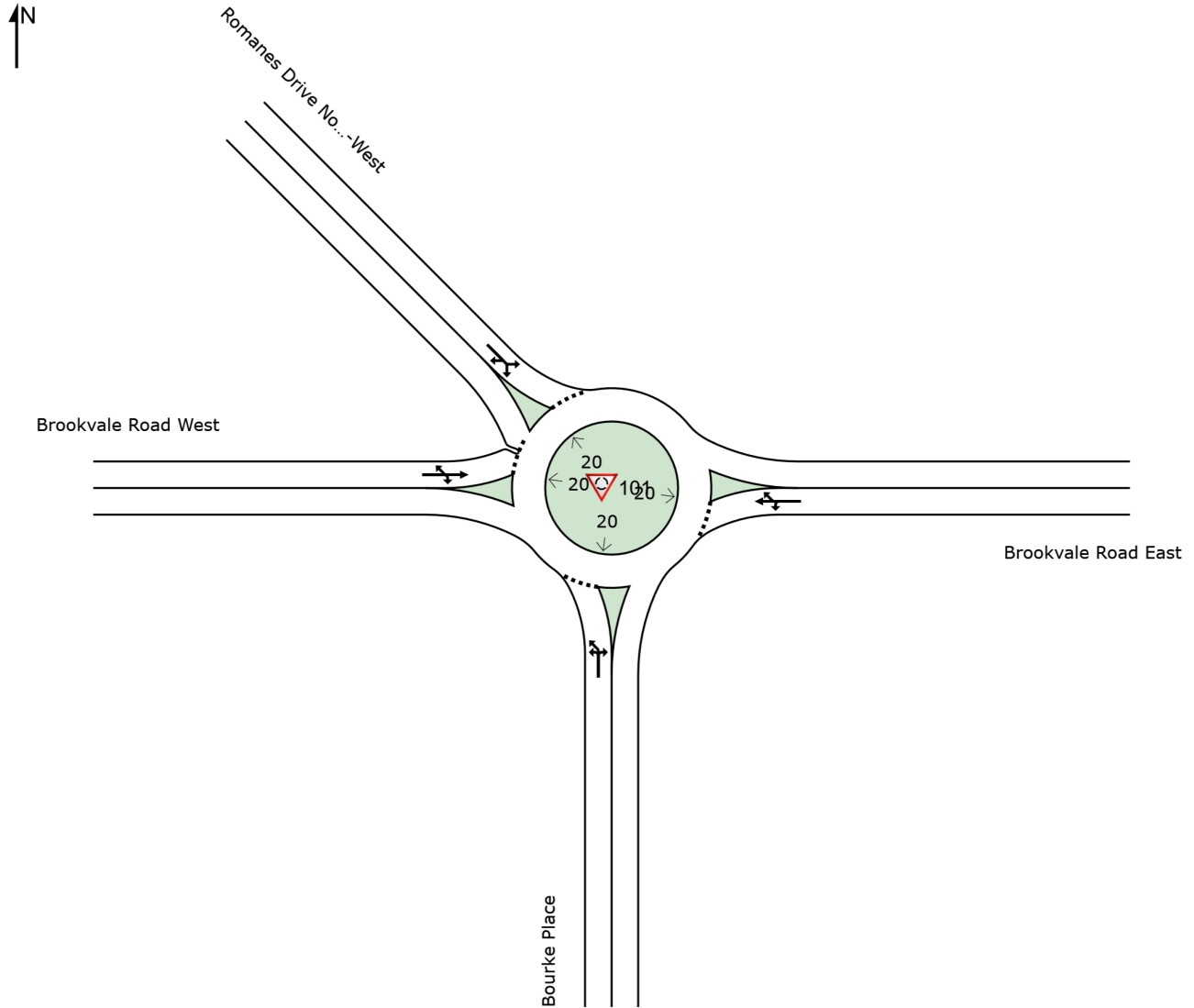
 **Site: 101 [Romanes Brookvale AM Ex (Site Folder: General)]**

New Site

Site Category: (None)

Roundabout

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



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MOVEMENT SUMMARY

 **Site: 101 [Romanes Brookvale AM Ex (Site Folder: General)]**

New Site

Site Category: (None)

Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Bourke Place														
1	L2	1	0	1	0.0	0.005	6.4	LOSA	0.0	0.2	0.58	0.55	0.58	52.6
1a	L1	2	0	2	0.0	0.005	6.2	LOSA	0.0	0.2	0.58	0.55	0.58	53.5
3	R2	1	0	1	0.0	0.005	11.2	LOS B	0.0	0.2	0.58	0.55	0.58	53.9
Approach		4	0	5	0.0	0.005	7.5	LOSA	0.0	0.2	0.58	0.55	0.58	53.4
East: Brookvale Road East														
4	L2	2	0	2	0.0	0.320	4.7	LOSA	2.0	14.5	0.37	0.58	0.37	51.4
5	T1	71	4	88	5.6	0.320	3.6	LOSA	2.0	14.5	0.37	0.58	0.37	49.1
6a	R1	260	4	321	1.5	0.320	8.5	LOSA	2.0	14.5	0.37	0.58	0.37	52.0
Approach		333	8	411	2.4	0.320	7.4	LOSA	2.0	14.5	0.37	0.58	0.37	51.4
NorthWest: Romanes Drive North-West														
27a	L1	156	6	193	3.8	0.235	4.0	LOSA	1.5	11.0	0.24	0.53	0.24	53.9
29a	R1	1	0	1	0.0	0.235	8.0	LOSA	1.5	11.0	0.24	0.53	0.24	53.9
29b	R3	108	6	133	5.6	0.235	10.1	LOS B	1.5	11.0	0.24	0.53	0.24	54.7
Approach		265	12	327	4.5	0.235	6.5	LOSA	1.5	11.0	0.24	0.53	0.24	54.2
West: Brookvale Road West														
10b	L3	173	3	214	1.7	0.262	6.0	LOSA	1.6	11.2	0.54	0.62	0.54	52.3
11	T1	49	0	60	0.0	0.262	4.6	LOSA	1.6	11.2	0.54	0.62	0.54	50.4
12	R2	1	0	1	0.0	0.262	10.6	LOS B	1.6	11.2	0.54	0.62	0.54	54.0
Approach		223	3	275	1.3	0.262	5.7	LOSA	1.6	11.2	0.54	0.62	0.54	51.8
All Vehicles		825	23	1019	2.8	0.320	6.7	LOSA	2.0	14.5	0.37	0.57	0.37	52.4

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

Roundabout LOS Method: SIDRA Roundabout LOS.

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

 Site: 101 [Romanes Brookvale AM Ex + BSP (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Bourke Place														
1	L2	1	0	1	0.0	0.007	8.0	LOS A	0.0	0.3	0.71	0.59	0.71	51.6
1a	L1	2	0	2	0.0	0.007	7.9	LOS A	0.0	0.3	0.71	0.59	0.71	52.5
3	R2	1	0	1	0.0	0.007	12.9	LOS B	0.0	0.3	0.71	0.59	0.71	52.8
Approach		4	0	5	0.0	0.007	9.1	LOS A	0.0	0.3	0.71	0.59	0.71	52.3
East: Brookvale Road East														
4	L2	2	0	2	0.0	0.474	4.9	LOS A	3.6	25.6	0.46	0.60	0.46	51.1
5	T1	79	4	98	5.1	0.474	3.9	LOS A	3.6	25.6	0.46	0.60	0.46	48.9
6a	R1	412	4	509	1.0	0.474	8.8	LOS A	3.6	25.6	0.46	0.60	0.46	51.8
Approach		493	8	609	1.6	0.474	8.0	LOS A	3.6	25.6	0.46	0.60	0.46	51.3
NorthWest: Romanes Drive North-West														
27a	L1	204	6	252	2.9	0.292	4.1	LOS A	2.1	15.0	0.28	0.52	0.28	54.0
29a	R1	1	0	1	0.0	0.292	8.0	LOS A	2.1	15.0	0.28	0.52	0.28	53.9
29b	R3	124	6	153	4.8	0.292	10.2	LOS B	2.1	15.0	0.28	0.52	0.28	54.7
Approach		329	12	406	3.6	0.292	6.4	LOS A	2.1	15.0	0.28	0.52	0.28	54.2
West: Brookvale Road West														
10b	L3	178	3	220	1.7	0.324	7.3	LOS A	2.1	15.0	0.69	0.73	0.69	51.4
11	T1	55	0	68	0.0	0.324	5.9	LOS A	2.1	15.0	0.69	0.73	0.69	49.5
12	R2	1	0	1	0.0	0.324	11.9	LOS B	2.1	15.0	0.69	0.73	0.69	53.0
Approach		234	3	289	1.3	0.324	7.0	LOS A	2.1	15.0	0.69	0.73	0.69	50.9
All Vehicles		1060	23	1309	2.2	0.474	7.3	LOS A	3.6	25.6	0.46	0.61	0.46	52.1

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

Roundabout LOS Method: SIDRA Roundabout LOS.

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

 **Site: 101 [Romanes Brookvale AM Ex + BSP + Od Res (Site Folder: General)]**

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Bourke Place														
1	L2	1	0	1	0.0	0.007	8.1	LOS A	0.0	0.3	0.71	0.59	0.71	51.6
1a	L1	2	0	2	0.0	0.007	7.9	LOS A	0.0	0.3	0.71	0.59	0.71	52.4
3	R2	1	0	1	0.0	0.007	12.9	LOS B	0.0	0.3	0.71	0.59	0.71	52.8
Approach		4	0	5	0.0	0.007	9.2	LOS A	0.0	0.3	0.71	0.59	0.71	52.3
East: Brookvale Road East														
4	L2	2	0	2	0.0	0.478	5.0	LOS A	3.6	25.9	0.47	0.60	0.47	51.1
5	T1	81	4	100	4.9	0.478	4.0	LOS A	3.6	25.9	0.47	0.60	0.47	48.9
6a	R1	412	4	509	1.0	0.478	8.8	LOS A	3.6	25.9	0.47	0.60	0.47	51.8
Approach		495	8	611	1.6	0.478	8.0	LOS A	3.6	25.9	0.47	0.60	0.47	51.3
NorthWest: Romanes Drive North-West														
27a	L1	204	6	252	2.9	0.295	4.1	LOS A	2.1	15.2	0.29	0.52	0.29	53.9
29a	R1	1	0	1	0.0	0.295	8.1	LOS A	2.1	15.2	0.29	0.52	0.29	53.9
29b	R3	126	6	156	4.8	0.295	10.2	LOS B	2.1	15.2	0.29	0.52	0.29	54.6
Approach		331	12	409	3.6	0.295	6.4	LOS A	2.1	15.2	0.29	0.52	0.29	54.2
West: Brookvale Road West														
10b	L3	185	3	228	1.6	0.336	7.3	LOS A	2.2	15.7	0.70	0.74	0.70	51.3
11	T1	57	0	70	0.0	0.336	6.0	LOS A	2.2	15.7	0.70	0.74	0.70	49.5
12	R2	1	0	1	0.0	0.336	11.9	LOS B	2.2	15.7	0.70	0.74	0.70	53.0
Approach		243	3	300	1.2	0.336	7.0	LOS A	2.2	15.7	0.70	0.74	0.70	50.9
All Vehicles		1073	23	1325	2.1	0.478	7.3	LOS A	3.6	25.9	0.47	0.61	0.47	52.1

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

Roundabout LOS Method: SIDRA Roundabout LOS.

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

 **Site: 101 [Romanes Brookvale PM Ex (Site Folder: General)]**

New Site

Site Category: (None)

Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Bourke Place														
1	L2	3	0	3	0.0	0.006	5.2	LOS A	0.0	0.2	0.43	0.50	0.43	53.6
1a	L1	2	0	2	0.0	0.006	5.0	LOS A	0.0	0.2	0.43	0.50	0.43	54.5
3	R2	1	0	1	0.0	0.006	10.0	LOS B	0.0	0.2	0.43	0.50	0.43	54.9
Approach		6	0	7	0.0	0.006	5.9	LOS A	0.0	0.2	0.43	0.50	0.43	54.1
East: Brookvale Road East														
4	L2	2	0	2	0.0	0.152	4.5	LOS A	0.8	5.8	0.31	0.55	0.31	51.5
5	T1	48	0	55	0.0	0.152	3.4	LOS A	0.8	5.8	0.31	0.55	0.31	49.2
6a	R1	118	1	134	0.8	0.152	8.3	LOS A	0.8	5.8	0.31	0.55	0.31	52.1
Approach		168	1	191	0.6	0.152	6.9	LOS A	0.8	5.8	0.31	0.55	0.31	51.3
NorthWest: Romanes Drive North-West														
27a	L1	242	3	275	1.2	0.291	4.1	LOS A	1.9	13.1	0.27	0.52	0.27	54.2
29a	R1	4	0	5	0.0	0.291	8.1	LOS A	1.9	13.1	0.27	0.52	0.27	54.1
29b	R3	113	0	128	0.0	0.291	10.2	LOS B	1.9	13.1	0.27	0.52	0.27	55.1
Approach		359	3	408	0.8	0.291	6.1	LOS A	1.9	13.1	0.27	0.52	0.27	54.5
West: Brookvale Road West														
10b	L3	88	1	100	1.1	0.145	4.8	LOS A	0.8	5.5	0.32	0.47	0.32	52.0
11	T1	69	0	78	0.0	0.145	3.4	LOS A	0.8	5.5	0.32	0.47	0.32	50.1
12	R2	2	0	2	0.0	0.145	9.4	LOS A	0.8	5.5	0.32	0.47	0.32	53.7
Approach		159	1	181	0.6	0.145	4.2	LOS A	0.8	5.5	0.32	0.47	0.32	51.2
All Vehicles		692	5	786	0.7	0.291	5.9	LOS A	1.9	13.1	0.29	0.51	0.29	52.9

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

Roundabout LOS Method: SIDRA Roundabout LOS.

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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


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

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MOVEMENT SUMMARY

 Site: 101 [Romanes Brookvale PM Ex + BSP (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Bourke Place														
1	L2	3	0	3	0.0	0.007	6.1	LOS A	0.0	0.3	0.55	0.54	0.55	53.1
1a	L1	2	0	2	0.0	0.007	6.0	LOS A	0.0	0.3	0.55	0.54	0.55	54.0
3	R2	1	0	1	0.0	0.007	11.0	LOS B	0.0	0.3	0.55	0.54	0.55	54.4
Approach		6	0	7	0.0	0.007	6.9	LOS A	0.0	0.3	0.55	0.54	0.55	53.6
East: Brookvale Road East														
4	L2	2	0	2	0.0	0.284	4.7	LOS A	1.8	12.5	0.37	0.58	0.37	51.4
5	T1	63	0	72	0.0	0.284	3.6	LOS A	1.8	12.5	0.37	0.58	0.37	49.2
6a	R1	255	1	290	0.4	0.284	8.5	LOS A	1.8	12.5	0.37	0.58	0.37	52.1
Approach		320	1	364	0.3	0.284	7.5	LOS A	1.8	12.5	0.37	0.58	0.37	51.5
NorthWest: Romanes Drive North-West														
27a	L1	322	3	366	0.9	0.367	4.3	LOS A	2.7	18.8	0.33	0.51	0.33	54.2
29a	R1	4	0	5	0.0	0.367	8.2	LOS A	2.7	18.8	0.33	0.51	0.33	54.1
29b	R3	122	0	139	0.0	0.367	10.3	LOS B	2.7	18.8	0.33	0.51	0.33	55.1
Approach		448	3	509	0.7	0.367	5.9	LOS A	2.7	18.8	0.33	0.51	0.33	54.5
West: Brookvale Road West														
10b	L3	93	1	106	1.1	0.182	5.6	LOS A	1.0	7.3	0.48	0.55	0.48	51.4
11	T1	79	0	90	0.0	0.182	4.3	LOS A	1.0	7.3	0.48	0.55	0.48	49.5
12	R2	2	0	2	0.0	0.182	10.2	LOS B	1.0	7.3	0.48	0.55	0.48	53.1
Approach		174	1	198	0.6	0.182	5.1	LOS A	1.0	7.3	0.48	0.55	0.48	50.6
All Vehicles		948	5	1077	0.5	0.367	6.3	LOS A	2.7	18.8	0.37	0.54	0.37	52.7

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

Roundabout LOS Method: SIDRA Roundabout LOS.

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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

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

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MOVEMENT SUMMARY

 **Site: 101 [Romanes Brookvale PM Ex + BSP + Od Res (Site Folder: General)]**

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Bourke Place														
1	L2	3	0	3	0.0	0.007	6.2	LOS A	0.0	0.3	0.55	0.54	0.55	53.1
1a	L1	2	0	2	0.0	0.007	6.0	LOS A	0.0	0.3	0.55	0.54	0.55	54.0
3	R2	1	0	1	0.0	0.007	11.0	LOS B	0.0	0.3	0.55	0.54	0.55	54.3
Approach		6	0	7	0.0	0.007	6.9	LOS A	0.0	0.3	0.55	0.54	0.55	53.6
East: Brookvale Road East														
4	L2	2	0	2	0.0	0.289	4.7	LOS A	1.8	12.8	0.38	0.58	0.38	51.4
5	T1	66	0	75	0.0	0.289	3.6	LOS A	1.8	12.8	0.38	0.58	0.38	49.1
6a	R1	255	1	290	0.4	0.289	8.5	LOS A	1.8	12.8	0.38	0.58	0.38	52.0
Approach		323	1	367	0.3	0.289	7.5	LOS A	1.8	12.8	0.38	0.58	0.38	51.4
NorthWest: Romanes Drive North-West														
27a	L1	322	3	366	0.9	0.374	4.3	LOS A	2.7	19.2	0.34	0.52	0.34	54.2
29a	R1	4	0	5	0.0	0.374	8.2	LOS A	2.7	19.2	0.34	0.52	0.34	54.0
29b	R3	127	0	144	0.0	0.374	10.3	LOS B	2.7	19.2	0.34	0.52	0.34	55.0
Approach		453	3	515	0.7	0.374	6.0	LOS A	2.7	19.2	0.34	0.52	0.34	54.4
West: Brookvale Road West														
10b	L3	96	1	109	1.0	0.189	5.6	LOS A	1.1	7.6	0.49	0.56	0.49	51.4
11	T1	82	0	93	0.0	0.189	4.3	LOS A	1.1	7.6	0.49	0.56	0.49	49.5
12	R2	2	0	2	0.0	0.189	10.2	LOS B	1.1	7.6	0.49	0.56	0.49	53.0
Approach		180	1	205	0.6	0.189	5.1	LOS A	1.1	7.6	0.49	0.56	0.49	50.5
All Vehicles		962	5	1093	0.5	0.374	6.3	LOS A	2.7	19.2	0.38	0.55	0.38	52.6

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

Roundabout LOS Method: SIDRA Roundabout LOS.

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA Standard.

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

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

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