

**Calcutta Farms Ltd**

**Industrial Zone Plan Change**

**Integrated Transport Assessment**

July 2022





## Document control

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Job number/s	146930.02
Job name	Calcutta Industrial Zone Plan Change
Report name and number	Integrated Transport Assessment
Date / period ending	July 2022
File path	C:\12ds\data\10.7.120.14\146930.02 - Industrial Development_5122\10 Traffic\Reports and Memos\Calcutta Farms Industrial Zone Plan Change ITA.docx

Report status			
Status	Name	Signature	Date
Report prepared by	Siva Balachandran		08/07/2022
Checked by	Cameron Inder		08/07/2022
Approved for issue (V1)	Cameron Inder		05/11/2021

Document history			
Version	Changes	Signature	Issue date
V2	Final		29/11/2021
V3	Draft – updated based on WK and MPDC comments		04/05/2022
V4	Final – updated based on WK and MPDC comments		08/07/2022





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# 1. Executive Summary

Bloxam Burnett & Olliver (BBO) has been commissioned by Veros, on behalf of Calcutta Farms Ltd (Calcutta) to prepare an Integrated Transport Assessment (ITA) in support of the Calcutta Plan Change application. The Plan Change seeks to rezone approximately 41 hectares (ha) of land, directly south of Tauranga Road in Matamata from its current rural land use and zoning to an Industrial Zone. Of this 41 ha, only a gross area of 36.3 ha is capable of being developed for industrial purposes (32.5 ha developable land plus 3.8 for internal roads), with the balance being set aside for landscape buffer and swale networks.

When complete, the proposed development is expected to generate approximately 560 vehicle trips per peak hour, with up to 20% of the total peak hour trips being heavy commercial vehicles. It is anticipated that the proposed rezoning will generate approximately 4,000 to 4,300 trips per day. A new roundabout is proposed on Tauranga Road (or State Highway 24 (SH24)) to provide access to the new Industrial Zone.

Overall, this ITA finds that the transportation effects on the adjoining road network enabled by the proposed rezoning can be managed and mitigated to an acceptable level subject to appropriate infrastructure provisions.

On that basis, the following transportation recommendations are made:

## ***Access Intersection***

- Construction of a roundabout on SH24 with an access road through the site in general accordance with the location and form illustrated in Appendix B of this ITA.

## ***Wider Network Intersection Upgrades***

- The SH24 / Tower Road / Burwood Road roundabout shall be **minimally** upgraded in general accordance with the intent illustrated in Appendix D of this ITA.

## ***Walking and Cycling***

- A 3 m wide shared path is to be provided to the west of the new roundabout access along the site frontage and extended by approximately 115 m beyond the western site boundary. A pedestrian refuge island is to be constructed approximately 115 m west northwest of the plan change site to provide a safe crossing point for pedestrians.
- A new 1.8 m footpath is to be constructed on the northern side of SH24 from Garland Street to the new crossing point.
- A 1.8 m wide footpath is to be provided to the east of the new roundabout access along the site frontage.
- 3 m wide shared paths to be provided the stormwater swale and landscape buffer around the site.

Apart from the above-mentioned mitigating measures, it is also recommended that Waka Kotahi NZ Transport Agency reviews the safe and appropriate speed limit along the site frontage and location of the gated speed limit signs such that it aligns with the industrial environment if the proposed rezoning is approved.

The following summarises the recommended transportation infrastructure upgrades and related timing and responsibilities for delivery, in relation to this rezoning submission.



Staging of Transportation Infrastructure Improvements			
No.	Infrastructure Upgrade	When?	Delivered By
1	3-arm roundabout on SH24 for access to the plan change site	Before any industrial activity in the plan change site generates traffic accessing SH24	The Applicant
2	Capacity Increase at SH24 / Tower Road / Burwood Road roundabout to dual lane approaches (refer to Appendix D, drawing 146930-02-0234)	When the total two-way volume at the Mangawhero Road (SH24) arm of the roundabout exceeds 1,570 vph during the PM peak period.	The Applicant
3	Construction of walking and cycling facilities within the plan change site as well as on SH24	Before any industrial activity in the plan change site generates traffic accessing SH24	The Applicant



## 2. Introduction

Calcutta Farms Ltd (Calcutta) is lodging a private Plan Change application with Matamata - Piako District Council (MPDC) to rezone approximately 41.4 hectares (ha) of rural zoned land to Industrial Zone.

This Integrated Transport Assessment (ITA) supports the Plan Change application and is in general accordance with Rule 9.1.6 of the Operative Matamata – Piako District Plan (District Plan), and Appendix 5C of the Waka Kotahi NZ Transport Agency Planning Policy Manual.

More specifically, the report provides an assessment of the traffic and transportation aspects of the proposed rezoning, which includes:

- The local transport environment surrounding the Plan Change area;
- An estimation of the predicted trip generation when rezoned and fully developed;
- The accessibility of the plan change site and its ability to safely, efficiently and effectively accommodate the predicted trip generation;
- Anticipated effects on the road corridors and intersections, including the State Highway 24 (SH24) / Tower Road / Burwood Road roundabout;
- Proposals to mitigate effects on the adjoining road network having regard to the long-term function and configuration of the road network and consideration for existing zoned and consented development;
- The provision for alternative modes of transport including public transport, micro-mobility and pedestrian and cycle linkages; and
- An assessment of the proposal's alignment with local and national transport strategies and policies.



### 3. Existing Transportation Environment

#### 3.1 Site Location

The plan change site is bordered by Tauranga Road (SH24) to the north-east. The locality of the site is shown in Figure 1.

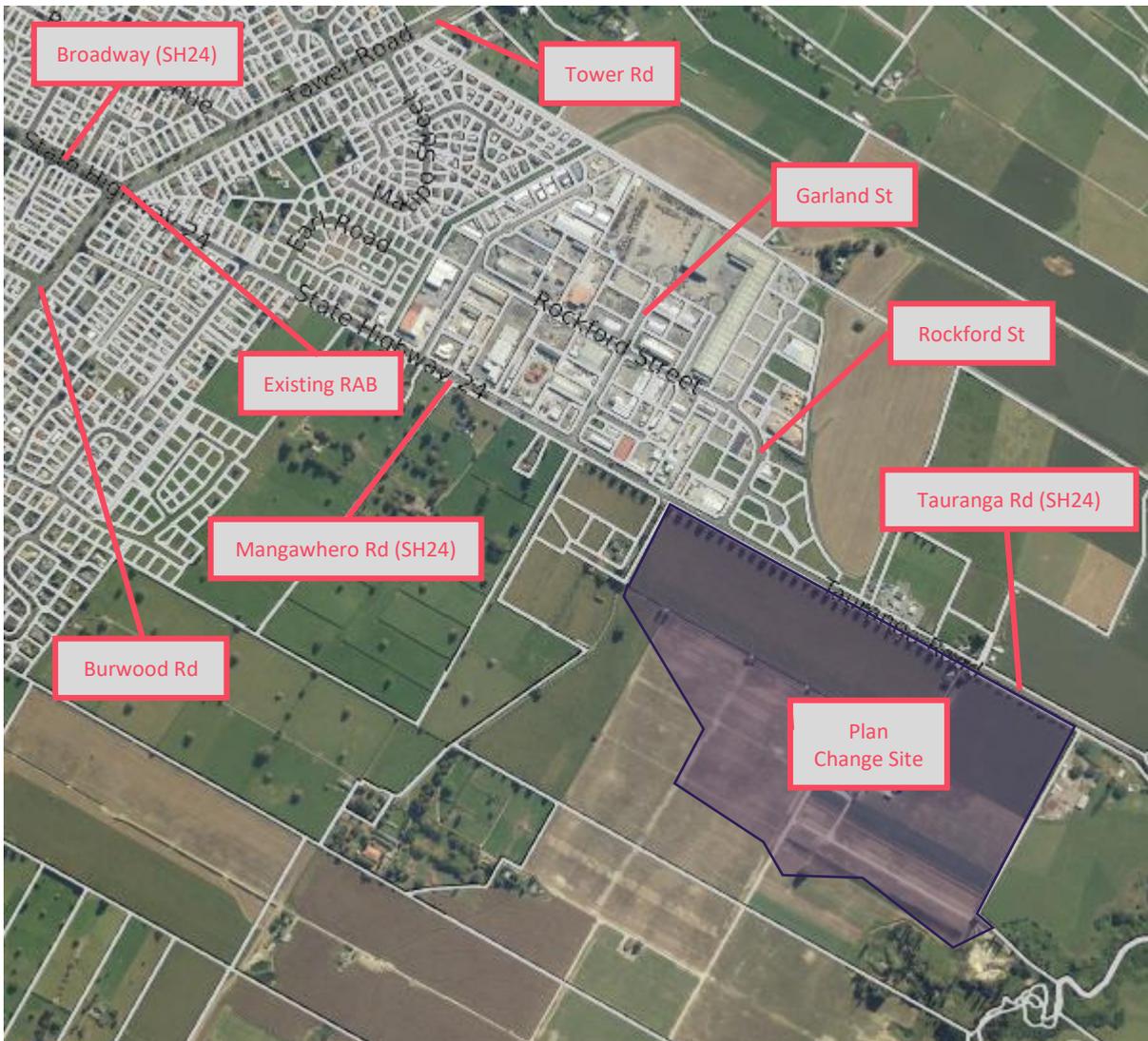


Figure 1: Site Locality

#### 3.2 Land Use

The land proposed for rezoning is currently zoned rural within the District Plan. The site is surrounded by a combination of rural and industrial land use, with residential land uses also nearby.

Figure 2 illustrates the plan change site with respect to adjacent land use. The future residential policy area is located west of the site on the south side of Mangawhero Road (SH24). The existing Rockford Street industrial area is located on the opposite side of SH24. MPDC own 12 ha of industrial land directly opposite the plan change site.



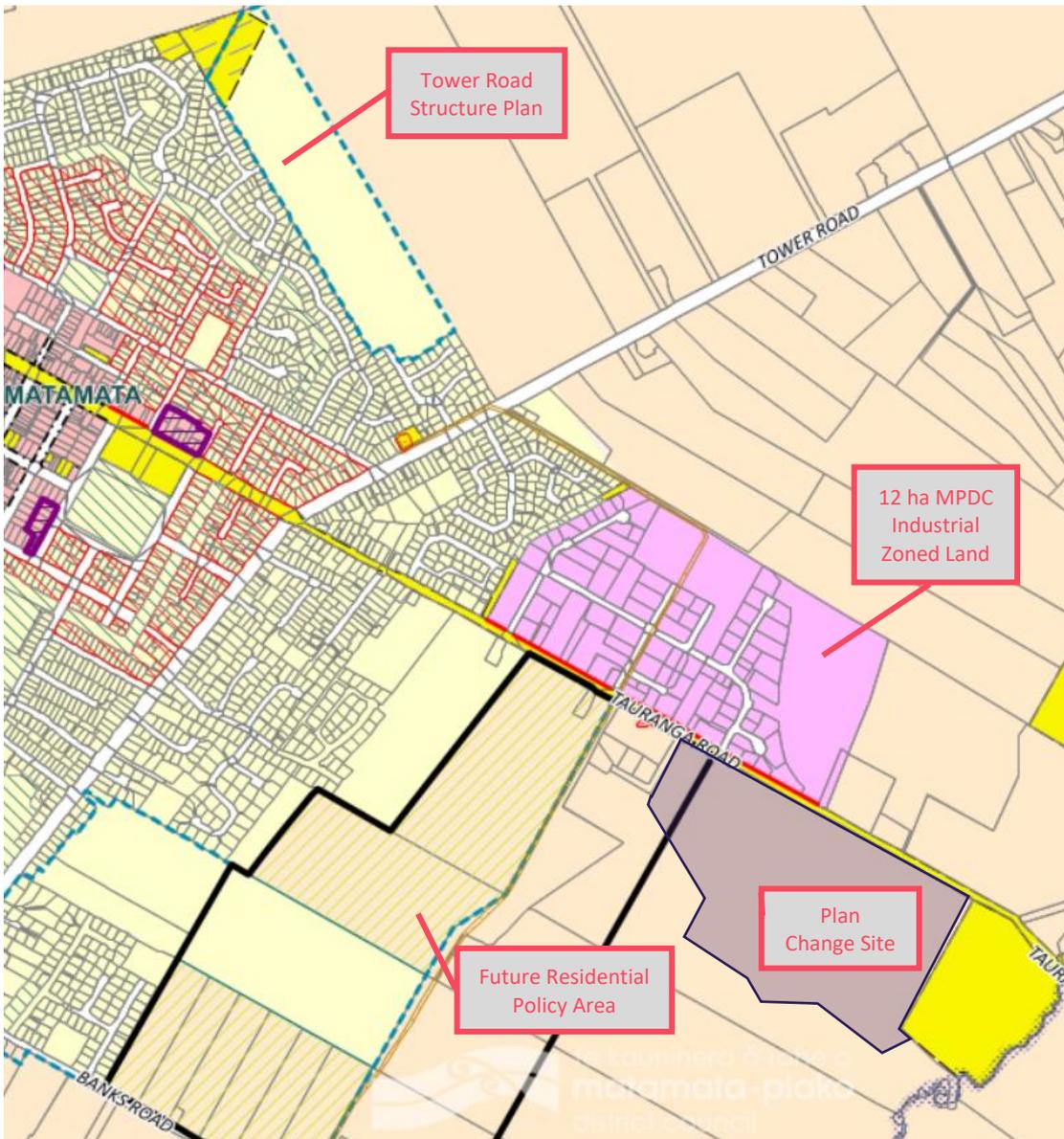


Figure 2: Surrounding Land Use from District Plan

### 3.3 Existing Road Network

The existing network of roads surrounding the plan change site that could potentially be affected by the proposed rezoning are described in this section.

#### 3.3.1 State Highway 24

SH24 provides the main transport link between State Highway 27 (SH27) in Matamata and State Highway 29 (SH29) which crosses the Kaimai Hills towards Tauranga to the east. SH24 runs in the east-west direction and is also known as Mangawhero Road (north-west of Garland Street) and Tauranga Road (south-east of Garland Street). It is identified as a Significant Road in the District Plan roading hierarchy and is classified as an Arterial Road in the One Network Road Classification (ONRC) system.

The estimated Annual Average Daily Traffic (AADT) volume along the section of SH24 fronting the plan change site is approximately 6,038 vehicles per day (vpd) with 17% heavy commercial vehicle (HCV) according to information on the Mobile Road website. However, the traffic volume on SH24 fronting the site appears to be implausible given the significant change in AADT volume that occurs to the west of Weraiti Drive (7,246



vpd). Therefore, this assessment assumes the AADT volume of SH24 fronting the plan change site is in the range of 6,700 vpd considering the surveyed intersection turning counts presented in Section 3.6.

SH24 in the vicinity of the site is subjected to transition from rural to urban environment, with various speed limits in place. The speed limit is 100 km/h at the section of road fronting the plan change site to Garland Street. Between Garland Street and Earl Place, the speed limit is 70 km/h and the speed limit reduces to 50 km/h from Earl Place towards Matamata town centre.

### **3.3.2 Tower Road**

Tower Road intersects with SH24 approximately 1.28 km north-west of the plan change site. The intersection of SH24 / Tower Road / Burwood Road is a single circulating lane roundabout with single lane approaches and exits except for the Tower Road approach where it operates as a continuous lane and a short-left turn lane.

Tower Road is a two-way two-lane road with a posted speed limit of 50 km/h within the residential area and is identified as a Collector Road in the District Plan roading hierarchy, and a Primary Collector Road in the ONRC. It has an estimated AADT of 4,700 vpd with 8% HCV based on information on the Mobile Road website.

### **3.3.3 Burwood Road**

Burwood Road which forms the south-western leg of the SH24 / Tower Road / Burwood Road roundabout, is two-way two-lane road with a posted speed limit of 50 km/h. It runs in the north-south direction linking SH24 and SH27. It is classified as an Arterial Road in the District Plan roading hierarchy, and a Primary Collector Road in the ONRC. It has an estimated AADT of 3,400 to 4,600 vpd with 6% HCV based on information on the Mobile Road website.

### **3.3.4 Rockford Street**

Rockford Street is located on the opposite side of SH24 to the plan change site. It is a 9.8 m wide unmarked two-way road with a posted speed limit of 50 km/h. It is identified as a Local Road in the District Plan roading hierarchy, and a Low Volume Access Road in the ONRC. It has an estimated AADT of 1,155 vpd with 5% HCV based on information on the Mobile Road website.

## **3.4 Existing Transport Modes**

### **3.4.1 Public Transport**

The 22 Eastern Connector bus service connects Matamata town centre with Hamilton. The service runs three times a day during weekdays. The closest bus stops to the plan change site would be at 15 Burwood Road and 14 Tower Road which are approximately 1.5 km north-west of the site.

### **3.4.2 Walking and Cycling**

There are no existing walking and cycling facilities along the frontage of the plan change site on both sides of SH24. This is consistent with the existing rural nature of the site.

The closest footpath runs along the northern side of SH24 between the SH24 / Tower Road / Burwood Road roundabout and SH24 / Garland Street intersection. Similarly, on the southern side of SH24, a 1.5 m wide footpath is present between the SH24 / Tower Road / Burwood Road roundabout and Earl Place.



However, at a district level, there is one segment of the Hauraki Rail Trail that connects to Matamata (i.e. Te Aroha to Matamata). This leg of the trail was recently completed and footpaths in urban areas including the section along Tower Road up to SH29 / Broadway roundabout via SH24 / Tower Road / Burwood Road roundabout were widened. Figure 3 illustrates this route.

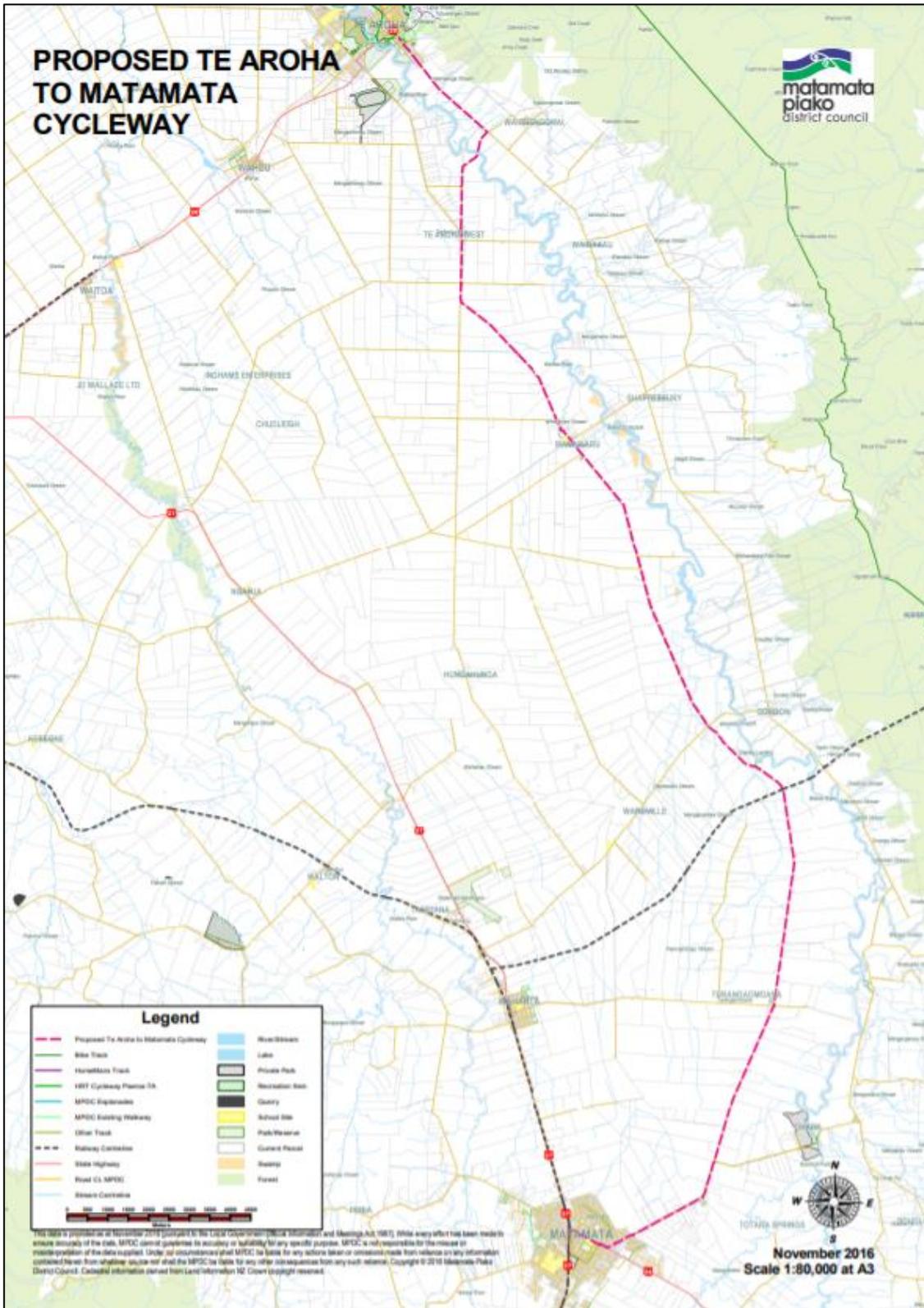


Figure 3: Te Aroha to Matamata Cycleway (now completed)



### 3.5 Crash History

Crash data was sourced from the Waka Kotahi NZ Transport Agency’s (Waka Kotahi) Crash Analysis System (CAS) over a five-year period from 2016 – 2020, including available data for 2021. The study area includes all crashes within a 200 m radius of the proposed access to the plan change site and within a 50 m radius of the existing SH24 / Tower Road / Burwood Road roundabout.

**Table No: 1**

Crash History 2016 - 2021						
Location	Total Crashes	Crash Severity				Comments
		Death	Serious	Minor	Non-injury	
SH24 near proposed access	0	0	0	0	0	-
SH24 / Tower Rd / Burwood Rd Roundabout	2	0	0	0	2	No trends observed, with one off-road crash and one rear-end collision.

The crash data indicates that there are no apparent road safety concerns in the immediate vicinity of the plan change site.

### 3.6 Existing Intersection Turning Counts

Intersection count surveys were undertaken on the 14<sup>th</sup> and 15<sup>th</sup> of April 2021 to determine the peak hour traffic volumes at the following intersections:

- SH24 / Waihou Street “T” intersection;
- SH24 / Garland Street “T” intersection;
- SH24 / Rockford Street “T” intersection; and
- SH24 / Tower Road / Burwood Road roundabout.

Figure 4 to Figure 11 provide a summary of the 2021 turning movement counts at these intersections for the weekday AM and PM peak periods which have been identified as 8:00 a.m. to 9:00 a.m. and 4:30 p.m. to 5:30 p.m. respectively.



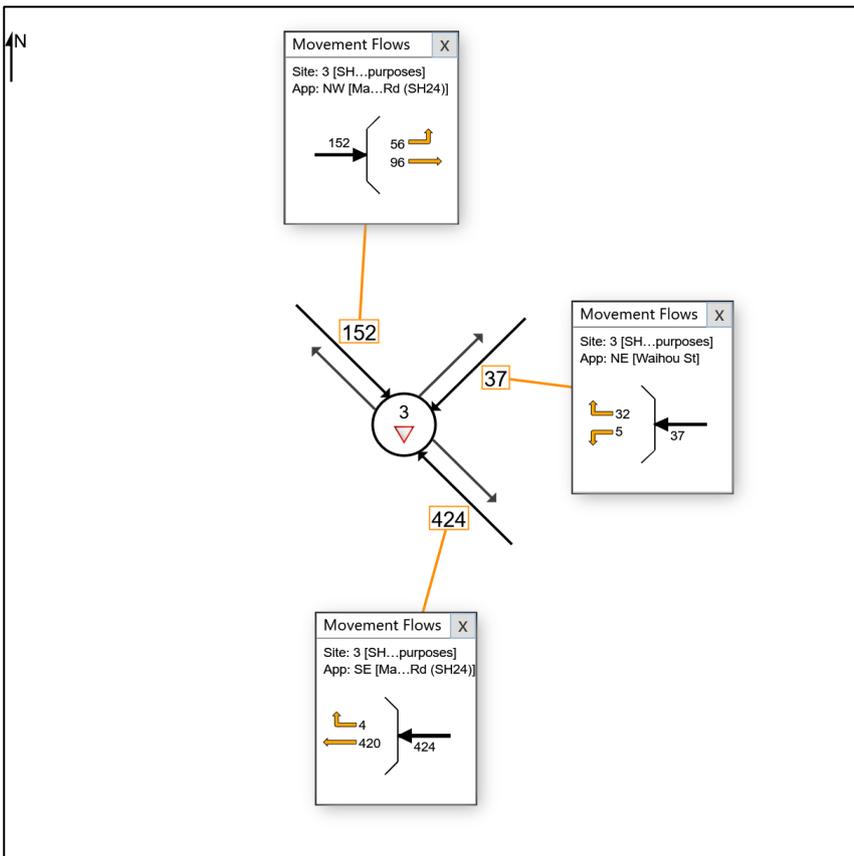


Figure 4: Existing Weekday AM Peak Hour Volumes at SH24 / Waihou Street Intersection

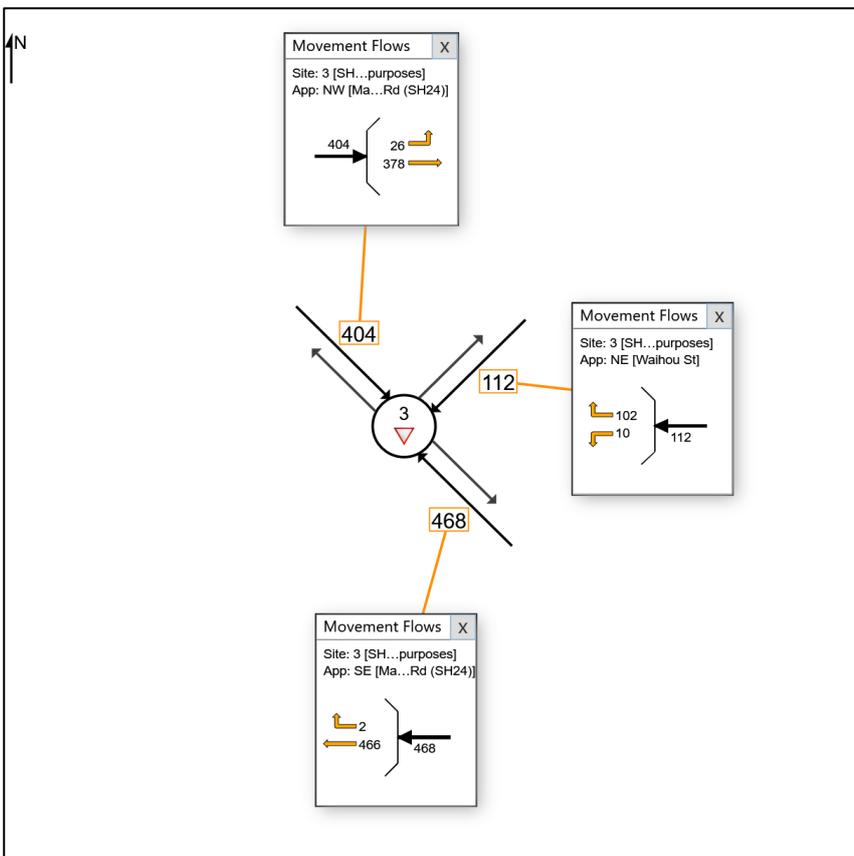


Figure 5: Existing Weekday PM Peak Hour Volumes at SH24 / Waihou Street Intersection



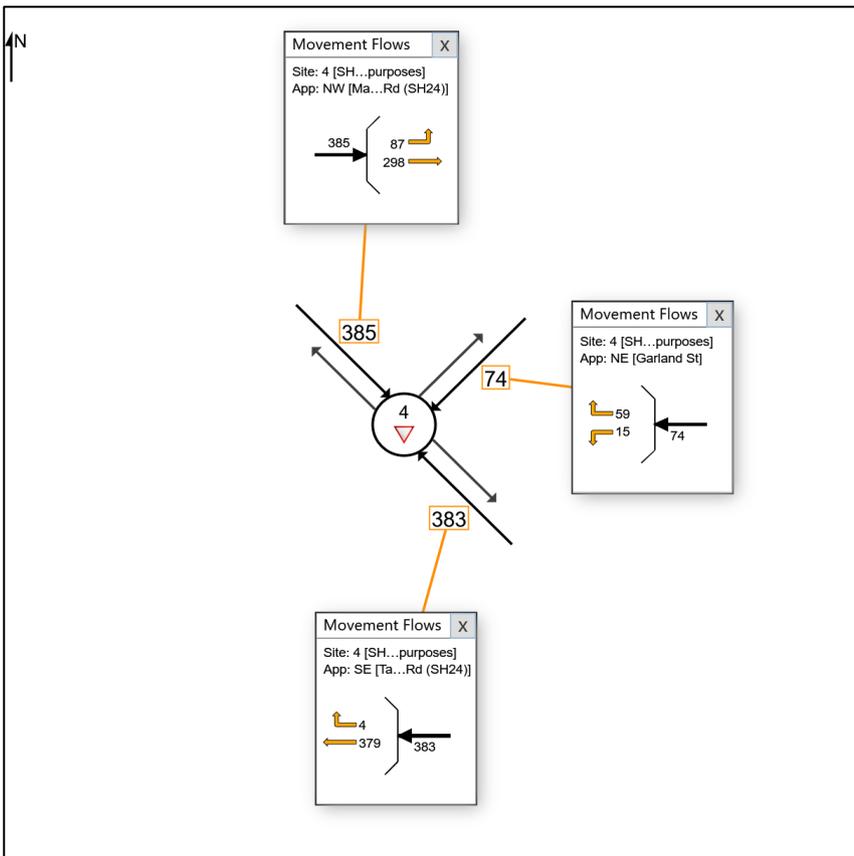


Figure 6: Existing Weekday AM Peak Hour Volumes at SH24 / Garland Street Intersection

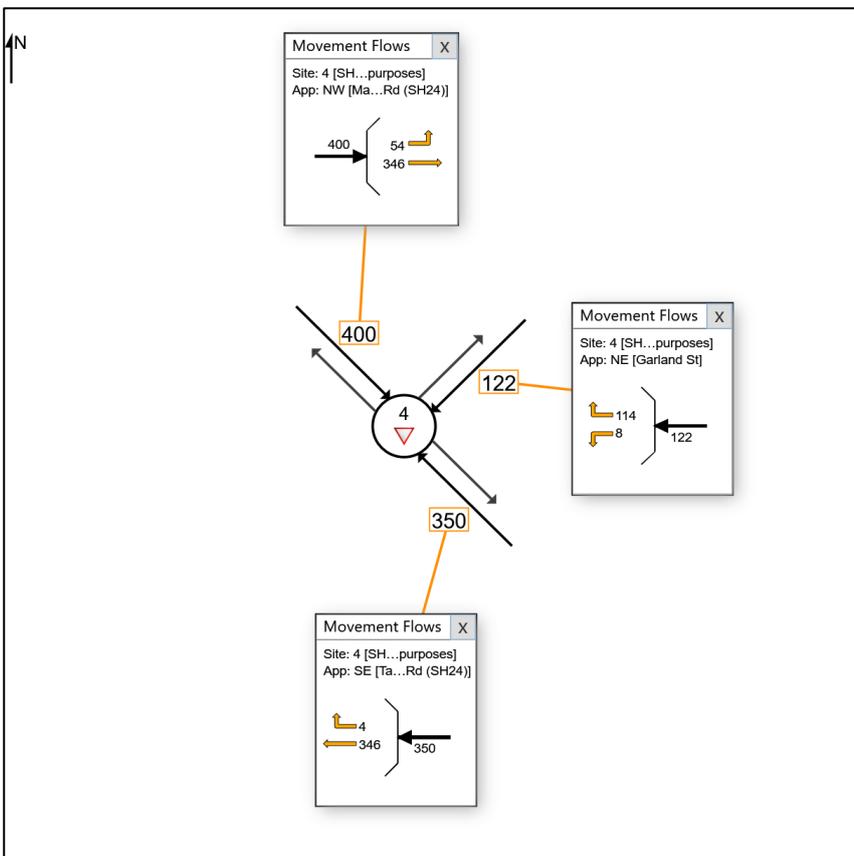


Figure 7: Existing Weekday PM Peak Hour Volumes at SH24 / Garland Street Intersection



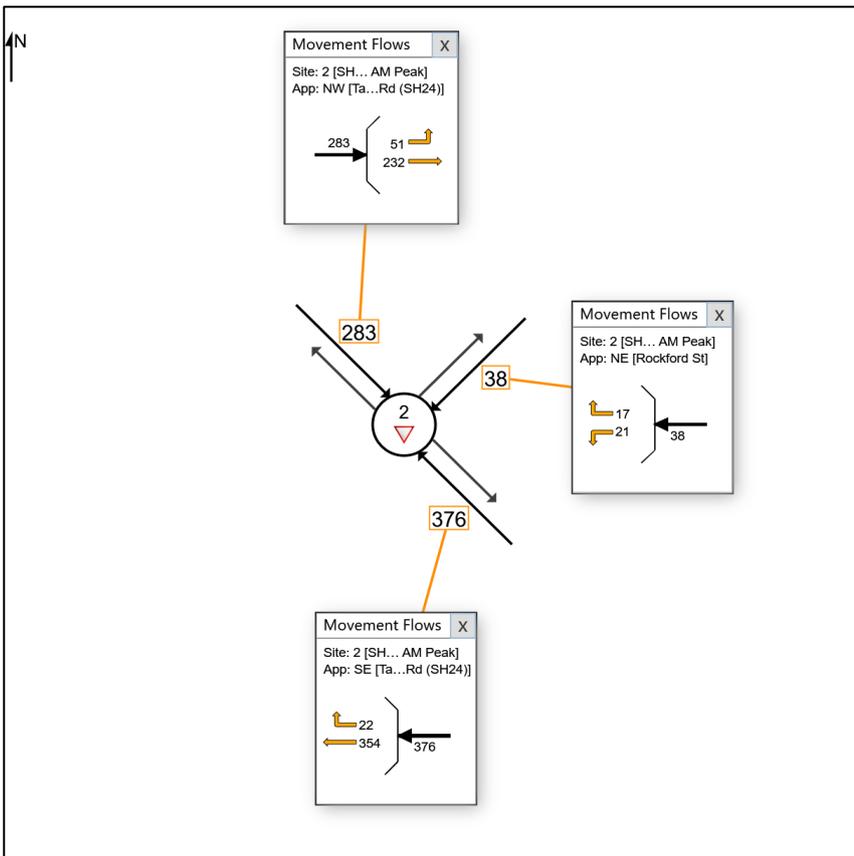


Figure 8: Existing Weekday AM Peak Hour Volumes at SH24 / Rockford Street Intersection

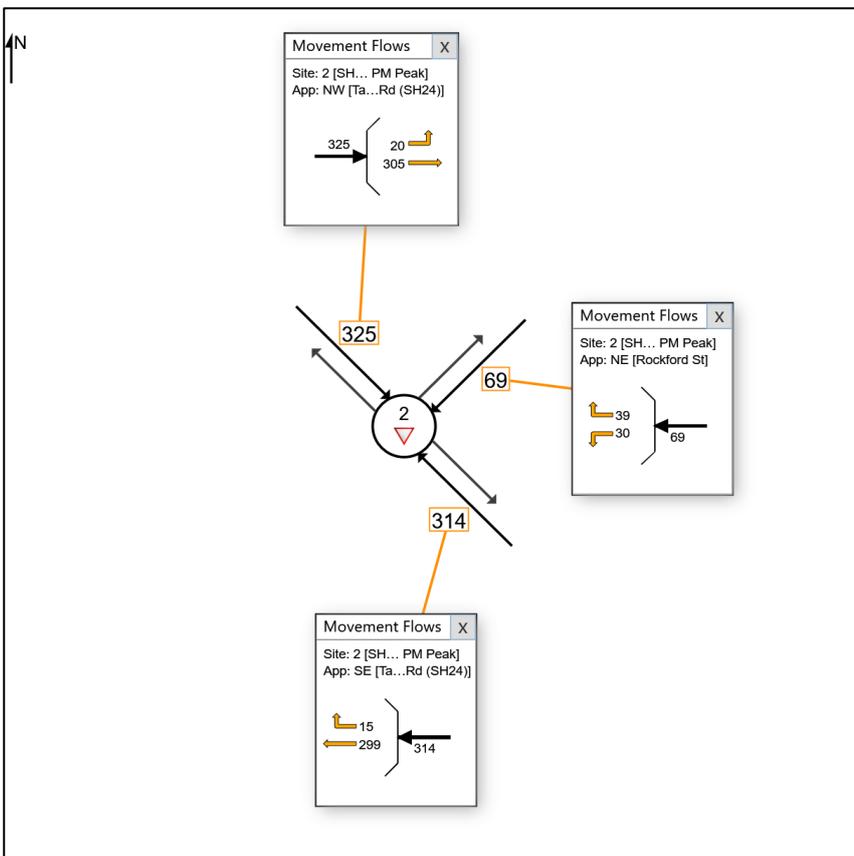


Figure 9: Existing Weekday PM Peak Hour Volumes at SH24 / Rockford Street Intersection



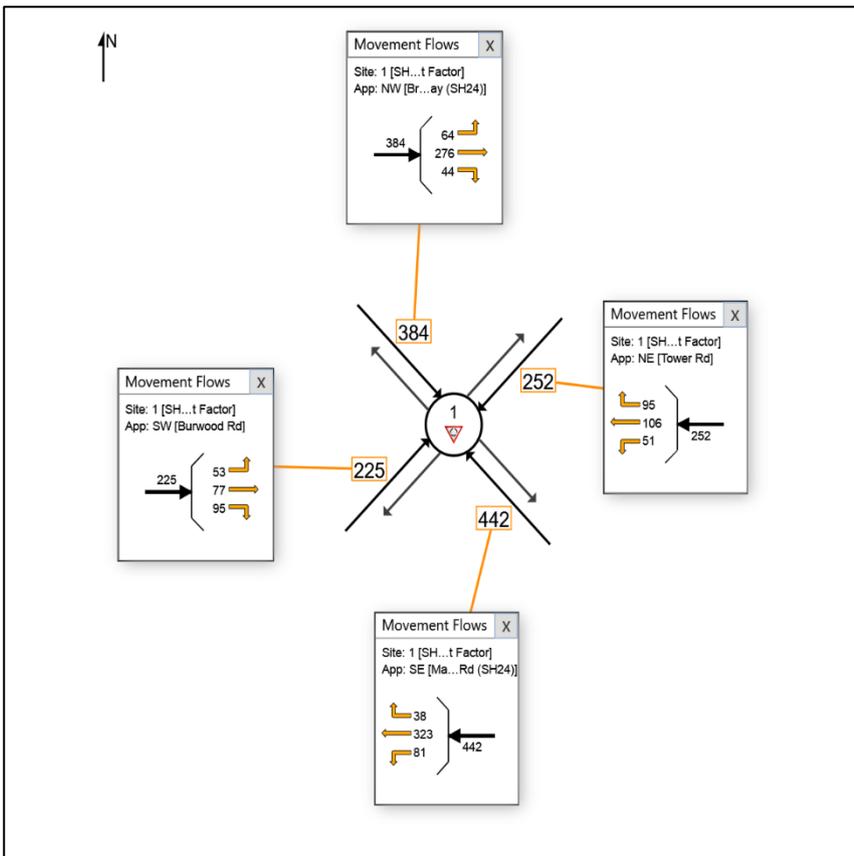


Figure 10: Existing Weekday AM Peak Hour Volumes at SH24 / Tower Road / Burwood Road Roundabout

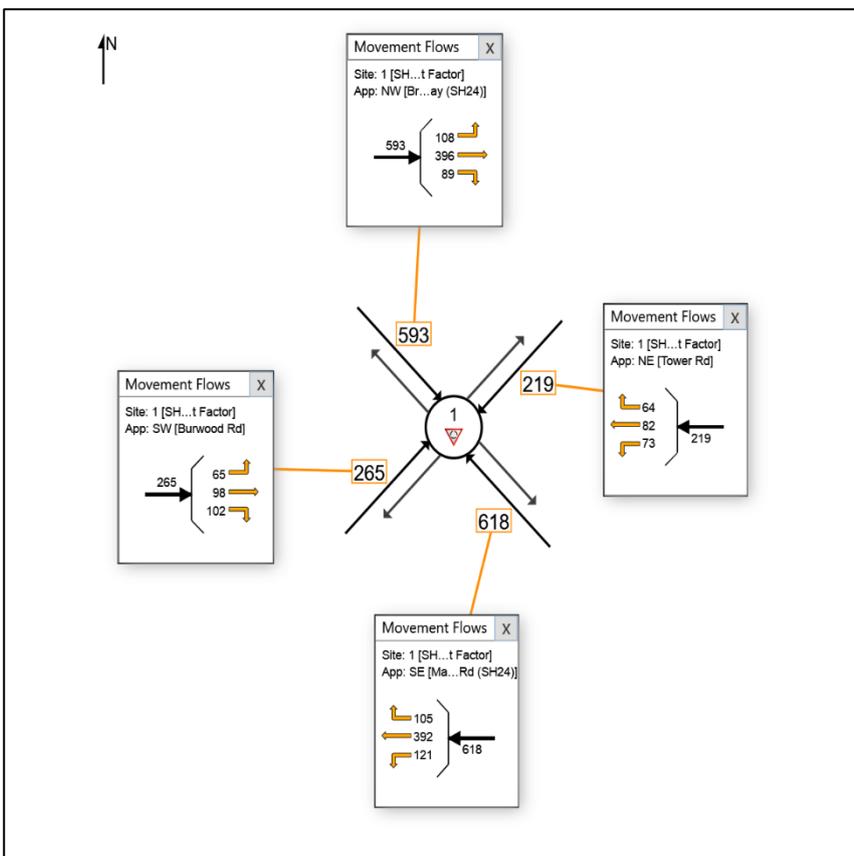


Figure 11: Existing Weekday PM Peak Hour Volumes at SH24 / Tower Road / Burwood Road Roundabout



### 3.6.1 Observed Traffic Patterns

The following observations are made from the intersection count survey data:

- The SH24 / Tower Road / Burwood Road roundabout is currently operating satisfactorily within its overall capacity. Some queueing does occur, with queues of approximately 8 vehicles and 9 vehicles on Mangawhero Road (SH24) during the AM and PM peak periods respectively. These queues can be described as occasional spikes, and clear relatively quickly.
- The subsequent observations were derived from the existing industrial traffic characteristics at the Waihou Street, Garland Street and Rockford Street intersections:
  - Approximately 60% of the trips generated by the Rockford Street industrial area enter the site and the remaining 40% depart the site during the AM peak period. About 87% of the trips entering the industrial area arrive from the north while approximately 72% of the trips leaving the area depart to the north during the AM peak hour.
  - About 70% of the trips generated by the Rockford Street industrial area leave the site and the balance 30% enter the site during the PM peak period. Approximately 84% of the trips leaving the industrial area depart to the north while about 83% of the trips entering the area arrive from the north during the PM peak hour.



## 4. Proposed Plan Change

### 4.1 Proposal Overview

Calcutta has developed a Development Area Plan (DAP) which provides the basis for the proposed rezoning across the site. The DAP, which is shown in Figure 12 and Appendix A, will continue to evolve, ensuring it responds to opportunities and constraints as they are identified through the rezoning process.



Figure 12: Employment Zone Development Area Plan

Approximately 41.4 ha of rural land is proposed to be rezoned to Industrial. Although the plan change is being sought for a land area of 41.4 ha, of that only about approximately 36.3 ha will be capable of being developed for industrial purposes (i.e. 32.5 ha developable land plus 3.8 ha for internal roads). The balance area is made of landscape buffers and swales.

The following transport infrastructure is proposed to support the rezoning and subsequent development:

- A new roundabout on SH24 (RP 0 / 2.747) for access to the site.
- Provision for safe and convenient walking and cycling connectivity within the plan change site and to SH24 (site frontage).
- A future connection to land southwest of the site to facilitate future development south of the site.

The transport effects of this proposal are considered and discussed in the following sections of this report.



## 4.2 Access Strategy

The DAP (Figure 12) that informs the rezoning proposal shows an access to SH24, approximately 290 m southeast of the SH24 / Rockford Street intersection (RP 0 / 2.458). Table 2 provides a summary of the concept design configuration of the proposed access intersection. It is Calcutta’s intention to construct the SH24 roundabout access from the initial stage of development.

Feedback has been sought from Waka Kotahi and MPDC to ensure there are no significant failings in the location or objections, at a fundamental level, to a new intersection at the location identified. It is recognised that this is a high-level concept, and the final design configuration is subject to preliminary and detailed design processes, safety audits and the RCA’s standard approval processes, so it will be amended and confirmed as part of future resource consent or subdivision consent applications to develop the land once rezoned.

For the purposes of demonstrating that access to the rezoned land is feasible, the concept access design has been produced in accordance with the provisions in the *Austrroads Guide to Road Design Part 4B: Roundabout*. The concept layout has been modelled to demonstrate that the expected performance and capacity of the intersection is sufficient for the transport demands of the rezoned land once developed.

**Table No: 2**

Preliminary Access Configurations			
Proposed Access	Access Type	Proposed Configuration	Appendix Reference
Access 1 (SH24 Access Roundabout)	Roundabout	Single circulating lane, 3-leg roundabout with single entry and exit lanes at approaches. (RP 0 / 2.747)	Appendix B Drawing 146930-02-0221

A roundabout configuration is considered appropriate at this location for the following reasons:

- The roundabout is an ideal configuration for the future semi-urban environment as the design is intended to significantly reduce vehicle operating speeds on the approaches to the intersection;
- In addition to reducing vehicle speeds, the configuration reduces the likelihood and severity of crashes by minimising T-bone and preventing head-on type collisions; and
- The configuration minimises vehicle delays, especially for vehicles entering / exiting the proposed industrial development.

The position of the roundabout is proposed with a bias towards the plan change site boundary. This is to avoid encroaching into the 12 ha industrial block of land on the opposite side. However, the roundabout is located to enable upgrading to a four-leg roundabout in future should development occur on the block of land opposite. If development of that land was confirmed in the short term as likely to occur, the roundabout could be designed to be located centrally on SH24 to assist with better integration with the MPDC owned land (Appendix B – Drawing CL-04).

## 4.3 Speed Environment

As described in Section 3.3.1, the section of SH24 fronting the plan change site has a posted speed limit of 100 km/h and the speed limit reduces to 70 km/h from approximately 80 m south-east of the SH24 / Garland Street intersection at RP 0 / 2.193.



The assessment considers that the existing 100 km/h posted speed limit along this section of road would not be best suited to the transport environment if rezoning was approved, for the following reasons:

- The road environment along the section of SH24 bordering the plan change site is expected to change from a rural to a semi-urban environment as the site is developed.
- Approximately 225 m west of the plan change site (opposite SH24 / Garland Street intersection) and at RP 0 / 2.110, the land is zoned future residential.
- Potential future residential areas to the south of the plan change site as shown in Figure 13 (indicative masterplan that captures the Calcutta's vision for their land). These areas are likely to obtain primary access from the new roundabout access.
- Mega Maps<sup>1</sup> indicates that the Safe and Appropriate Speed (SAAS) for this section of SH24 is 80 km/h. The map indicates that the SAAS for the existing section of SH24 posted 70 km/h reduces to 60 km/h, with the SAAS for the existing industrial roads being 40 km/h.
- With the introduction of a roundabout access to the site, the operating speed along this section of SH24 fronting the plan change site will reduce to between 60 km/h and 70 km/h.

Waka Kotahi Speed Management Team is currently undertaking a speed review of SH24, between Matamata and the SH24 / SH29 intersection. Based on consultation with Waka Kotahi on 16 March 2022, it was understood that the speed review process of SH24 has not concluded. However, it was likely that the current speed limit of 100 km/h will be reduced to 80 km/h during the interim stage and there is potential for the speed limit to be reduced to 60 km/h once there has been further and relatively extensive development along both sides of the state highway corridor. On this basis, it is proposed that the posted speed limit along this section of SH24 be changed from the existing 100 km/h to 80 km/h if the rezoning is approved, to reflect the more semi-urbanised road environment that will result and to be aligned with the SAAS. A speed threshold treatment with new gated speed limit signs is proposed approximately 360 m south-east of the proposed SH24 roundabout at RP 0 / 3.107 as illustrated in Drawing 146930-02-0221 (Appendix B). The location of the speed threshold treatment is indicative, however it achieves a stopping sight distance of 160 m for a truck (i.e. 90 km/h operating speed) from the entrance to Matamata Refuse and Recycling Centre.

As such, the conclusions and recommendations in this assessment, as well as the design of the roundabout access, are based on the SAAS for this section of SH24 (i.e. 80 km/h). This may need to be reviewed once there has been confirmation from Waka Kotahi as to what the speed limit on SH24 will be changed to.

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<sup>1</sup> This information is obtained from the "Rockford Street Industrial Development: Transport Assessment" draft report prepared by Gray Matter Limited (dated 12 April 2021) for MPDC.





Figure 13: Calcutta Farms Ltd Overall Vision (Indicative Masterplan)

#### 4.4 Sight Distance

Safe intersection sight distance (SISD) does not apply to the proposed SH24 access roundabout. Instead, the approaches to a roundabout must meet the requirements for the operating speed in relation to Criterion 1 and 2 of the *Austrroads Guide to Road Design Part 4B – Roundabouts*. Criterion 3 sightline is also desirable but not mandatory. Criterion 1 is Approach Sight Distance (ASD).

For the proposed location of the SH24 roundabout, the minimum ASD required, for a design speed of 80 km/h is 114 m. The concept roundabout design complies with both Criterion 1 and Criterion 2 sight distance requirements based on the design speeds. Drawing 146930-02-0224 in Appendix B demonstrates the sight distance compliance.

#### 4.5 Separation Distance

The position of the SH24 access roundabout achieves a separation distance of approximately 290 m to SH24 / Rockford Street T-intersection from the centre of the roundabout. The Planning Policy Manual does not provide the separation distances or spacing between intersections. However, typically Waka Kotahi prefers the separation distance of intersections on State Highways to be at least 400 m to 500 m, which is not achieved in this case. However, the shortfall in separation distance is not considered critical at this location for the following reasons:

- As discussed in Section 4.3, the posted speed limit is recommended to be reduced to 80 km/h at a location approximately 360 m south-east of the proposed roundabout access (centre of the roundabout). The introduction of a roundabout will further reinforce and be consistent with the operating speed at the intersection and the urbanised environment.
- The separation distance between SH24 / Garland Street and SH24 / Rockford Street intersections is approximately 345 m which does not meet the minimum requirement as well. However, there does



not appear to be any underlying road safety issues attributed to the shortfall in separation distance, particularly with the rural operating speed reducing to an urban speed.

## 4.6 Internal Transport Network

An indicative network of internal roads to service the proposed development has been developed as shown in the DAP (Figure 12). The internal roads will be designed to industrial road standards to appropriately cater for high volume of heavy vehicles which are typically expected with this land-use activity. While the DAP reflects the internal network configuration, the finer details of the internal road network will be refined at future subdivision stages.

The proposed development's internal road network will consist of two industrial road typologies described in the subsequent sub-sections. The proposed cross-sections were assessed against Table 3.1 of the *MPDC Development Manual 2010* (Development Manual) which provide the minimum geometric and structural standards for each road classification. The assessment indicated that the proposed cross-sections fulfil all minimum requirements for an industrial road.

### 4.6.1 Collector Road

The main internal road, also referred to as the spine road, will run from the new SH24 access roundabout to the southern boundary of the site. This spine road could provide future connection to additional development south of the plan change site that is part of an overall Calcutta Farms masterplan (Figure 13).

The indicative cross-section of the proposed internal spine road is illustrated in Figure 14. This industrial road typology provides a carriageway width of 10 m inclusive of a 3 m wide flush median within a 23 m wide road reserve. No shoulders are provided due to the provision of shared walking and cycling paths on the western side of the road. The shared path and footpath provide a direct connection to the paths provided along the site frontage and can be extended if land is developed further south. On-street parking is provided on both sides of the carriageway as per the Development Manual requirements.

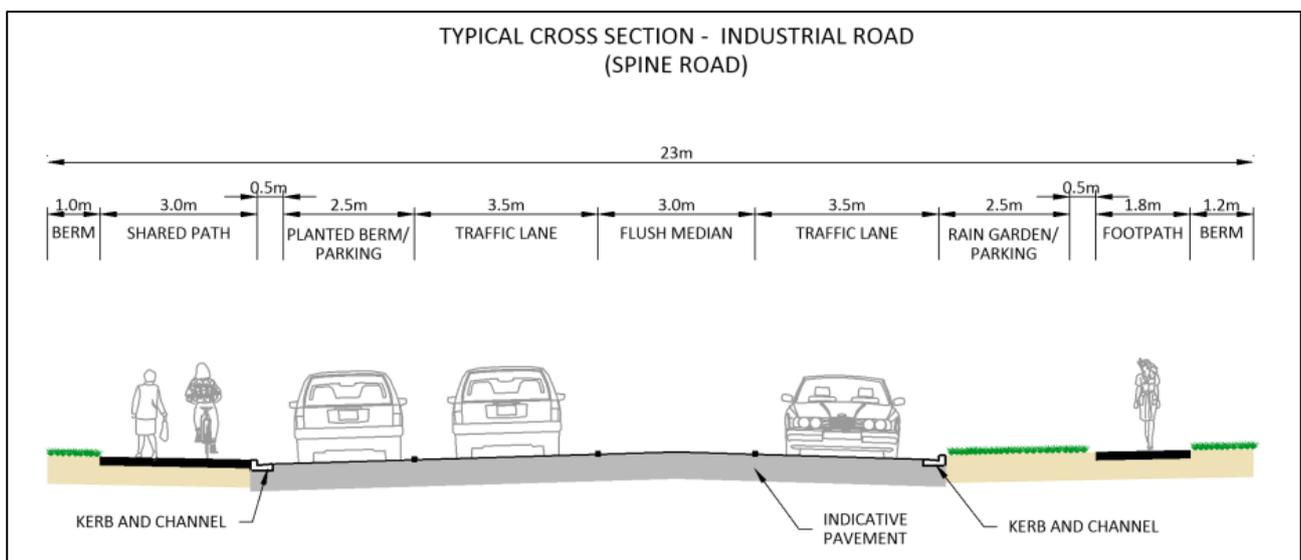


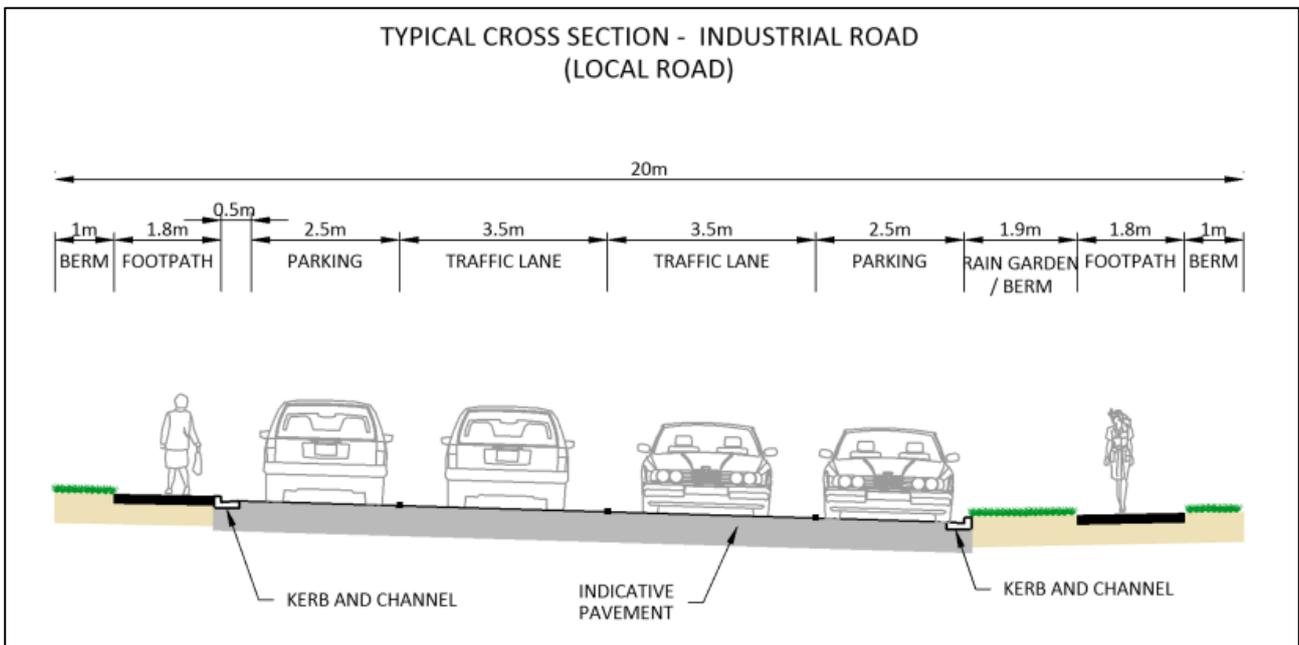
Figure 14: Typical Cross-Section – Collector Road

### 4.6.2 Local Road

All other internal roads will be designed as per the cross-section illustrated in Figure 15. This local industrial road typology provides a carriageway width of 7 m within a 20 m wide road reserve. The wide road reserve



can safely accommodate cyclists on road. 1.8 m footpaths and 2.5 m wide on-street parking are provided on both sides of the carriageway as per the Development Manual requirements.



**Figure 15: Typical Cross-Section – Local Road**

## 4.7 Public Transport Network

Existing public transport services into Matamata for commuting purposes are limited at present. Although the proposed Industrial Zone is not anticipated to significantly affect demand for public transport, some demand at a regional level may be stimulated by growing local employment opportunities.

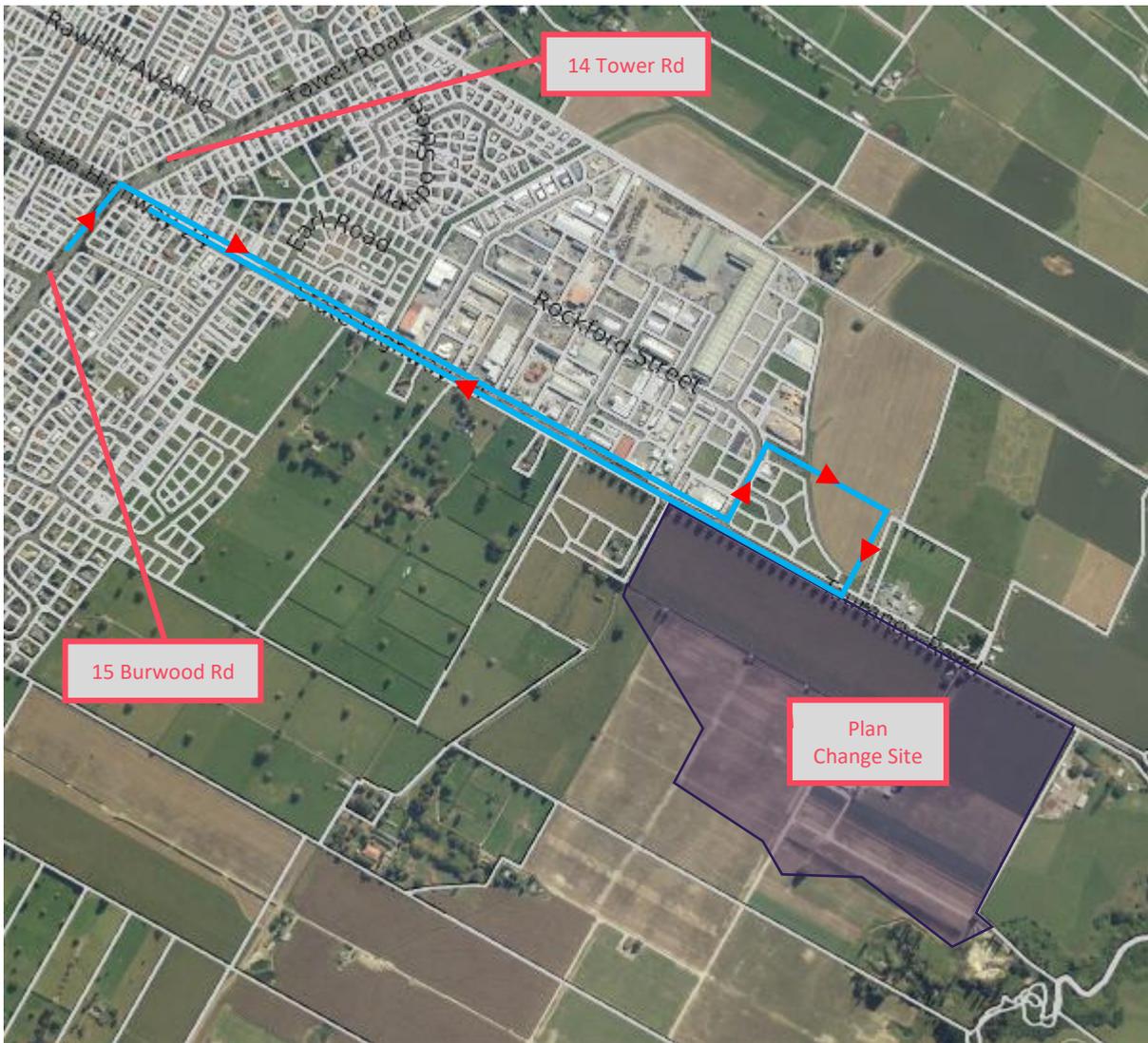
The closest bus stops are located at 15 Burwood Road and 14 Tower Road which are approximately 1.5 km north-west of the plan change site. The link between the subject site and these existing bus stops would be significantly improved by the addition of the shared path and proposed refuge island along the site frontage which provides a more direct pedestrian connection to the existing bus stops on Burwood Road.

In the longer term, as the proposed Industrial Zone is developed, it is recommended that opportunities to provide transport choices for commuter travel via the public transport network are explored with Waikato Regional Council (WRC) and MPDC.

Potential future public transport options include:

- A new bus stop provided on both sides of SH24 in the vicinity of the Rockford Street industrial area, with appropriate safe road crossing facilities for walking and cycling connectivity to the bus stops. These new bus stops could potentially be serviced by extending the existing 22 Eastern Connector bus route to turn right from Burwood Road onto SH24, making a loop via Rockford Street and turning right at the new access roundabout to head back towards Matamata town centre and eventually Hamilton as shown in Figure 16.





**Figure 16: Potential Bus Route Option**

BBO had consulted WRC with regards to the potential bus route option identified in Figure 16. Although WRC recognizes that there may need to be a future bus service extension, at this stage they would not support an extension to the proposed plan change site in isolation. They are keen to work with MPDC and Calcutta to ensure that the infrastructure allows for future stops for when a future extension becomes viable. Additional work on surrounding land use will have to be undertaken from WRC’s end to develop the longer-term route concept.

#### **4.8 Walking and Cycling Networks**

The proposed Plan Change and resulting job opportunities in the proposed Employment Zone in future are unlikely to create significant demand for walking and / or cycling to work based on 2018 Census Data. It was calculated in the 2018 Census that approximately 4.1% and 1% of the surveyed population in Matamata-Piako District walk and cycle to work respectively.

However, to support and encourage walking to the Industrial Zone as well as any development in the future, south of the site, a 3 m wide shared path is proposed along the frontage of the site to the west of the new roundabout access. A 1.8 m wide footpath is also proposed along the frontage of the site to the east of the new roundabout access. This is indicatively shown in Figure 12 and illustrated further in Drawing 146930-02-0221 in Appendix B.



The proposed shared path is extended beyond the western site boundary by approximately 115 m, at which point a pedestrian refuge island is proposed. The pedestrian refuge island is indicatively positioned at the midpoint between Garland Street and Weraiti Drive. A new 1.8 m footpath is to be constructed on the northern side of SH24 from Garland Street to the new crossing point. BBO had highlighted that the introduction of a pedestrian refuge island would mean that cyclists travelling eastbound will have to cross SH24 closer to the new access roundabout and Waka Kotahi confirmed that the arrangement was acceptable considering there are currently no dedicated crossing facilities for cyclists on SH24. This is illustrated in Drawing 146930-02-0221 in Appendix B.

A shared walking and cycling path network is also proposed along the stormwater swale around the site as illustrated in Figure 12. These shared paths provide a connection to the existing infrastructure on SH24 away from the proposed roundabout access. This reduces the risk of cyclist / pedestrian conflict with vehicles at the new roundabout access. However, it is likely some cyclists will prefer riding on the road rather than utilise the shared path network away from the roundabout. The proposed roundabout design has taken this into consideration and includes off-ramps for cyclists closer to the roundabout and typical kerb cut-down crossing points at the roundabout splitter islands.

Walking and cycling within the Plan Change area will also be enabled by the inclusion of 3 m shared paths along the western side of the spine road and 1.8 m wide paths on the other roads as described in Section 4.6. This assessment recommends that walking and cycling facilities are considered along the overland flow paths, however, the exact location and design for them will be confirmed at the time of subdivision.



## 5. Trip Generation

### 5.1 Baseline

Prior to assigning vehicle trips to the road network and carrying out an assessment, it is important to determine the underlying base traffic conditions for analysis purposes. In this respect, the traffic counts carried out in late April 2021 have been used as the underlying base for assessment purposes.

The District Plan sets out an effective “permitted” range of activities near the vicinity of the plan change site including the 12 ha industrial zoned land on the opposite side of SH24. There are a number of permitted activities in Matamata that will have an impact on the traffic volumes on SH24 and the SH24 / Tower Road / Burwood Road roundabout, and hence those have been considered as the baseline traffic. The locations of these consented developments as well as permitted land use are shown in Figure 17.

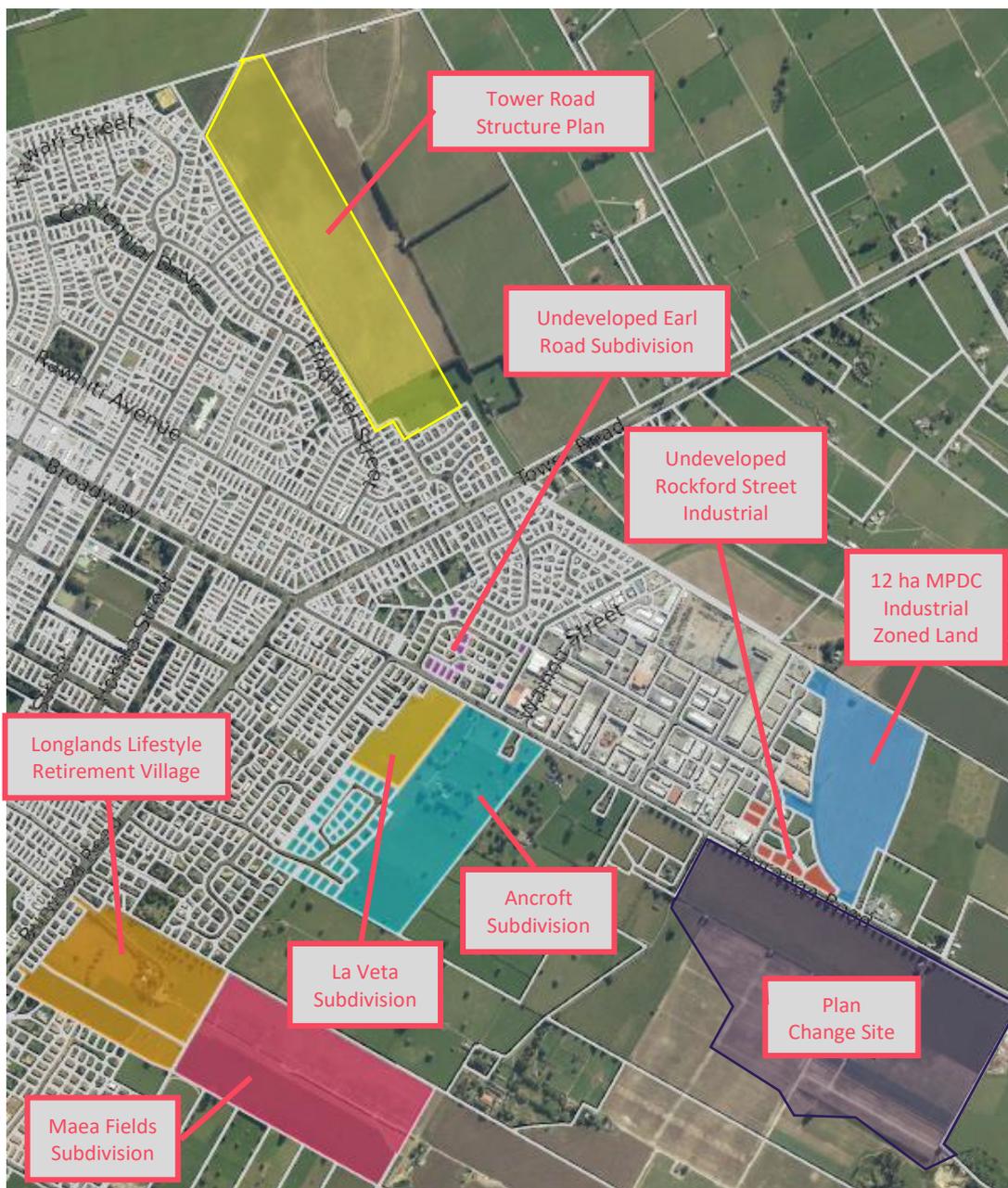


Figure 17: Permitted and Consented Land Use



Although, these developments are yet to be developed, the trip generation from these consented and permitted developments need to be added to the underlying base traffic (i.e. current day volumes). By way of further description, the following table presents the consented and permitted trip demands that will be included in the baseline traffic.

**Table No: 3**

<b>Baseline Traffic</b>				
<b>Development</b>	<b>Units</b>	<b>Trip Rate</b>	<b>Trip Generation (trips per peak hour)</b>	<b>Source</b>
MPDC 12 ha Industrial Block	12 ha	15.4 trips/ha/hr	185	-
Maea Fields Subdivision	228 Lots	1.1 trips/lot/hr	251	<i>Proposed Residential Zone (Plan Change 47) ITA (dated September 2019) prepared by TPC</i>
Ancroft + La Veta Subdivisions	168 Lots (Ancroft – 127 Lots La Veta – 41 Lots)	1.1 trips/lot/hr	185	Number of lots obtained from respective resource consent applications. No ITAs provided.
Longlands Lifestyle Retirement Village	177 Units (excluding 65 units that have been completed)	0.3 trips/unit/hr	53	<i>Burwood Road Matamata Transportation Assessment Report (dated April 2017 and March 2021) prepared by Harrison Transportation</i>
Tower Road Structure Plan	24 ha = 240 Lots (Assuming a density of 10 lots per ha)	1.1 trips/lot/hr	264	-
Undeveloped Rockford Street Industrial Lots	Developable = 1.4 ha	12.5 trips/ha/hr	18	-
Undeveloped Earl Road Subdivision Lots	10 remaining lots	1.1 trips/lot/hr	11	-

The trip generation of some of the developments presented in Table 3 are unknown. Therefore, the following assumptions were made to calculate a representative trip generation for those likely land uses:

- A typical industrial rate of 15.4 trips per hectare per hour was assumed for the 12 ha industrial block. The same rate is assumed for the plan change site. Further elaboration on this rate is provided in Section 5.2.
- Trip generation data sourced from the *NZTA Research Report 453 – Trips and parking related to land use* (Report 453) states that the 50<sup>th</sup> percentile trip generation rate for a residential dwelling is approximately 1.1 trips per peak hour per dwelling. This has been assumed for all consented residential developments.



- Based on a desktop study, it was calculated that a density of ten dwellings per hectare was common within Matamata.
- The 12.5 trips per hectare per hour trip rate used for the Rockford Street industrial lots were based on the traffic survey undertaken in April 2021.

## 5.2 Predicted Trip Generation

The intersection count surveys that were undertaken in April 2021 at the Waihou Street, Garland Street and Rockford Street intersections with SH24 were used to determine the trip generation rate of the Rockford Street industrial area. The surveyed industrial trip rate was calculated to be 11.0 trips per developable hectare and 12.5 trips per developable hectare during the morning and evening peak periods respectively.

However, this has not been applied to the plan change area in this instance. Instead, a higher trip generation rate of 15.4 trips per gross hectare per peak hour has been adopted for this assessment to provide a degree of confidence to the forecasting and less need to rely on trip-based monitoring for the site. The trip rate of 15.4 trips / ha / hour is a typical rate used by Hamilton City Council and Waikato District for industrial sites including Horotiu Industrial Park and Rotokauri industrial area. The same rate has been adopted here.

On this basis, it is anticipated that the proposed rezoning will generate approximately 560 trips per peak hour and approximately 4,000 to 4,300 trips per day (i.e. calculated based on survey intersection counts and estimated AADT obtained from Mobile Road at Garland Street intersection).



## 6. Trip Distribution

### 6.1 Permitted Activities

Figure 18 and Figure 19 below illustrate the basis on which the baseline traffic described in Section 5.1 is distributed to the adjoining road network during peak periods. The trips generated by the Maea Fields subdivision, and the Longlands Lifestyle Retirement Village are distributed based on the transport assessments prepared for each individual activity. The trip distribution for the remaining permitted subdivisions such as the Ancroft, La Veta and Tower Road Structure Plan are based on the assumptions stated in the ITA prepared for the Maea Fields subdivision (i.e. Proposed Residential Zone PC47 ITA by TPC). As for the industrial activities, the trip distribution is based on the existing Rockford Street industrial area distribution that was surveyed on-site.

It is to be noted that the turning movement split at the SH24 / Tower Road / Burwood Road roundabout is based on the surveyed turning movement counts illustrated in Figure 10 and Figure 11.

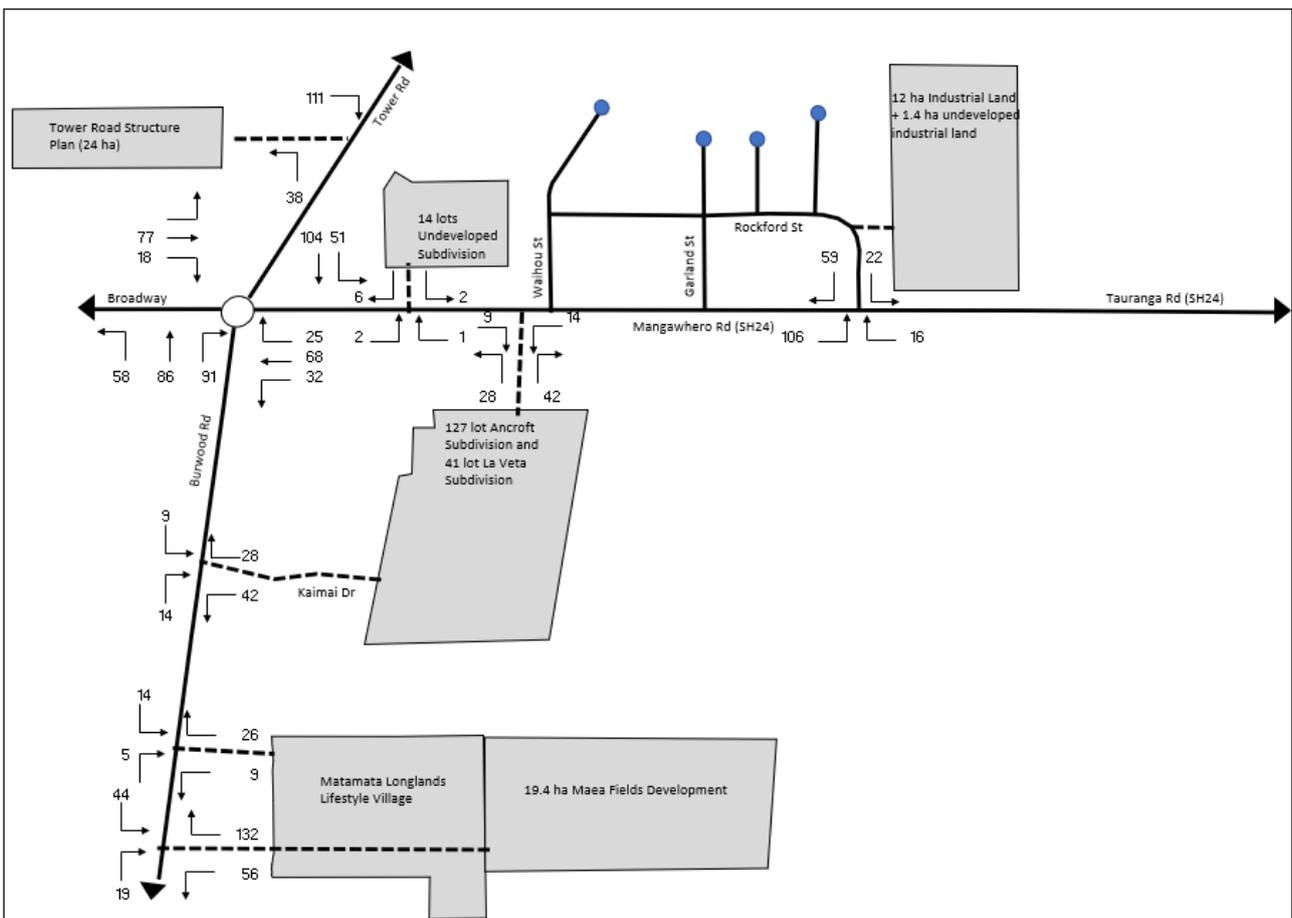


Figure 18: Weekday AM Peak Hour Baseline Trip Distribution (vph)



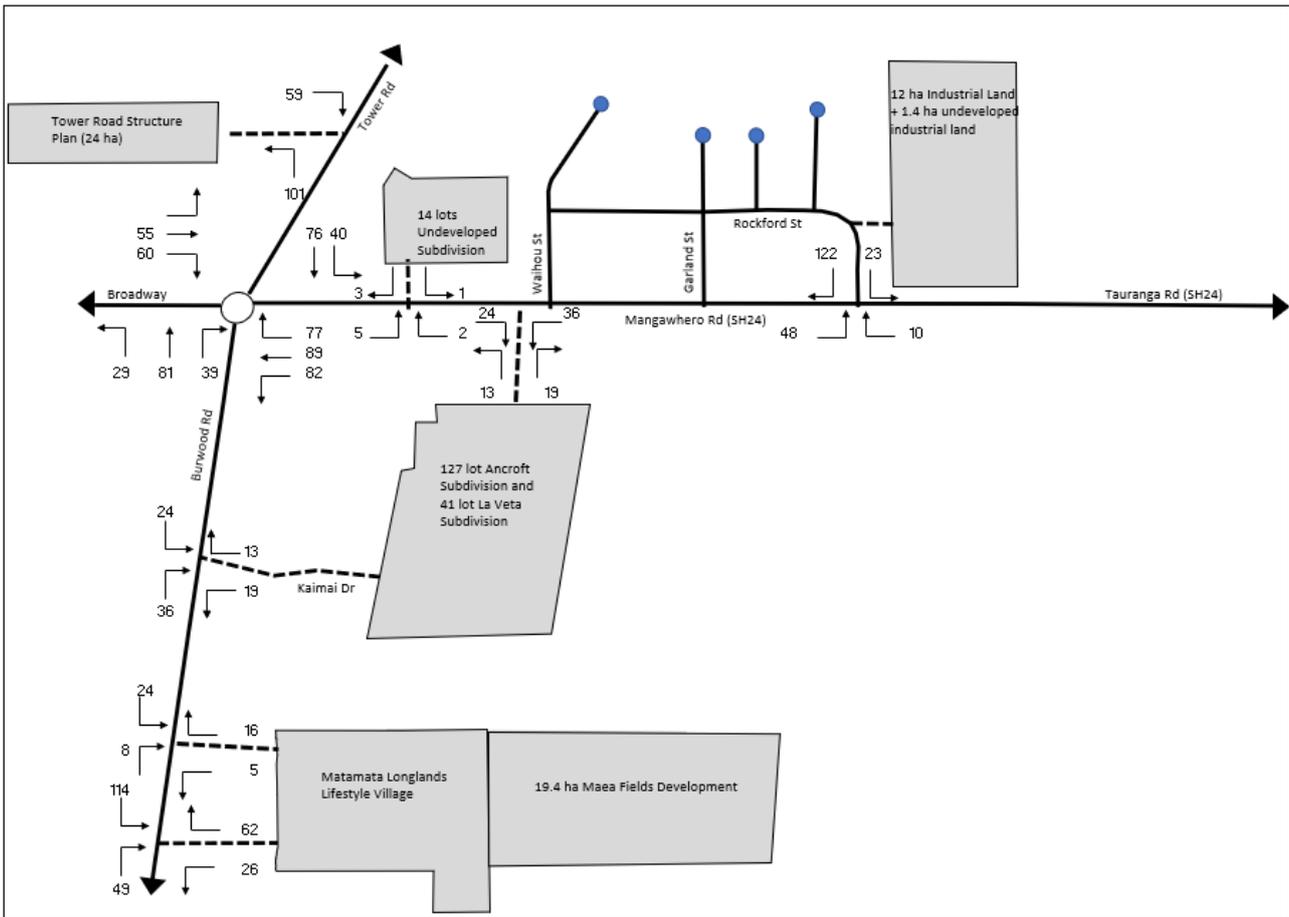


Figure 19: Weekday PM Peak Hour Baseline Trip Distribution (vph)

## 6.2 Proposed Rezoning

Traffic generated by the plan change site during peak periods have been allocated to the adjoining road network based on the intersection count surveys undertaken in April 2021 at the Waihou Street, Garland Street and Rockford Street intersections with SH24. These intersections provide direct access to the Rockford Street industrial area and therefore provide a reasonable proxy to anticipate the direction of future movements from the proposed industrial development.

On this basis, it is expected during the AM peak hour that:

- Approximately 60% of generated trips are attracted to the proposed industrial development while the remaining 40% depart the site.
- About 52% of the trips generated by the proposed development will arrive from the northwest by turning right at the new access roundabout. 8% of the trips will enter from the southeast.
- Approximately 11% of the traffic generated by the proposed industrial development will exit the site by turning right at the new access roundabout while the remaining 29% will turn left and head towards the SH24 / Tower Road / Burwood Road roundabout.

During the PM peak hour, the survey data suggest that:

- Around 29% of the trips generated are inbound to the site while the remaining 71% are departing.



- Approximately 24% of the trips generated by the proposed development will arrive from the northwest by turning right at the new access roundabout. 5% of the trips will enter by turning left at the new access roundabout.
- About 11% of the traffic generated by the proposed industrial development will exit the site by turning right at the new access roundabout while the remaining 60% will turn left and head towards the SH24 / Tower Road / Burwood Road roundabout.

Figure 20 and Figure 21 demonstrate the proposed industrial development’s assumed peak hour volume split.



Figure 20: Weekday AM Peak Hour Trip Distribution (vph)





Figure 21: Weekday PM Peak Hour Trip Distribution (vph)



## 7. Appraisal of Transportation Effects

### 7.1 Intersection Capacity and Performance

The following intersections have been modelled using the industry-recognised SIDRA Intersection 9 software to assess the effects of traffic associated with the proposed rezoning.

- SH24 / Tower Road / Burwood Road roundabout; and
- New access roundabout

The peak hour volumes are derived from the surveyed count data and the models have been calibrated against the 95<sup>th</sup> percentile queue lengths observed during the surveys.

The capacity assessment results are summarised in the following sub-sections in terms of Level of Service (LOS) with full SIDRA outputs provided in Appendix C. LOS is a standard measure for intersection performance and is based on the average delay experienced by drivers in each lane, by arm. In general, LOS levels A to C are considered acceptable, LOS D to E are considered permissible where reasonable improvements cannot be made, provided safety effects can be mitigated. LOS F is generally considered to be an unsatisfactory level of service. Delay thresholds in seconds of delay for LOS A to F are given in Table 3 below.

Table No. 4

SIDRA Level of Service Definitions	
Level of Service	Average Delay per Vehicle for Signalised Intersections (seconds)
A	≤ 10
B	10 - 20
C	20 – 35
D	35 – 55
E	55 – 80
F	> 80

#### 7.1.1 Modelling Scenarios

The performance of each of the above-mentioned intersections has been modelled for both the AM and PM peak periods under the following scenarios:

##### 1. 2021 Baseline

The 2021 baseline represents the performance of the existing intersections with current peak hour traffic flows and the consented peak period traffic volumes from the activities identified in Section 5.1. Under this scenario, no development of the plan change site has occurred.

Baseline models were built using the surveyed traffic volumes and calibrated against the observed queue lengths such that the models reflected the current situation as accurately as possible.

##### 2. 2031 Baseline

The proposed rezoning may be fully developed within 10 years (i.e. worst-case scenario). Therefore, the effects assessment was conducted on the basis of a 10-year assessment period. Under this scenario, no development of the plan change site has occurred.



Future scenarios (year 2031 with and without development) have assumed background traffic growth independent of the development of the site as well as other consented / permitted activities. This needs to be factored into future traffic estimates as future traffic volumes on the State Highway network will not purely increase based on traffic generated by the proposed and consented developments. From the most recent data extracted from the NZTA TMS State Highway records, SH24 has had an approximate average baseline growth of 2% per annum.

The background growth rates for Tower Road and Burwood Road were assumed to be 0% to avoid double counting as the growth on these local roads are dependent on developments that have been or will be consented to obtain access from these roads.

### 3. 2031 Baseline + Proposed Rezoning

Additional traffic (i.e. 560 trips per peak hour) associated with the proposed industrial development from the plan change site was added to the baseline 2031 model to understand the effects on the intersections for a future year scenario.

## 7.1.2 SH24 / Tower Road / Burwood Road Roundabout

The existing roundabout layout modelled within SIDRA is shown in Figure 22. The results of the intersection performance for all four scenarios during the peak periods are presented in Table 5.

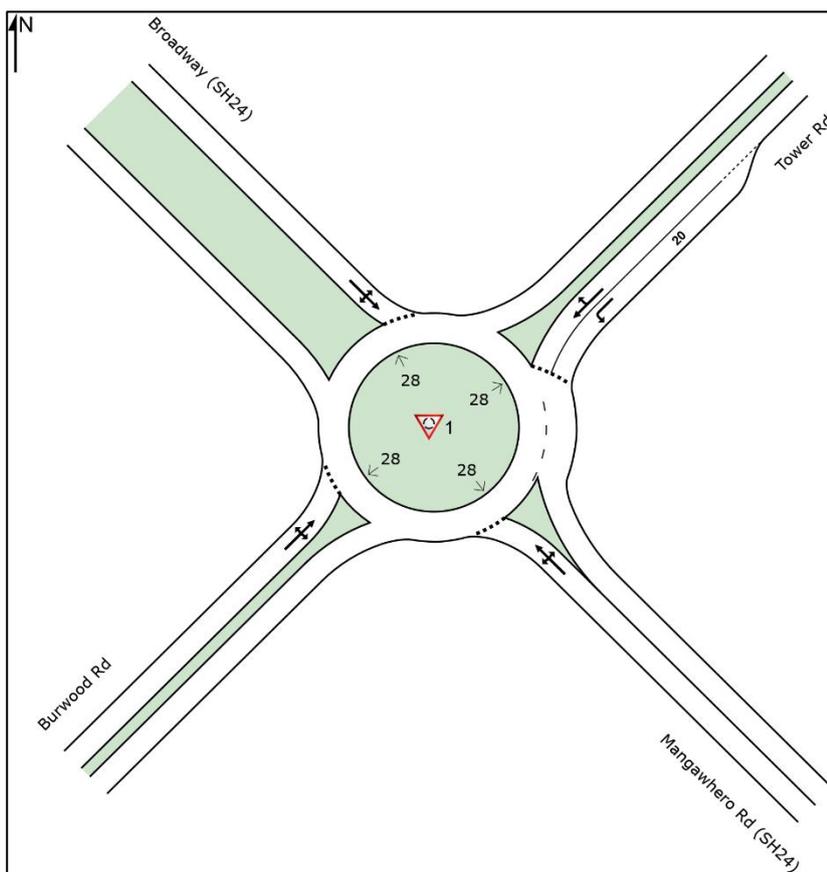


Figure 22: Existing SH24 / Tower Road / Burwood Road Roundabout Layout



Table No. 5

SH24 / Tower Rd / Burwood Rd Roundabout Performance									
Scenario	Peak	Intersection Average			Worst Movements (in terms of delay)				
		V/C	Delay (s)	LOS	Movement	Delay (s)	Queue (m)	LOS	
1	Baseline 2021 (existing roundabout)	AM	1.20	54	E	RT from Burwood Rd	123	301	F
		PM	1.17	61	E	RT from Burwood Rd	116	259	F
2	Baseline 2031 (existing roundabout)	AM	1.21	204	F	RT from Burwood Rd	411	869	F
		PM	1.24	241	F	RT from Mangawhero Rd	451	1,996	F
3	Baseline 2031 + Proposed Rezoning (existing roundabout)	AM	1.45	423	F	RT from Mangawhero Rd	826	2,677	F
		PM	1.63	593	F	RT from Mangawhero Rd	1,148	5,082	F

Analysis of the modelling results indicate the following:

- During the current year baseline scenario, the roundabout is already performing at or near capacity with the Mangawhero Road (SH24) and Burwood Road approaches failing. This situation only worsens in the baseline 2031 scenario when the background growth on SH24 is considered with the roundabout performing unsatisfactorily.
- Adding the trips generated by the proposed rezoning onto the adjoining road network only results in the performance of the intersection becoming worse.

Therefore, this means that effects at the intersection will have to be mitigated in order to accommodate the trips generated by the proposed rezoning. Additional intersection modelling was undertaken to understand the necessary intersection upgrades required to accommodate the additional trips. Based on that modelling the following intersection upgrades are recommended:

1. Required minimum: This refers to the minimum upgrade required and to be carried out by Calcutta in order for the roundabout to accommodate the additional trips generated by the proposed rezoning and so that it performs at a similar or better level to the baseline scenario which includes consented / permitted activities.
2. Desirable: This refers to the desirable upgrade required to enable the roundabout to perform at a satisfactory level (i.e. LOS C or greater). The cost of the required minimum upgrade described above will be borne by Calcutta and the cost of the additional upgrades to obtain the desirable outcome is proposed to be fairly shared between Waka Kotahi and MPDC. During the meeting with Waka Kotahi and MPDC on 16 March 2022, it was confirmed by both parties that no funding is available for the proposed intersection upgrades and therefore, Calcutta is not proposing an upgrade to the desirable option. Hence, this option will not be addressed in this assessment.

### 7.1.3 Required Minimum Intersection Upgrade

The minimum required improvements for capacity include the addition of auxiliary left turn lanes on Mangawhero Road (SH24), Tower Road and Broadway (SH24) approaches, and auxiliary right turn lane on



Burwood Road approach as shown in Figure 23. The concept design of the proposed upgrade is included in Appendix D (Drawing 146930-02-0234). Some of the design considerations for this include:

- Reduction of the roundabout's central island diameter to 20 m. The reduction in the diameter does not help to improve the undeflected southbound movement from Tower Road onto Burwood Road however it is an existing deficiency that is not worsened by the overall improvement. However, a raised safety platform is also proposed on Tower Road as a mitigation measure to reduce the operating speed of this southbound approach.
- Design entry path radii are not achieved on all approaches as per Austroads design guidance. However, the deflection achieved on all movements (other than that described above) remains an improvement on the existing intersection in that regard. Raised safety platforms are proposed on all approaches to reduce entry and exit speeds. These raised safety platforms provide a safer speed environment by reducing the likelihood of severe injuries incurred from collisions between road users.
- Raised safety platforms are proposed on all approaches such that vehicle speeds would be sufficiently low to achieve a safe system crossing point. This is an improvement to the existing arrangement where kerb cut-down crossing is only provided at the Burwood Road approach.
- The existing splitter island on Broadway (SH24) is reduced in width to accommodate the auxiliary left turn lane.
- A new splitter island is proposed on Tower Road to channel the left turning vehicles. This left turning lane is designed to accommodate the safe turning of a semi-trailer which is an improvement from the existing design. Tracking curves indicate that the alignment of the existing approach lane on Tower Road only accommodates a large truck to perform a left turn safely.
- The lengths of the splitter islands on Tower Road and Burwood Road ensure that existing vehicle crossings are not affected and all existing movements at the vehicle crossings are still permitted with the proposed upgrade (refer to drawing 146930-02-0240 in Appendix D).
- The intersection upgrade has been designed to accommodate tracking curves of a car and a semi-trailer.
  - As illustrated in the concept design of the proposed upgrade (Appendix D), an exclusive right turn lane has been introduced on the Burwood Road approach with its own exit lane and spiral curve pavement marking to split right turning traffic from the straight through movement which has only one exit lane.
  - The spiral curve pavement marking is required to guide motorists entering the roundabout from Mangawhero Road (SH24) and intending to make a right turn to proceed north to Tower Road to use the correct exit lane. These spiral curve pavement markings discourage a northbound through moving vehicle from Burwood Road to enter the roundabout if there is a right turning vehicle from Mangawhero Road to Tower Road.
  - The proposed layout allows drivers to remain within the lane allocated to them when entering the roundabout. Exit lane and spiral curve pavement markings provide drivers with the guidance required to negotiate the roundabout, safely and efficiently.
- The recently constructed Te Aroha to Matamata cycleway will have to be realigned at the northern corner of the roundabout to accommodate the proposed upgrade. However, the width of the shared path (2.5 m) can be maintained.
- The Tower Road car park spaces adjacent to the Gull service station will remain. However, due to the introduction of the additional left turn lane on Tower Road, vehicles exiting the car park spaces to head south or west will have a relatively short distance to weave across the left turn lane in order to merge with the through / right turning traffic on Tower Road. The safety risk is considered acceptable



as the speed approaching the roundabout is expected to be relatively low (30 km/h) due to the proposed raised safety platform. A minimum manoeuvring depth of 4.1 m has also been ensured for the short-term angled car park spaces in accordance with Figure 5 of the Development Manual. This further reduces the risk of rear-end and side impact crashes within the left turn lane.

The results of the intersection performance comparing the baseline scenarios with the future year development scenarios during the peak periods are presented in Table 6.

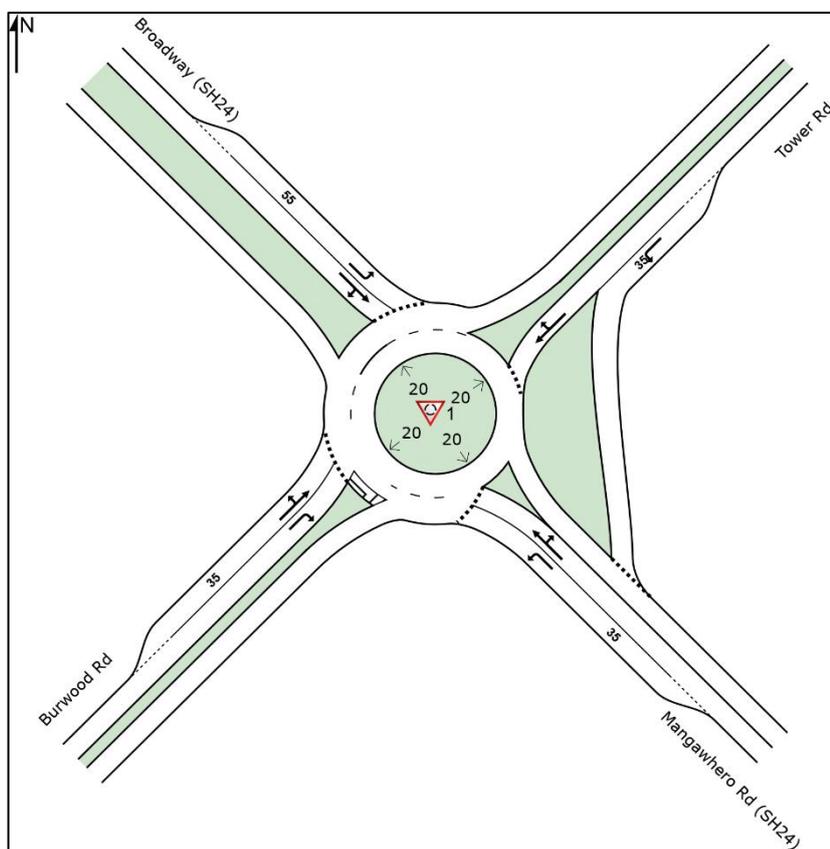


Figure 23: Minimum Intersection Upgrade at SH24 / Tower Road / Burwood Road Roundabout

Table No. 6

SH24 / Tower Rd / Burwood Rd Roundabout Performance									
Scenario		Peak	Intersection Average			Worst Movements (in terms of delay)			
			V/C	Delay (s)	LOS	Movement	Delay (s)	Queue (m)	LOS
1	Baseline 2021 (existing roundabout)	AM	1.20	54	E	RT from Burwood Rd	123	301	F
		PM	1.17	61	E	RT from Burwood Rd	116	259	F
2	Baseline 2031 (existing roundabout)	AM	1.21	204	F	RT from Burwood Rd	411	869	F
		PM	1.24	241	F	RT from Mangawhero Rd	451	1,996	F
3	Baseline 2031 + Proposed Rezoning (with required minimum upgrade)	AM	1.05	52	E	RT from Mangawhero Rd	138	577	F



SH24 / Tower Rd / Burwood Rd Roundabout Performance								
Scenario	Peak	Intersection Average			Worst Movements (in terms of delay)			
		V/C	Delay (s)	LOS	Movement	Delay (s)	Queue (m)	LOS
	PM	1.18	145	F	RT from Mangawhero Rd	345	1,728	F

Table 6 demonstrates that with the proposed minimum upgrades, the SH24 / Tower Road / Burwood Road roundabout will continue performing unsatisfactorily although slightly better than the modelled 2031 baseline scenarios.

### 7.1.4 Sensitivity Distribution Scenario

As the testing of the minimum intersection upgrade option and corresponding impact at the SH24 / Tower Road / Burwood Road roundabout was undertaken, it was considered necessary to include sensitivity testing on the trip distribution assumption. The ratio of incoming and outgoing trips from the plan change site was modified to approximately 80% of generated trips are attracted to the proposed industrial development while the remaining 20% depart the site during the AM peak hour and vice versa during the PM peak period. This trip distribution assumption is based on the industry recognised ITE Trip Generation manual.

The effects arising from this sensitivity trip distribution scenario are presented in Table 7.

Table No. 7

SH24 / Tower Rd / Burwood Rd Roundabout Performance								
Scenario	Peak	Intersection Average			Worst Movements (in terms of delay)			
		V/C	Delay (s)	LOS	Movement	Delay (s)	Queue (m)	LOS
1	AM	1.21	204	F	RT from Burwood Rd	411	869	F
	PM	1.24	241	F	RT from Mangawhero Rd	451	1,996	F
2	AM	1.05	52	E	RT from Mangawhero Rd	138	577	F
	PM	1.18	145	F	RT from Mangawhero Rd	345	1,728	F
3	AM	0.96	37	D	RT from Mangawhero Rd	50	239	D
	PM	1.21	165	F	RT from Mangawhero Rd	394	1,964	F

Table 7 illustrates that based on the ITE trip distribution assumptions, the performance of the SH24 / Tower Road / Burwood Road roundabout is worse (i.e. increase in average delay by 20 seconds at the roundabout) than the intersection performance based on surveyed trip distribution ratios. Nonetheless, the performance is still marginally better than the modelled 2031 baseline scenarios. The only issue raised by the sensitivity analysis is that the through and right turning movement from Tower Road fails during the AM peak hour as



vehicles have to give way to high through moving volume from Broadway to Mangawhero Road. That being said, the same issue exists in the 2031 baseline scenario (which is based on surveyed trip distribution ratios) just that in this case the right turning movement from Burwood Road fails during the AM peak hour as vehicles have to give way to higher through moving volume from Mangawhero Road to Broadway (i.e. outgoing to incoming ratio was 40/60 (surveyed) compared to 20/80 (ITE)).

### 7.1.5 Timing of Proposed Upgrade

The SH24 / Tower Road / Burwood Road roundabout is currently performing at LOS A during both peak periods based on the existing surveyed turning movement counts as presented in Figure 10 and Figure 11. Since some of the consented and permitted developments that have been considered in the baseline scenario are yet to be developed, the existing roundabout does still have capacity to accommodate trips generated by the proposed industrial development (i.e. plan change site).

On this basis, our assessment identifies that the proposed roundabout upgrade to dual lane approaches would not technically be needed until the two-way peak hour volume at the Mangawhero Road (SH24) arm of the roundabout exceeds 1,570 trips per peak hour during the PM peak period. This volume trigger is obtained from the Baseline 2021 scenario which equates to existing surveyed counts plus the traffic volumes generated by the permitted and consented activities near the vicinity of the plan change site (refer to Figure 11 and Figure 19).

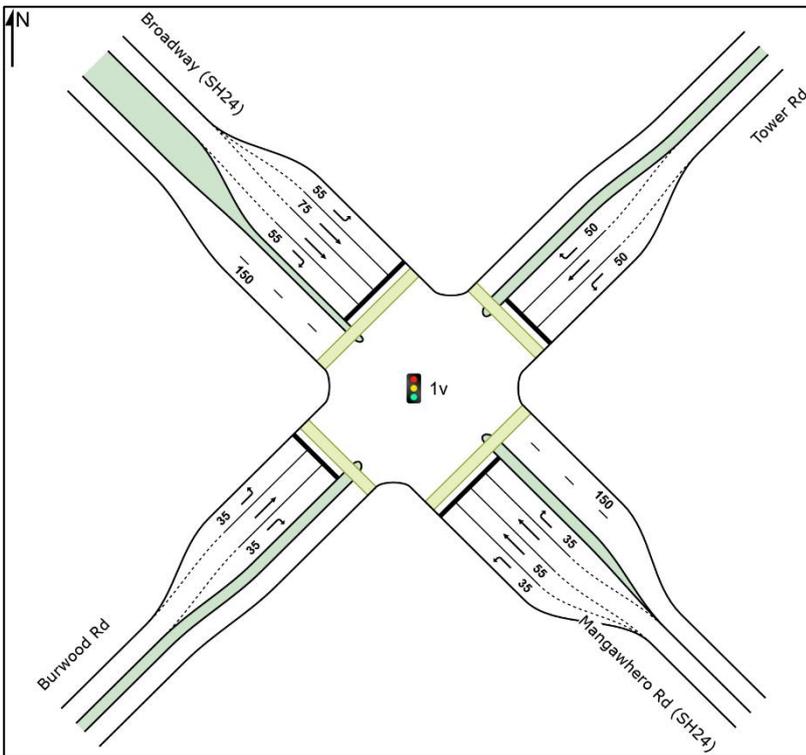
### 7.1.6 Signalised Intersection – Alternative Option

Converting the SH24 / Tower Road / Burwood Road roundabout into a signalised intersection has been considered to determine if it could be an alternative feasible solution to accommodate the additional traffic volumes (Year 2031) from the proposed development as well as consented / permitted developments.

However, this option is not considered to be feasible for the following reasons:

- The required intersection footprint is relatively large as shown in Figure 24. This includes widening SH24 approaches (both Mangawhero Road and Broadway) to six lanes to achieve satisfactory level of performance.
- Left turn slip lanes cannot be incorporated considering the proximity of the property boundaries on SH24. Therefore, the left turning lanes at all approaches might not provide a safe turning movement for semi-trailers.
- Crash severity at signalised intersections is usually greater than at roundabouts due to higher vehicle speeds (typically greater than 50 km/h) and the potential for higher collision angles.





**Figure 24: Signalising SH24 / Tower Road / Burwood Road Intersection**

### 7.1.7 Access Roundabout

The new access roundabout layout modelled within SIDRA is shown in Figure 25. It is to be noted that the intersection has been modelled as a four-leg roundabout instead of the three-leg roundabout shown in the access concept design (Appendix B). This is due to the fact that with the 12 ha of MPDC owned industrial block on the opposite side of SH24 is considered in the baseline and it is likely that this new roundabout could be upgraded in the future to provide access to the 12 ha industrial block when the land is developed. As a worst-case scenario, it is also assumed that the SH24 / Rockford Street intersection will be closed in the future when the 12 ha block gets developed and the all trips at the intersection are accommodated at the new roundabout access.

The results of the intersection performance for Scenario 3 during the peak periods are presented in Table 8.



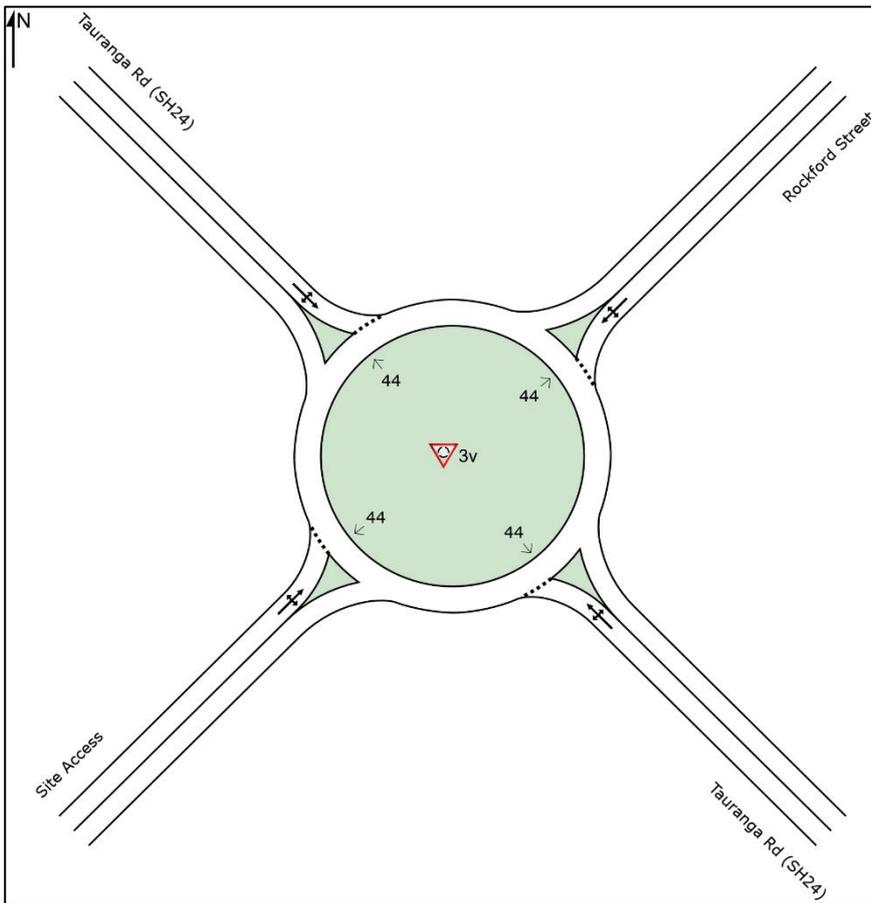


Figure 25: New Roundabout Access

Table No. 8

New Access Roundabout Performance									
Scenario	Peak	Intersection Average			Worst Movements (in terms of delay)				
		V/C	Delay (s)	LOS	Movement	Delay (s)	Queue (m)	LOS	
3	Baseline 2031 + Proposed Rezoning	AM	0.62	8	A	RT from site	12	17	B
		PM	0.52	8	A	RT from site	15	35	B

The modelling assessment indicates that the new access roundabout will operate satisfactorily within practical spare capacity and with minor delay during both peak periods in the future year scenario.

## 7.2 Staging of Transportation Infrastructure Improvements

Table 9 below summarises the recommended transportation infrastructure upgrades and related timing and responsibilities for delivery, in relation to this rezoning submission. The recommended improvements are based on the findings from the transportation effects assessments that were undertaken in the preceding sections.



Table No: 9

Staging of Transportation Infrastructure Improvements			
No.	Infrastructure Upgrade	When?	Delivered By
1	3-arm roundabout on SH24 for access to the plan change site	Before any industrial activity in the plan change site generates traffic accessing SH24	The Applicant
2	Capacity Increase at SH24 / Tower Road / Burwood Road roundabout to dual lane approaches (refer to Appendix D, drawing 146930-02-0234)	When the total two-way peak hour volume at the Mangawhero Road (SH24) arm of the roundabout exceeds 1,570 vph during the PM peak period.	The Applicant
3	Construction of walking and cycling facilities within the plan change site as well as on SH24	Before any industrial activity in the plan change site generates traffic accessing SH24	The Applicant



## 8. Transport Strategies and Policies

### 8.1 Government Policy Statement on Land Transport 2021 / 22 – 2030 / 31

The Government Policy Statement (GPS2021) outlines this Government’s priorities for expenditure from the National Land Transport Fund over the next 10 years. It also provides guidance to decision-makers about where the Government will focus resources, consistent with the purpose of the Land Transport Management Act, which is:

*“To contribute to an effective, efficient, and safe land transport system in the public interest”.*

The four key strategic priorities of the GPS2021 are defined as Safety, Better Travel Options, Improving Freight Connections and Climate Change. These are defined further as follows:

- *Safety: Developing a transport system where no-one is killed or seriously injured.*
- *Better Travel Options: Providing people with better transport options to access social and economic opportunities.*
- *Improving Freight Connections: Improving freight connections for economic development.*
- *Climate Change: Developing a low carbon transport system that supports emissions reductions, while improving safety and inclusive access.*

### 8.2 The Transport Outlook 2017

The Transport Outlook 2017 provides an overview of what we can expect by way of traffic movements in the future. The population is expected to grow consistently over the next 50 years which will create additional demand on New Zealand’s transport networks.

### 8.3 NZTA Statement of Intent 2018 – 2022

This statement of intent presents a new direction for Waka Kotahi. Over the next five years Waka Kotahi aims to deliver three big changes that form the foundation of this new direction:

- *One Connected Transport System: Transform land transport system by integrating digital technology with physical infrastructure to create a safe, connected system that works for everyone.*
- *People Centric Approach: Simplify our customers; lives and or partners’ work with innovative services and experiences that make it easy for them to do what they need to.*
- *Partnership For Prosperity: Unlock social and economic opportunities for customers, businesses and communities through targeted partnerships.*

### 8.4 Waikato Regional Land Transport Plan 2021 - 2051

The Waikato Regional Land Transport Plan 2021 – 2051 sets out the strategic direction for land transport in the Waikato region over the next thirty years. The Plan is built around the region’s three key transport problems, namely:

- *Protecting the function of our strategic corridors in the context of growth pressures in and around Hamilton, the North Waikato and in the upper North Island.*



- *Tackling our complex road safety problem and the disproportionate number of death and serious injuries in the region.*
- *Providing better, more equitable transport options to access social, health, economic and cultural opportunities.*

The Plan sets out seven priorities for land transport in the Waikato region. The priorities relevant in this instance are as follows.

- *Strategic Corridors: Improving network resilience, route reliability and safety on key strategic corridors.*
- *Managing Growth: Providing multi-modal transport solutions to support housing and growth in high growth areas.*
- *Road Safety: Implementing priorities in Road to Zero for the Waikato 2020 road safety strategy.*
- *Access and Mobility: Growing public transport and active mode share in urban and high growth areas.*
- *Maintaining what we have: Maximising efficiencies and optimisation across the transport system.*

## **8.5 Road to Zero Road Safety Strategy 2020 – 2030**

This strategy sets out the vision for New Zealand where no one is killed or seriously injured in road crashes. The following seven principles are included in the strategy to guide how we design the network and make road safety decisions:

- *Promote good choices but plan for mistakes*
- *Design for human vulnerability*
- *Strengthen all parts of the road transport system*
- *Shared responsibility for improving road safety*
- *Our actions are grounded in evidence and evaluated*
- *Road safety actions support health, wellbeing, and liveable places*
- *Make safety a critical decision-making priority*

## **8.6 Policy Alignment of the Proposed Plan Change**

The report finds that the proposed Plan Change is consistent with the GPS and directions set out in the other national or regional strategies and policies because:

- The proposed rezoning will support economic growth in the region by providing access to more industrial land that can be developed, which will lead to more jobs and increased prosperity.
- The plan change site lies adjacent to existing urban environment and provides access to key strategic transport corridor.
- The proposed rezoning provides for mode neutrality by providing walking and cycling infrastructure within the development and also on the surrounding network to enable connections to the Matamata town centre.
- The proposed access strategy for the proposed rezoning is considered to be a safe and efficient access solution. The proposed access strategy will provide the appropriate capacity to enable the



Industrial Zone to deliver regional economic growth while providing safe and efficient accessibility to the industrial park and the surrounding transport network at an appropriate cost.

- Although this proposal does not create public transport services to and from the proposed industrial development, the proposed access arrangement will support more efficient bus movements to the industrial areas if services are commenced by WRC in the future.
- The proposed rezoning is consistent with the Road to Zero Road Strategy as it:
  - Plans for walking and cycling facilities to be separated from heavy vehicles wherever possible; and
  - Encourages safe mobility by establishing and communicating a network hierarchy of functional transport routes for all users.



## 9. Stakeholder Engagement

Consultation has been undertaken with Waka Kotahi (Emily Hunt, Planner and Robert Swears, WSP), MPDC and Gray Matter Limited (on behalf of MPDC) during the development of this report. Meetings with Waka Kotahi were held on 20<sup>th</sup> May 2021 and 16<sup>th</sup> March 2022 while discussions with MPDC / Gray Matter have been on-going throughout this Plan Change process.

The items that were raised by both parties are attached in Appendix E. These matters have been addressed in this report.



## 10. Conclusion

The overall transportation effects on the adjoining road network with the introduction of the proposed rezoning are expected to be minor to moderate if no transport mitigation measures are implemented.

However, with the recommended mitigation measures, the transportation effects from rezoning the site for industrial purposes can be sufficiently mitigated to an acceptable and appropriate level, which is generally no more than minor. The following conclusions can be made based on the assessments detailed in this report:

- The proposal consists of rezoning approximately 41.4 ha of land for industrial activities. Out of this, only about 36.3 ha will be capable of being developed for industrial purposes (i.e. 32.5 ha developable land plus 3.8 ha for internal roads). The balance area is made of landscape buffers and swales.
- When complete the developed land is expected to generate approximately 560 vehicle trips per peak hour, with potentially up to 20% of the total peak hour trips being heavy commercial vehicles. It is anticipated that the proposed rezoning will generate approximately 4,000 to 4,300 trips per day.
- Access to the plan change site is proposed via a new roundabout access to SH24 which will be designed in accordance with Austroads geometric design guidelines.
- The SH24 access is currently proposed as a 3-arm roundabout and is positioned to be closer to the plan change site boundary. However, the roundabout is anticipated to be upgraded to a four-leg roundabout in the future when MPDC is ready to develop the 12 ha industrial block on the opposite side of state highway. The specific position and alignment of the roundabout will be confirmed during detailed design stage.
- Traffic modelling indicates that the entire plan change site can be serviced by the roundabout at SH24 alone.
- Following the consultation with Waka Kotahi and MPDC, it was likely that the current speed limit of 100 km/h will be reduced to 80 km/h during the interim stage and there is potential for the speed limit to be reduced to 60 km/h once there has been further and relatively extensive development along both sides of the state highway corridor.
- It is understood that Waka Kotahi is currently undertaking public engagement for SH24 speed limit review. As such, the conclusions and recommendations in this assessment as well as the design of the roundabout access are based on the SAAS for this section of SH24 (i.e. 80 km/h). This will have to be reviewed once there has been confirmation from Waka Kotahi as to what the speed limit on SH24 will be changed to.
- Cross-sections and designs for the internal road network will be designed and constructed to conform with its intended network hierarchy and adhere to relevant design requirements of the Development Manual. This includes, but not limited to, vehicle crossing spacings, sight distance and parking requirements, and paths for walking and cycling.
- Existing public transport services into Matamata for commuting purposes are limited at present. However, the proposed Employment Zone will create significant employment opportunities, and thus are likely to increase the demand for PT services. Although WRC recognizes that there may need to be a future bus service extension, at this stage they would not support an extension to the proposed plan change site in isolation. They are keen to work with MPDC and Calcutta to ensure that the infrastructure allows for future stops for when a future extension becomes viable. Additional work on surrounding land use will have to be undertaken from WRC's end to develop the longer-term route concept.
- To support and encourage walking to the Industrial Zone as well as the wider Calcutta development in the future, a 3 m wide shared path is proposed to the west of the new roundabout access and



extended by approximately 115 m beyond the western site boundary. A pedestrian refuge island is proposed approximately 115 m west northwest of the plan change site to provide a safe crossing point for pedestrians. A 1.8 m footpath is proposed to the east of the roundabout, along site frontage.

- 3 m wide shared paths are also proposed along the stormwater swale and landscape buffer around the site.
- Capacity assessment undertaken via SIDRA Intersection 9 indicate that the SH24 / Tower Road / Burwood Road roundabout will perform at or near capacity during the current year baseline scenario (i.e. after considering consented and permitted activities). This situation only worsens in the baseline 2031 scenario when the background growth on SH24 is considered.
- A minimum intersection upgrade is required and is to be carried out by Calcutta in order for the SH24 / Tower Road / Burwood Road roundabout to accommodate the additional trips generated by the proposed rezoning and perform at a similar or better level to the baseline scenario which includes consented / permitted activities. This involves the addition of left turn lanes on Mangawhero Road (SH24), Tower Road and Broadway (SH24) approaches, and right turn lane on Burwood Road approach.
- The proposed minimum intersection upgrade to dual lane approaches would not technically be needed until the two-way peak hour volume at the Mangawhero Road (SH24) arm of the roundabout exceeds 1,570 trips per peak hour during the PM peak period. This volume trigger is obtained from the Baseline 2021 scenario which equates to existing surveyed counts plus the traffic volumes generated by the permitted and consented activities near the vicinity of the plan change site.



## 11. Recommendations

The following transportation infrastructure are recommended for mitigating the future transport effects of the proposed rezoning:

### **Access Intersection**

- Construction of a roundabout on SH24 with an access road through the site in general accordance with the location and form illustrated in Appendix B of this ITA.

### **Wider Network Intersection Upgrades**

- The SH24 / Tower Road / Burwood Road roundabout shall be **minimally** upgraded in general accordance with the intent illustrated in Appendix D of this ITA.

### **Walking and Cycling**

- A 3 m wide shared path is to be provided to the west of the new roundabout access along the site frontage and extended by approximately 115 m beyond the western site boundary. A pedestrian refuge island is to be constructed approximately 115 m west northwest of the plan change site to provide a safe crossing point for pedestrians.
- A new 1.8 m footpath is to be constructed on the northern side of SH24 from Garland Street to the new crossing point.
- A 1.8 m wide footpath is to be provided to the east of the new roundabout access along the site frontage.
- 3 m wide shared paths to be provided the stormwater swale and landscape buffer around the site.

Apart from the above-mentioned mitigating measures, it is also recommended that Waka Kotahi NZ Transport Agency reviews the safe and appropriate speed limit along the site frontage and location of the gated speed limit signs such that it aligns with the industrial environment if the proposed rezoning is approved.

The following summarises the recommended transportation infrastructure upgrades and related timing and responsibilities for delivery, in relation to this rezoning submission.

Staging of Transportation Infrastructure Improvements			
No.	Infrastructure Upgrade	When?	Delivered By
1	3-arm roundabout on SH24 for access to the plan change site	Before any industrial activity in the plan change site generates traffic accessing SH24	The Applicant
2	Capacity Increase at SH24 / Tower Road / Burwood Road roundabout to dual lane approaches (refer to Appendix D, drawing 146930-02-0234)	When the total two-way volume at the Mangawhero Road (SH24) arm of the roundabout exceeds 1,570 vph during the PM peak period. This volume trigger equates to existing surveyed counts plus the consented baseline traffic volumes. (Refer to Figure 11 and Figure 19)	The Applicant



3	Construction of walking and cycling facilities within the plan change site as well as on SH24	Before any industrial activity in the plan change site generates traffic accessing SH24	The Applicant
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# Appendix A – Employment Zone Development Area Plan





- Key.**
- Plan Change Boundary
  - Existing Trees
  - Existing Powerlines
  - 4m Powerline Easement
  - Proposed General Industrial Zone
  - Proposed Road Network
  - Key Transport Corridor
  - Proposed Stormwater Reserve (Swale)
  - Proposed Overland Flow Path
  - Proposed Landscape Buffer
  - Stormwater Management
  - Ecological Area
  - Proposed Pedestrian Connection
  - Future Vehicle Connection

**Areas:**  
 Total Area to be Zoned = 41.41ha  
 Total Developable Land = 32.50ha  
 Roads = 4.16ha  
 Landscape Buffers/Swale Networks within Plan Change Area = 4.76ha  
 Landscape Buffers/Swale Networks outside of Plan Change Area = 6.17ha

Rev	Date	Issued for	Drawn
E	01.12.21	Information	TM
D	22.10.21	Information	TM
C	21.10.21	Information	TM
B	19.10.21	Information	TM



**Calcutta Matamata**  
 Client  
**Employment Zone**  
 Job Name

**Development Area Plan**  
 Drawing Title

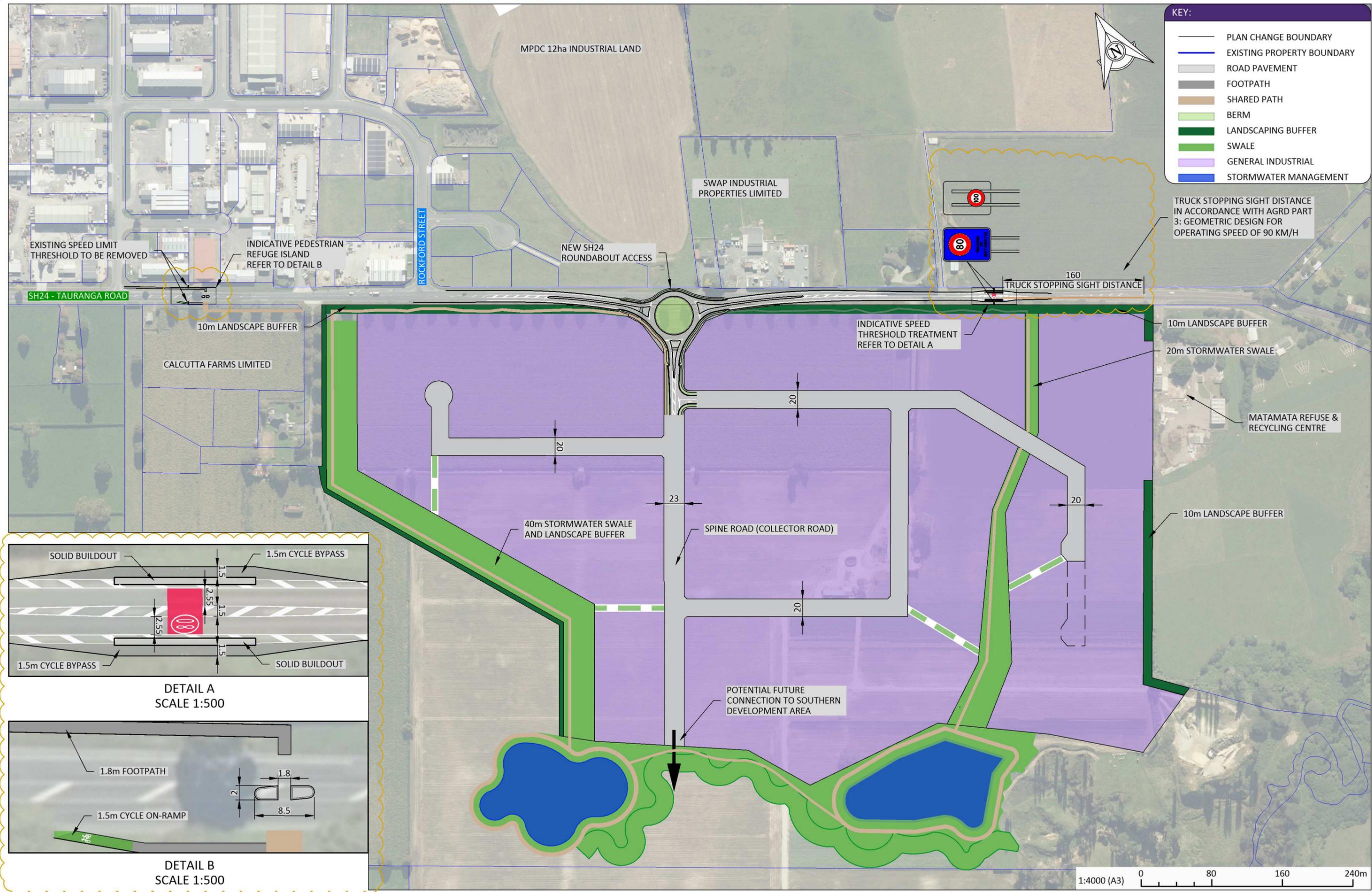
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# Appendix B – Access Concept Design

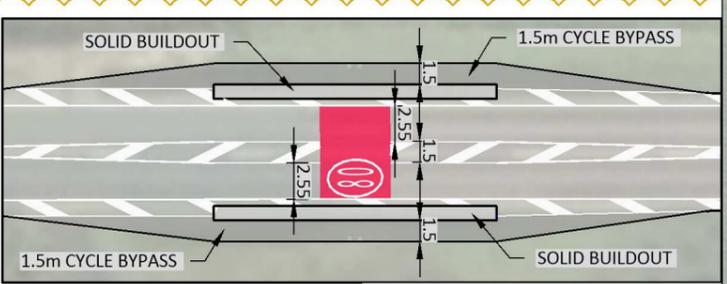


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Version 4.0 - March 2020

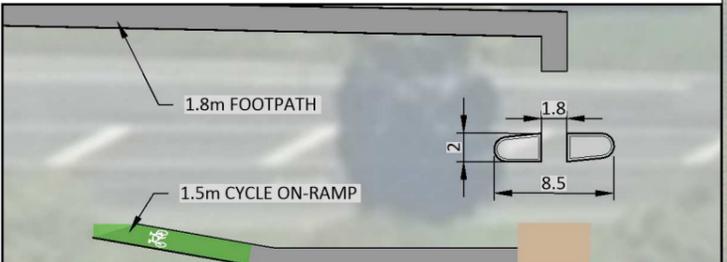


**KEY:**

- PLAN CHANGE BOUNDARY
- EXISTING PROPERTY BOUNDARY
- ROAD PAVEMENT
- FOOTPATH
- SHARED PATH
- BERM
- LANDSCAPING BUFFER
- SWALE
- GENERAL INDUSTRIAL
- STORMWATER MANAGEMENT



**DETAIL A**  
SCALE 1:500



**DETAIL B**  
SCALE 1:500

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05.04.2022	UPDATED SPEED LIMIT AND PEDESTRIAN REFUGE ISLAND	SB	CI	CI
03.11.2021	FOR PLAN CHANGE APPLICATION	LV	CI	CI

DESIGNED	CHECKED
LV	CI
DRAWN	APPROVED
LV	CI



CLIENT  
**CALCUTTA Veros**

PROJECT  
**CALCUTTA FARMS INDUSTRIAL ZONE PLAN CHANGE**

DRAWING  
**SH24 ROUNDABOUT ACCESS OVERALL PLAN**

STATUS	
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DRAWING NUMBER	REVISION
146930-02-0221	B

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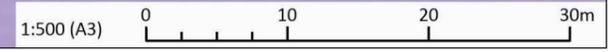
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**KEY:**

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- EXISTING PROPERTY BOUNDARY
- ROAD PAVEMENT
- FOOTPATH
- SHARED PATH
- BERM
- LANDSCAPING BUFFER
- SWALE
- GENERAL INDUSTRIAL
- STORMWATER MANAGEMENT



DESIGNED	CHECKED			
LV	CI			
DRAWN	APPROVED			
LV	CI			
A	03.11.2021	FOR PLAN CHANGE APPLICATION	LV	CI
DATE	ISSUE/REVISION DETAIL	BY	CHK	APPR

mx model version:	
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CLIENT  
**CALCUTTA Veros**

PROJECT  
**CALCUTTA FARMS INDUSTRIAL ZONE PLAN CHANGE**

DRAWING  
**SH24 ROUNDABOUT ACCESS ENLARGEMENT PLAN AND DIMENSIONS**

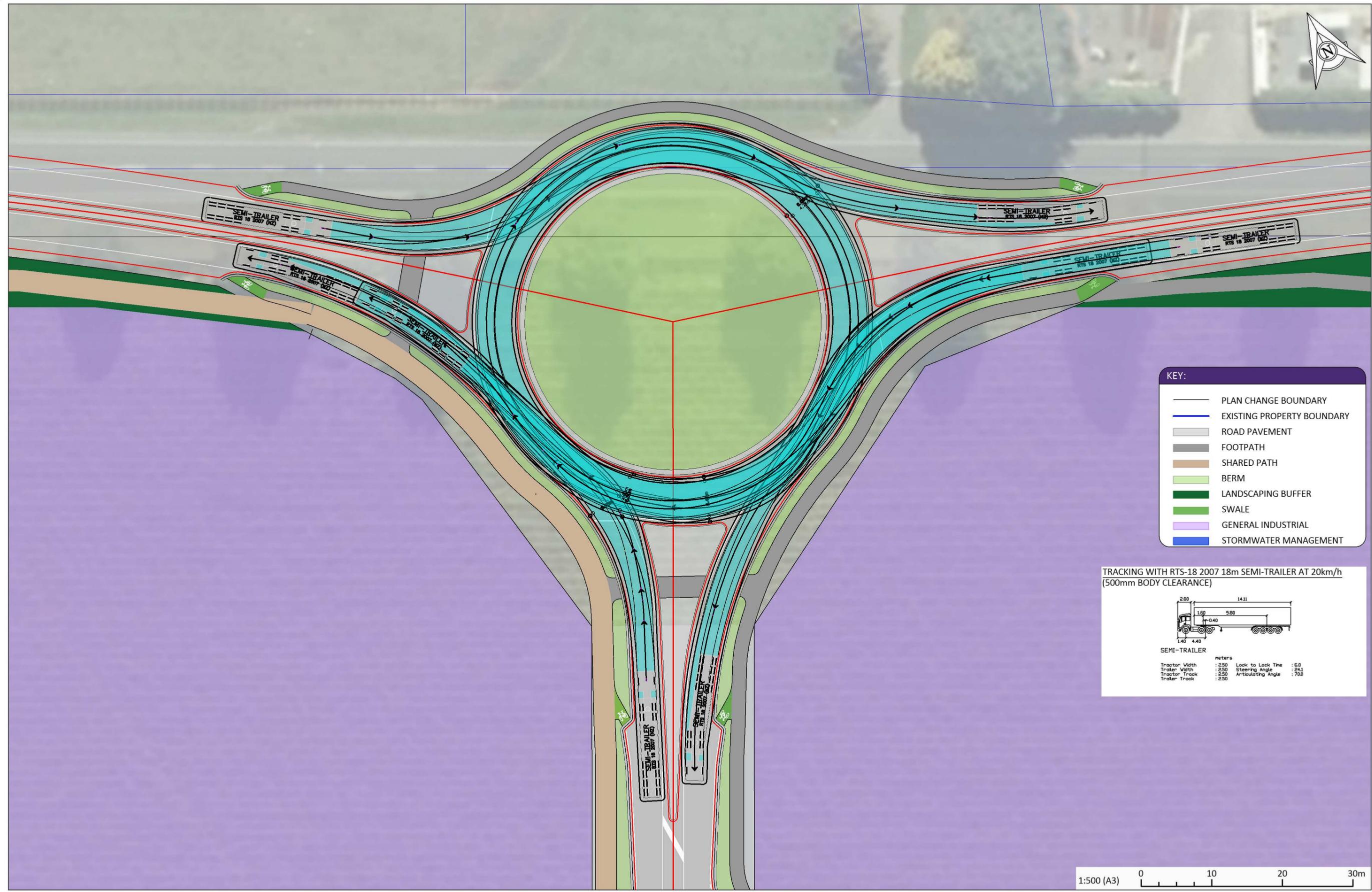
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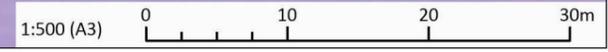
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- PLAN CHANGE BOUNDARY
- EXISTING PROPERTY BOUNDARY
- ROAD PAVEMENT
- FOOTPATH
- SHARED PATH
- BERM
- LANDSCAPING BUFFER
- SWALE
- GENERAL INDUSTRIAL
- STORMWATER MANAGEMENT

TRACKING WITH RTS-18 2007 18m SEMI-TRAILER AT 20km/h  
(500mm BODY CLEARANCE)

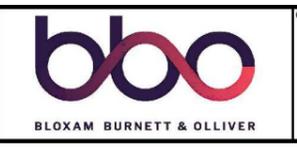
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Trailer Track		: 2.50		



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LV	CI			
DRAWN	APPROVED			
LV	CI			
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A	03.11.2021	FOR PLAN CHANGE APPLICATION	LV	CI
DATE		ISSUE/REVISION DETAIL	BY	CHK
			APP	

DESIGNED	CHECKED
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DATE	
	ISSUE/REVISION DETAIL



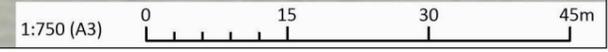
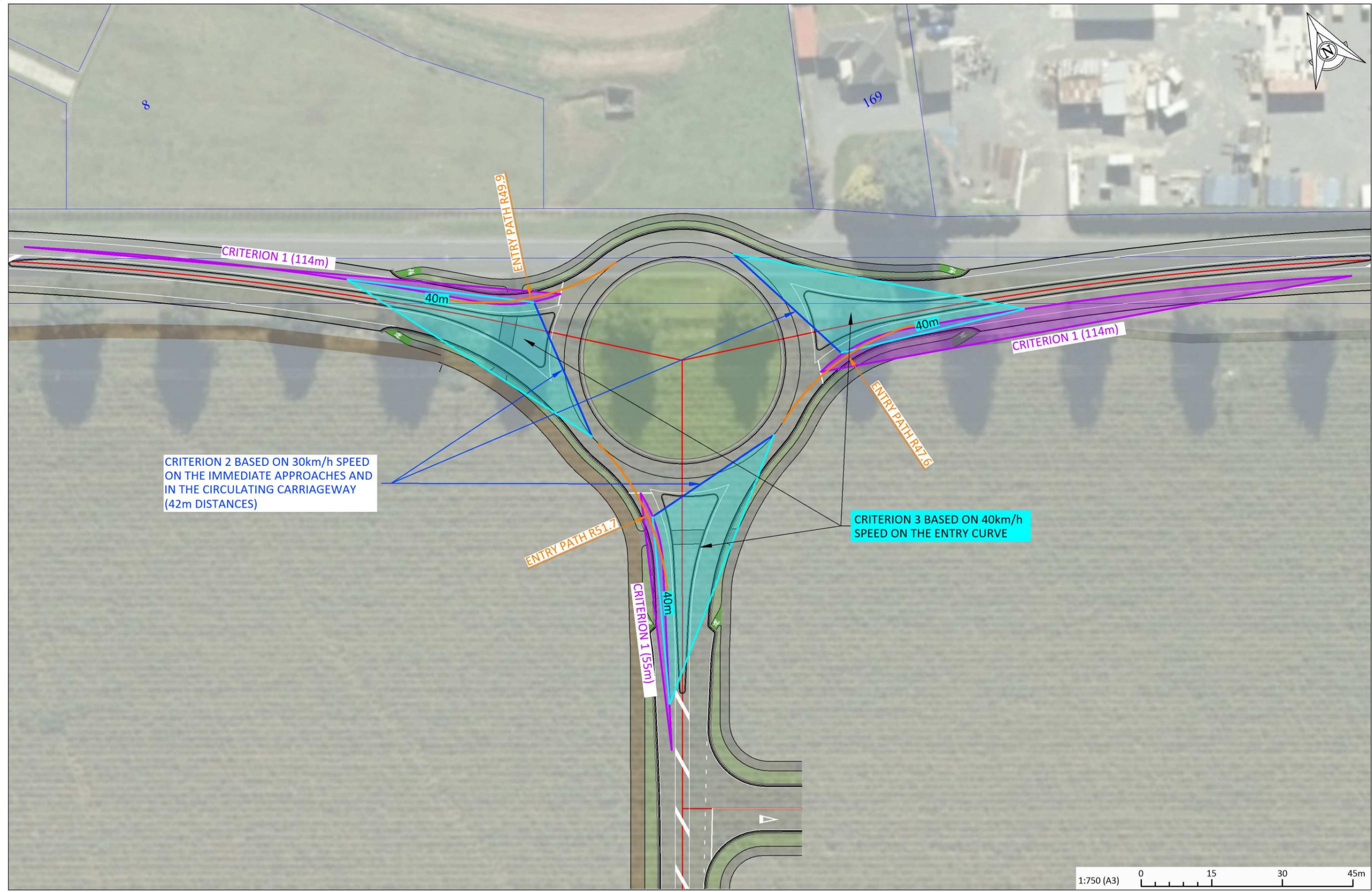
CLIENT  
**CALCUTTA Veros**

PROJECT  
**CALCUTTA FARMS INDUSTRIAL ZONE PLAN CHANGE**

DRAWING  
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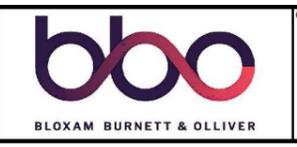
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 Version 4.0 - March 2020



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DATE	ISSUE/REVISION DETAIL	BY	CHK	APPR

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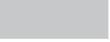


CLIENT  
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 PROJECT  
**CALCUTTA FARMS INDUSTRIAL ZONE PLAN CHANGE**

DRAWING  
**SH24 ROUNDABOUT ACCESS SIGHT DISTANCES AND ENTRY PATHS**

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DRAWING NUMBER	146930-02-0224	REVISION A



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-  Plan Change Boundary
  -  Existing Trees
  -  Existing Powerlines
  -  4m Powerline Easement
  -  Proposed General Industrial Zone
  -  Proposed Road Network
  -  Key Transport Corridor
  -  Proposed Stormwater Reserve (Swale)
  -  Proposed Overland Flow Path
  -  Proposed Landscape Buffer
  -  Stormwater Management
  -  Ecological Area
  -  Proposed Pedestrian Connection
  -  Future Vehicle Connection

A	04.04.21	Information	TM
Rev	Date	Issued for	Drawn



**Calcutta Matamata**  
Client

**Employment Zone**  
Job Name

**Indicative Roundabout**  
Drawing Title

<b>CL-04</b>	<b>A</b>
Drawing Number	Revision



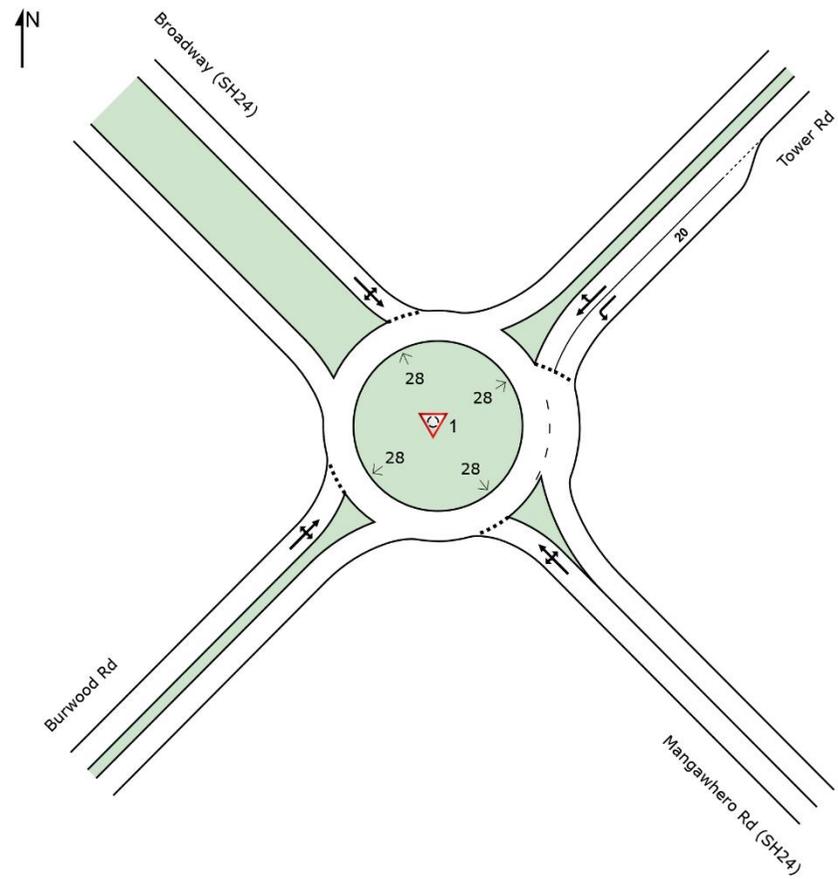
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20m Road

# Appendix C – SIDRA Movement Summaries



# SIDRA Results – SH24 / Tower Road / Burwood Road Roundabout



## 2021 Baseline (Existing Traffic Volumes + Consented / Permitted Traffic Volumes)

### Site: 1 [SH24 / Tower Rd / Burwood Rd RAB – Baseline 2021 - AM Peak]

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
SouthEast: Mangawhero Rd (SH24)														
4	L2	113	16.0	119	16.0	1.089	71.4	LOS F	36.7	292.4	1.00	2.22	3.52	25.5
5	T1	391	16.0	412	16.0	1.089	71.1	LOS F	36.7	292.4	1.00	2.22	3.52	25.9
6	R2	63	16.0	66	16.0	1.089	76.5	LOS F	36.7	292.4	1.00	2.22	3.52	26.0
Approach		567	16.0	597	16.0	1.089	71.8	LOS F	36.7	292.4	1.00	2.22	3.52	25.8
NorthEast: Tower Rd														
7	L2	102	7.0	107	7.0	0.267	11.2	LOS B	1.5	11.3	0.80	0.87	0.80	43.6
8	T1	210	7.0	221	7.0	0.499	9.8	LOS A	4.2	30.9	0.88	0.96	1.02	44.8
9	R2	95	7.0	100	7.0	0.499	15.1	LOS B	4.2	30.9	0.88	0.96	1.02	45.2
Approach		407	7.0	428	7.0	0.499	11.4	LOS B	4.2	30.9	0.86	0.94	0.97	44.6
NorthWest: Broadway (SH24)														
10	L2	64	16.0	67	16.0	0.538	5.8	LOS A	4.6	36.6	0.77	0.69	0.81	45.7
11	T1	353	16.0	372	16.0	0.538	5.5	LOS A	4.6	36.6	0.77	0.69	0.81	47.0
12	R2	62	16.0	65	16.0	0.538	10.8	LOS B	4.6	36.6	0.77	0.69	0.81	47.4
Approach		479	16.0	504	16.0	0.538	6.2	LOS A	4.6	36.6	0.77	0.69	0.81	46.9
SouthWest: Burwood Rd														
1	L2	111	7.0	117	7.0	1.195	118.1	LOS F	40.5	300.7	1.00	2.56	4.69	19.1
2	T1	163	7.0	172	7.0	1.195	117.8	LOS F	40.5	300.7	1.00	2.56	4.69	19.4
3	R2	186	7.0	196	7.0	1.195	123.2	LOS F	40.5	300.7	1.00	2.56	4.69	19.4
Approach		460	7.0	484	7.0	1.195	120.1	LOS F	40.5	300.7	1.00	2.56	4.69	19.3
All Vehicles		1913	11.9	2014	11.9	1.195	54.1	LOS E	40.5	300.7	0.91	1.65	2.58	29.4



**Site: 1 [SH24 / Tower Rd / Burwood Rd RAB – Baseline 2021 - PM Peak]**

<b>Vehicle Movement Performance</b>														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
<b>SouthEast: Mangawhero Rd (SH24)</b>														
4	L2	203	12.0	214	12.0	1.164	93.1	LOS F	63.6	490.9	1.00	2.90	4.72	22.1
5	T1	481	12.0	506	12.0	1.164	92.8	LOS F	63.6	490.9	1.00	2.90	4.72	22.4
6	R2	182	12.0	192	12.0	1.164	98.1	LOS F	63.6	490.9	1.00	2.90	4.72	22.5
Approach		866	12.0	912	12.0	1.164	94.0	LOS F	63.6	490.9	1.00	2.90	4.72	22.4
<b>NorthEast: Tower Rd</b>														
7	L2	113	7.0	119	7.0	0.278	10.5	LOS B	1.9	13.9	0.90	0.91	0.90	43.9
8	T1	158	7.0	166	7.0	0.408	9.0	LOS A	3.3	24.6	0.96	0.94	0.99	45.3
9	R2	64	7.0	67	7.0	0.408	14.4	LOS B	3.3	24.6	0.96	0.94	0.99	45.7
Approach		335	7.0	353	7.0	0.408	10.6	LOS B	3.3	24.6	0.94	0.93	0.96	44.9
<b>NorthWest: Broadway (SH24)</b>														
10	L2	108	16.0	114	16.0	0.826	13.8	LOS B	13.6	108.3	1.00	1.18	1.50	42.1
11	T1	451	16.0	475	16.0	0.826	13.5	LOS B	13.6	108.3	1.00	1.18	1.50	43.1
12	R2	149	16.0	157	16.0	0.826	18.8	LOS B	13.6	108.3	1.00	1.18	1.50	43.4
Approach		708	16.0	745	16.0	0.826	14.6	LOS B	13.6	108.3	1.00	1.18	1.50	43.0
<b>SouthWest: Burwood Rd</b>														
1	L2	94	7.0	99	7.0	1.169	111.2	LOS F	34.9	259.3	1.00	2.40	4.36	19.9
2	T1	179	7.0	188	7.0	1.169	110.9	LOS F	34.9	259.3	1.00	2.40	4.36	20.1
3	R2	141	7.0	148	7.0	1.169	116.2	LOS F	34.9	259.3	1.00	2.40	4.36	20.2
Approach		414	7.0	436	7.0	1.169	112.8	LOS F	34.9	259.3	1.00	2.40	4.36	20.1
All Vehicles		2323	11.6	2445	11.6	1.169	61.1	LOS E	63.6	490.9	0.99	2.00	3.13	27.9



## 2031 Baseline

### Site: 1 [SH24 / Tower Rd / Burwood Rd RAB – Baseline 2031 – AM Peak]

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
SouthEast: Mangawhero Rd (SH24)														
4	L2	117	16.0	117	16.0	1.178	345.5	LOS F	145.1	1155.3	1.00	6.93	13.16	8.9
5	T1	476	16.0	476	16.0	1.178	345.2	LOS F	145.1	1155.3	1.00	6.93	13.16	8.9
6	R2	65	16.0	65	16.0	1.178	350.6	LOS F	145.1	1155.3	1.00	6.93	13.16	8.9
Approach		658	16.0	658	16.0	1.178	345.8	LOS F	145.1	1155.3	1.00	6.93	13.16	8.9
NorthEast: Tower Rd														
7	L2	105	7.0	105	7.0	0.281	12.0	LOS B	1.6	12.0	0.82	0.89	0.82	43.2
8	T1	216	7.0	216	7.0	0.524	11.1	LOS B	4.6	34.0	0.92	1.02	1.11	44.1
9	R2	100	7.0	100	7.0	0.524	16.5	LOS B	4.6	34.0	0.92	1.02	1.11	44.5
Approach		421	7.0	421	7.0	0.524	12.6	LOS B	4.6	34.0	0.89	0.99	1.04	43.9
NorthWest: Broadway (SH24)														
10	L2	67	16.0	67	16.0	0.580	6.0	LOS A	5.4	42.9	0.79	0.72	0.85	45.7
11	T1	426	16.0	426	16.0	0.580	5.7	LOS A	5.4	42.9	0.79	0.72	0.85	46.9
12	R2	64	16.0	64	16.0	0.580	11.1	LOS B	5.4	42.9	0.79	0.72	0.85	47.3
Approach		557	16.0	557	16.0	0.580	6.4	LOS A	5.4	42.9	0.79	0.72	0.85	46.8
SouthWest: Burwood Rd														
1	L2	114	7.0	114	7.0	1.207	406.0	LOS F	117.2	869.4	1.00	6.47	14.04	7.8
2	T1	167	7.0	167	7.0	1.207	405.7	LOS F	117.2	869.4	1.00	6.47	14.04	7.8
3	R2	191	7.0	191	7.0	1.207	411.0	LOS F	117.2	869.4	1.00	6.47	14.04	7.8
Approach		472	7.0	472	7.0	1.207	407.9	LOS F	117.2	869.4	1.00	6.47	14.04	7.8
All Vehicles		2108	12.2	2108	12.2	1.207	203.5	LOS F	145.1	1155.3	0.92	4.00	7.68	13.5



**Site: 1 [SH24 / Tower Rd / Burwood Rd RAB – Baseline 2031 – PM Peak]**

<b>Vehicle Movement Performance</b>														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
<b>SouthEast: Mangawhero Rd (SH24)</b>														
4	L2	209	12.0	209	12.0	1.238	445.7	LOS F	258.6	1996.4	1.00	10.08	18.37	7.2
5	T1	584	12.0	584	12.0	1.238	445.4	LOS F	258.6	1996.4	1.00	10.08	18.37	7.2
6	R2	188	12.0	188	12.0	1.238	450.7	LOS F	258.6	1996.4	1.00	10.08	18.37	7.2
Approach		981	12.0	981	12.0	1.238	446.5	LOS F	258.6	1996.4	1.00	10.08	18.37	7.2
<b>NorthEast: Tower Rd</b>														
7	L2	117	7.0	117	7.0	0.312	11.9	LOS B	2.1	15.9	0.94	0.96	0.94	43.2
8	T1	162	7.0	162	7.0	0.454	11.4	LOS B	4.0	29.3	1.00	1.02	1.11	44.0
9	R2	67	7.0	67	7.0	0.454	16.8	LOS B	4.0	29.3	1.00	1.02	1.11	44.4
Approach		346	7.0	346	7.0	0.454	12.6	LOS B	4.0	29.3	0.98	1.00	1.05	43.8
<b>NorthWest: Broadway (SH24)</b>														
10	L2	114	16.0	114	16.0	0.884	17.9	LOS B	19.3	153.4	1.00	1.33	1.78	40.3
11	T1	555	16.0	555	16.0	0.884	17.6	LOS B	19.3	153.4	1.00	1.33	1.78	41.2
12	R2	154	16.0	154	16.0	0.884	23.0	LOS C	19.3	153.4	1.00	1.33	1.78	41.5
Approach		823	16.0	823	16.0	0.884	18.6	LOS B	19.3	153.4	1.00	1.33	1.78	41.1
<b>SouthWest: Burwood Rd</b>														
1	L2	97	7.0	97	7.0	1.191	382.8	LOS F	101.2	750.7	1.00	5.87	12.78	8.2
2	T1	184	7.0	184	7.0	1.191	382.5	LOS F	101.2	750.7	1.00	5.87	12.78	8.2
3	R2	146	7.0	146	7.0	1.191	387.8	LOS F	101.2	750.7	1.00	5.87	12.78	8.2
Approach		427	7.0	427	7.0	1.191	384.4	LOS F	101.2	750.7	1.00	5.87	12.78	8.2
All Vehicles		2577	11.8	2577	11.8	1.238	241.3	LOS F	258.6	1996.4	1.00	5.37	9.82	11.9



## 2031 Baseline + Development

### Site: 1 [SH24 / Tower Rd / Burwood Rd RAB – Baseline 2031 + Development – AM Peak]

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
SouthEast: Mangawhero Rd (SH24)														
4	L2	147	16.0	147	16.0	1.448	821.7	LOS F	336.3	2676.7	1.00	12.67	24.77	4.2
5	T1	595	16.0	595	16.0	1.448	821.4	LOS F	336.3	2676.7	1.00	12.67	24.77	4.2
6	R2	79	16.0	79	16.0	1.448	826.8	LOS F	336.3	2676.7	1.00	12.67	24.77	4.2
Approach		821	16.0	821	16.0	1.448	822.0	LOS F	336.3	2676.7	1.00	12.67	24.77	4.2
NorthEast: Tower Rd														
7	L2	141	7.0	141	7.0	0.475	19.9	LOS B	3.5	25.7	0.96	1.06	1.18	39.5
8	T1	216	7.0	216	7.0	0.758	30.0	LOS C	9.4	69.9	1.00	1.34	1.78	36.1
9	R2	100	7.0	100	7.0	0.758	35.3	LOS D	9.4	69.9	1.00	1.34	1.78	36.4
Approach		457	7.0	457	7.0	0.758	28.0	LOS C	9.4	69.9	0.99	1.25	1.59	37.1
NorthWest: Broadway (SH24)														
10	L2	67	16.0	67	16.0	0.772	9.8	LOS A	11.4	90.5	0.96	0.99	1.23	44.4
11	T1	618	16.0	618	16.0	0.772	9.5	LOS A	11.4	90.5	0.96	0.99	1.23	45.6
12	R2	64	16.0	64	16.0	0.772	14.8	LOS B	11.4	90.5	0.96	0.99	1.23	45.9
Approach		749	16.0	749	16.0	0.772	10.0	LOS A	11.4	90.5	0.96	0.99	1.23	45.5
SouthWest: Burwood Rd														
1	L2	114	7.0	114	7.0	1.388	722.6	LOS F	202.7	1504.0	1.00	9.49	21.28	4.7
2	T1	167	7.0	167	7.0	1.388	722.4	LOS F	202.7	1504.0	1.00	9.49	21.28	4.7
3	R2	257	7.0	257	7.0	1.388	727.7	LOS F	202.7	1504.0	1.00	9.49	21.28	4.7
Approach		538	7.0	538	7.0	1.388	725.0	LOS F	202.7	1504.0	1.00	9.49	21.28	4.7
All Vehicles		2565	12.5	2565	12.5	1.448	423.1	LOS F	336.3	2676.7	0.99	6.56	13.04	7.5

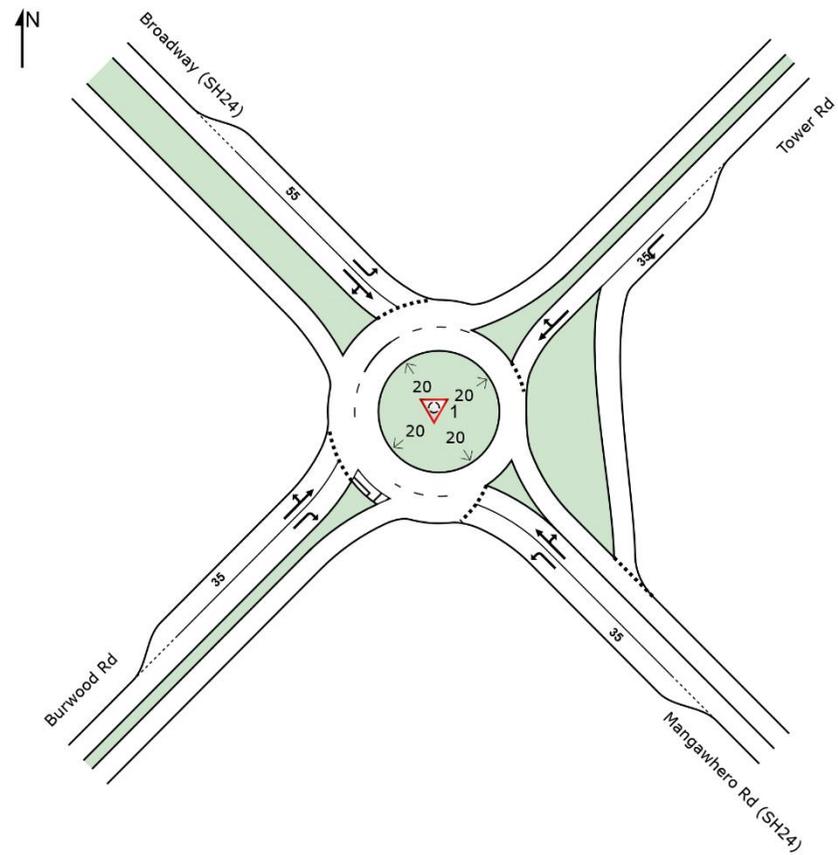


**Site: 1 [SH24 / Tower Rd / Burwood Rd RAB – Baseline 2031 + Development – PM Peak]**

<b>Vehicle Movement Performance</b>														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
<b>SouthEast: Mangawhero Rd (SH24)</b>														
4	L2	275	12.0	275	12.0	1.629	1143.3	LOS F	658.3	5081.8	1.00	19.12	35.32	3.1
5	T1	799	12.0	799	12.0	1.629	1143.0	LOS F	658.3	5081.8	1.00	19.12	35.32	3.1
6	R2	245	12.0	245	12.0	1.629	1148.4	LOS F	658.3	5081.8	1.00	19.12	35.32	3.1
Approach		1319	12.0	1319	12.0	1.629	1144.1	LOS F	658.3	5081.8	1.00	19.12	35.32	3.1
<b>NorthEast: Tower Rd</b>														
7	L2	134	7.0	134	7.0	0.415	16.3	LOS B	3.2	23.4	0.99	1.05	1.11	41.1
8	T1	162	7.0	162	7.0	0.539	17.0	LOS B	5.2	38.6	1.00	1.12	1.26	41.3
9	R2	67	7.0	67	7.0	0.539	22.3	LOS C	5.2	38.6	1.00	1.12	1.26	41.7
Approach		363	7.0	363	7.0	0.539	17.7	LOS B	5.2	38.6	1.00	1.09	1.20	41.3
<b>NorthWest: Broadway (SH24)</b>														
10	L2	114	16.0	114	16.0	0.968	37.4	LOS D	38.7	308.2	1.00	1.98	2.95	33.3
11	T1	647	16.0	647	16.0	0.968	37.1	LOS D	38.7	308.2	1.00	1.98	2.95	34.0
12	R2	154	16.0	154	16.0	0.968	42.5	LOS D	38.7	308.2	1.00	1.98	2.95	34.2
Approach		915	16.0	915	16.0	0.968	38.1	LOS D	38.7	308.2	1.00	1.98	2.95	33.9
<b>SouthWest: Burwood Rd</b>														
1	L2	97	7.0	97	7.0	1.297	566.2	LOS F	143.4	1064.0	1.00	7.51	16.83	5.8
2	T1	184	7.0	184	7.0	1.297	565.9	LOS F	143.4	1064.0	1.00	7.51	16.83	5.9
3	R2	170	7.0	170	7.0	1.297	571.2	LOS F	143.4	1064.0	1.00	7.51	16.83	5.9
Approach		451	7.0	451	7.0	1.297	567.9	LOS F	143.4	1064.0	1.00	7.51	16.83	5.9
All Vehicles		3048	11.9	3048	11.9	1.629	592.7	LOS F	658.3	5081.8	1.00	10.11	18.80	5.6



## SIDRA Results – SH24 / Tower Road / Burwood Road Roundabout – Required Minimum Upgrade



## 2031 Baseline + Development (Required Minimum Upgrade)

### Site: 1 [SH24 / Tower Rd / Burwood Rd RAB – Baseline 2031 + Development (Required Minimum Upgrade) – AM Peak]

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
SouthEast: Mangawhero Rd (SH24)														
4	L2	147	16.0	147	16.0	0.395	11.0	LOS B	2.1	16.6	0.70	0.85	0.76	43.4
5	T1	595	16.0	595	16.0	1.047	133.6	LOS F	72.5	577.2	1.00	3.73	6.36	18.0
6	R2	79	16.0	79	16.0	1.047	137.8	LOS F	72.5	577.2	1.00	3.73	6.36	18.1
Approach		821	16.0	821	16.0	1.047	112.0	LOS F	72.5	577.2	0.95	3.22	5.36	20.1
NorthEast: Tower Rd														
7	L2	141	7.0	141	7.0	0.328	11.8	LOS B	2.3	17.0	0.93	0.95	0.93	43.3
8	T1	216	7.0	216	7.0	0.819	44.3	LOS D	11.8	87.3	1.00	1.51	2.18	31.7
9	R2	100	7.0	100	7.0	0.819	49.1	LOS D	11.8	87.3	1.00	1.51	2.18	31.7
Approach		457	7.0	457	7.0	0.819	35.3	LOS D	11.8	87.3	0.98	1.34	1.80	34.5
NorthWest: Broadway (SH24)														
10	L2	67	16.0	67	16.0	0.132	7.1	LOS A	0.6	4.6	0.62	0.73	0.62	45.6
11	T1	618	16.0	618	16.0	0.767	9.1	LOS A	8.4	66.9	0.89	1.07	1.22	45.6
12	R2	64	16.0	64	16.0	0.767	14.1	LOS B	8.4	66.9	0.89	1.07	1.22	45.7
Approach		749	16.0	749	16.0	0.767	9.3	LOS A	8.4	66.9	0.87	1.04	1.16	45.6
SouthWest: Burwood Rd														
1	L2	114	7.0	114	7.0	0.802	36.3	LOS D	9.6	70.9	1.00	1.38	1.90	33.6
2	T1	167	7.0	167	7.0	0.802	35.7	LOS D	9.6	70.9	1.00	1.38	1.90	34.3
3	R2	257	7.0	257	7.0	0.734	33.0	LOS C	7.6	56.2	1.00	1.27	1.64	35.7
Approach		538	7.0	538	7.0	0.802	34.6	LOS C	9.6	70.9	1.00	1.33	1.78	34.8
All Vehicles		2565	12.5	2565	12.5	1.047	52.1	LOS E	72.5	577.2	0.94	1.85	2.75	29.9



**Site: 1 [SH24 / Tower Rd / Burwood Rd RAB – Baseline 2031 + Development (Required Minimum Upgrade) – PM Peak]**

<b>Vehicle Movement Performance</b>														
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	HV ]	[ Total	HV ]				[ Veh.	Dist ]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
<b>SouthEast: Mangawhero Rd (SH24)</b>														
4	L2	275	12.0	275	12.0	0.542	12.5	LOS B	4.4	33.8	0.83	0.96	1.00	42.6
5	T1	799	12.0	799	12.0	1.178	340.8	LOS F	223.8	1727.7	1.00	8.75	15.19	9.0
6	R2	245	12.0	245	12.0	1.178	345.0	LOS F	223.8	1727.7	1.00	8.75	15.19	9.0
Approach		1319	12.0	1319	12.0	1.178	273.2	LOS F	223.8	1727.7	0.96	7.13	12.23	10.7
<b>NorthEast: Tower Rd</b>														
7	L2	134	7.0	134	7.0	0.255	9.3	LOS A	1.9	14.3	0.93	0.88	0.93	44.6
8	T1	162	7.0	162	7.0	0.571	20.6	LOS C	5.7	42.3	1.00	1.15	1.33	39.6
9	R2	67	7.0	67	7.0	0.571	25.3	LOS C	5.7	42.3	1.00	1.15	1.33	39.7
Approach		363	7.0	363	7.0	0.571	17.3	LOS B	5.7	42.3	0.97	1.05	1.18	41.3
<b>NorthWest: Broadway (SH24)</b>														
10	L2	114	16.0	114	16.0	0.224	7.7	LOS A	1.0	8.2	0.65	0.79	0.65	45.2
11	T1	647	16.0	647	16.0	0.906	17.6	LOS B	16.8	133.8	1.00	1.48	1.97	41.1
12	R2	154	16.0	154	16.0	0.906	22.6	LOS C	16.8	133.8	1.00	1.48	1.97	41.2
Approach		915	16.0	915	16.0	0.906	17.2	LOS B	16.8	133.8	0.96	1.39	1.81	41.6
<b>SouthWest: Burwood Rd</b>														
1	L2	97	7.0	97	7.0	1.036	181.4	LOS F	34.1	253.0	1.00	2.79	5.34	14.5
2	T1	184	7.0	184	7.0	1.036	180.9	LOS F	34.1	253.0	1.00	2.79	5.34	14.6
3	R2	170	7.0	170	7.0	0.755	50.6	LOS E	7.1	52.9	1.00	1.30	1.75	30.6
Approach		451	7.0	451	7.0	1.036	131.9	LOS F	34.1	253.0	1.00	2.23	3.98	18.2
All Vehicles		3048	11.9	3048	11.9	1.178	145.0	LOS F	223.8	1727.7	0.97	3.96	6.57	17.1



## 2031 Baseline + Development (Required Minimum Upgrade) – Sensitivity Analysis

Site: 1 [SH24 / Tower Rd / Burwood Rd RAB – Baseline 2031 + Development (Required Minimum Upgrade) + Sensitivity – AM Peak]

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
SouthEast: Mangawhero Rd (SH24)														
4	L2	132	16.0	132	16.0	0.355	10.3	LOS B	1.8	14.1	0.69	0.83	0.71	43.8
5	T1	535	16.0	535	16.0	0.953	45.7	LOS D	30.0	239.0	1.00	1.92	2.85	31.4
6	R2	72	16.0	72	16.0	0.953	50.0	LOS D	30.0	239.0	1.00	1.92	2.85	31.4
Approach		739	16.0	739	16.0	0.953	39.8	LOS D	30.0	239.0	0.94	1.73	2.47	33.1
NorthEast: Tower Rd														
7	L2	152	7.0	152	7.0	0.412	15.7	LOS B	3.2	23.5	0.99	1.04	1.10	41.4
8	T1	216	7.0	216	7.0	0.963	114.3	LOS F	24.4	181.0	1.00	2.28	4.00	19.9
9	R2	100	7.0	100	7.0	0.963	119.1	LOS F	24.4	181.0	1.00	2.28	4.00	19.9
Approach		468	7.0	468	7.0	0.963	83.3	LOS F	24.4	181.0	1.00	1.88	3.06	23.9
NorthWest: Broadway (SH24)														
10	L2	67	16.0	67	16.0	0.134	7.2	LOS A	0.6	4.7	0.62	0.74	0.62	45.5
11	T1	678	16.0	678	16.0	0.844	11.8	LOS B	11.5	91.4	0.97	1.23	1.49	44.2
12	R2	64	16.0	64	16.0	0.844	16.8	LOS B	11.5	91.4	0.97	1.23	1.49	44.2
Approach		809	16.0	809	16.0	0.844	11.8	LOS B	11.5	91.4	0.94	1.19	1.42	44.3
SouthWest: Burwood Rd														
1	L2	114	7.0	114	7.0	0.746	28.3	LOS C	8.1	60.0	1.00	1.28	1.67	36.2
2	T1	167	7.0	167	7.0	0.746	27.8	LOS C	8.1	60.0	1.00	1.28	1.67	37.0
3	R2	277	7.0	277	7.0	0.735	31.3	LOS C	7.8	58.0	1.00	1.27	1.63	36.3
Approach		558	7.0	558	7.0	0.746	29.6	LOS C	8.1	60.0	1.00	1.28	1.65	36.5
All Vehicles		2574	12.4	2574	12.4	0.963	36.7	LOS D	30.0	239.0	0.96	1.49	2.07	34.1

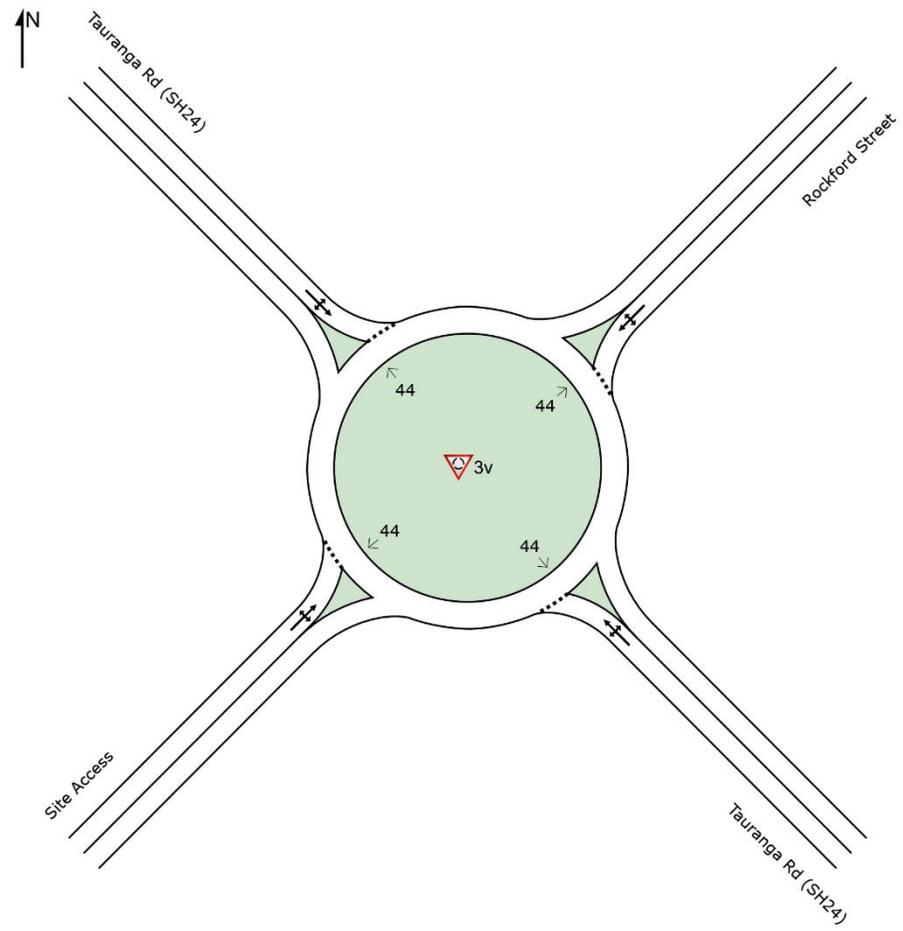


**Site: 1 [SH24 / Tower Rd / Burwood Rd RAB – Baseline 2031 + Development (Required Minimum Upgrade) + Sensitivity – PM Peak]**

<b>Vehicle Movement Performance</b>														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
<b>SouthEast: Mangawhero Rd (SH24)</b>														
4	L2	282	12.0	282	12.0	0.556	12.9	LOS B	4.6	35.5	0.84	0.98	1.03	42.5
5	T1	821	12.0	821	12.0	1.206	389.3	LOS F	254.4	1963.6	1.00	9.68	16.86	8.1
6	R2	251	12.0	251	12.0	1.206	393.5	LOS F	254.4	1963.6	1.00	9.68	16.86	8.1
Approach		1354	12.0	1354	12.0	1.206	311.7	LOS F	254.4	1963.6	0.97	7.87	13.57	9.7
<b>NorthEast: Tower Rd</b>														
7	L2	129	7.0	129	7.0	0.232	8.7	LOS A	1.7	12.7	0.91	0.85	0.91	45.0
8	T1	162	7.0	162	7.0	0.535	17.5	LOS B	5.1	38.0	1.00	1.12	1.26	40.9
9	R2	67	7.0	67	7.0	0.535	22.3	LOS C	5.1	38.0	1.00	1.12	1.26	41.0
Approach		358	7.0	358	7.0	0.535	15.2	LOS B	5.1	38.0	0.97	1.02	1.13	42.3
<b>NorthWest: Broadway (SH24)</b>														
10	L2	114	16.0	114	16.0	0.222	7.7	LOS A	1.0	8.1	0.65	0.78	0.65	45.3
11	T1	618	16.0	618	16.0	0.869	14.2	LOS B	13.5	107.5	0.99	1.33	1.69	42.7
12	R2	154	16.0	154	16.0	0.869	19.2	LOS B	13.5	107.5	0.99	1.33	1.69	42.8
Approach		886	16.0	886	16.0	0.869	14.2	LOS B	13.5	107.5	0.95	1.26	1.55	43.0
<b>SouthWest: Burwood Rd</b>														
1	L2	97	7.0	97	7.0	1.043	190.1	LOS F	35.6	264.2	1.00	2.87	5.53	14.0
2	T1	184	7.0	184	7.0	1.043	189.6	LOS F	35.6	264.2	1.00	2.87	5.53	14.1
3	R2	163	7.0	163	7.0	0.744	49.9	LOS D	6.8	50.6	1.00	1.28	1.71	30.8
Approach		444	7.0	444	7.0	1.043	138.4	LOS F	35.6	264.2	1.00	2.29	4.13	17.7
All Vehicles		3042	11.8	3042	11.8	1.206	164.9	LOS F	254.4	1963.6	0.97	4.32	7.23	15.7



## SIDRA Results – SH24 Roundabout Access



## 2031 Baseline + Development

### Site: 2 [SH24 Roundabout Access – Baseline 2031 + Development – AM Peak]

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
SouthEast: Tauranga Rd (SH24)														
4	L2	45	10.0	45	10.0	0.606	6.3	LOS A	6.1	49.7	0.82	0.81	0.93	52.3
5	T1	494	20.0	494	20.0	0.606	10.2	LOS B	6.1	49.7	0.82	0.81	0.93	59.5
23	R2	38	10.0	38	10.0	0.606	12.1	LOS B	6.1	49.7	0.82	0.81	0.93	55.9
Approach		577	18.6	577	18.6	0.606	10.1	LOS B	6.1	49.7	0.82	0.81	0.93	58.6
NorthEast: Rockford Street														
24	L2	43	20.0	43	20.0	0.209	8.5	LOS A	1.5	11.9	0.87	0.85	0.87	43.8
25	T1	1	10.0	1	10.0	0.209	7.2	LOS A	1.5	11.9	0.87	0.85	0.87	45.3
26	R2	76	20.0	76	20.0	0.209	14.4	LOS B	1.5	11.9	0.87	0.85	0.87	46.2
Approach		120	19.9	120	19.9	0.209	12.2	LOS B	1.5	11.9	0.87	0.85	0.87	45.3
NorthWest: Tauranga Rd (SH24)														
27	L2	157	10.0	157	10.0	0.658	2.8	LOS A	7.8	61.8	0.58	0.52	0.58	50.0
11	T1	440	20.0	440	20.0	0.658	6.5	LOS A	7.8	61.8	0.58	0.52	0.58	56.5
12	R2	293	10.0	293	10.0	0.658	8.6	LOS A	7.8	61.8	0.58	0.52	0.58	53.3
Approach		890	14.9	890	14.9	0.658	6.6	LOS A	7.8	61.8	0.58	0.52	0.58	54.2
SouthWest: Site Access														
1	L2	163	20.0	163	20.0	0.332	6.7	LOS A	2.4	19.8	0.85	0.82	0.85	45.8
31	T1	1	10.0	1	10.0	0.332	5.5	LOS A	2.4	19.8	0.85	0.82	0.85	47.4
3	R2	62	20.0	62	20.0	0.332	12.6	LOS B	2.4	19.8	0.85	0.82	0.85	48.5
Approach		226	20.0	226	20.0	0.332	8.3	LOS A	2.4	19.8	0.85	0.82	0.85	46.5
All Vehicles		1813	17.0	1813	17.0	0.658	8.3	LOS A	7.8	61.8	0.71	0.67	0.74	53.7



**Site: 2 [SH24 Roundabout Access – Baseline 2031 + Development – PM Peak]**

<b>Vehicle Movement Performance</b>														
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 km/h
		[ Total veh/h	HV ] %	[ Total veh/h	HV ] %				[ Veh. veh	Dist ] m				
<b>SouthEast: Tauranga Rd (SH24)</b>														
4	L2	28	20.0	28	20.0	0.542	4.5	LOS A	4.6	35.4	0.72	0.64	0.72	53.6
5	T1	525	12.0	525	12.0	0.542	7.9	LOS A	4.6	35.4	0.72	0.64	0.72	63.0
23	R2	25	20.0	25	20.0	0.542	10.4	LOS B	4.6	35.4	0.72	0.64	0.72	57.3
Approach		578	12.7	578	12.7	0.542	7.8	LOS A	4.6	35.4	0.72	0.64	0.72	62.2
<b>NorthEast: Rockford St</b>														
24	L2	53	10.0	53	10.0	0.285	6.7	LOS A	2.0	15.1	0.81	0.81	0.81	44.4
25	T1	1	20.0	1	20.0	0.285	6.2	LOS A	2.0	15.1	0.81	0.81	0.81	45.9
26	R2	161	10.0	161	10.0	0.285	12.6	LOS B	2.0	15.1	0.81	0.81	0.81	46.9
Approach		215	10.0	215	10.0	0.285	11.1	LOS B	2.0	15.1	0.81	0.81	0.81	46.3
<b>NorthWest: Tauranga Rd (SH24)</b>														
27	L2	68	20.0	68	20.0	0.494	2.5	LOS A	4.8	38.3	0.45	0.48	0.45	52.8
11	T1	462	16.0	462	16.0	0.494	6.1	LOS A	4.8	38.3	0.45	0.48	0.45	61.0
12	R2	133	20.0	133	20.0	0.494	8.4	LOS A	4.8	38.3	0.45	0.48	0.45	56.3
Approach		663	17.2	663	17.2	0.494	6.2	LOS A	4.8	38.3	0.45	0.48	0.45	59.1
<b>SouthWest: Site Access</b>														
1	L2	339	10.0	339	10.0	0.584	11.5	LOS B	6.0	45.7	0.97	1.07	1.24	43.5
31	T1	1	20.0	1	20.0	0.584	11.1	LOS B	6.0	45.7	0.97	1.07	1.24	45.0
3	R2	64	10.0	64	10.0	0.584	17.3	LOS B	6.0	45.7	0.97	1.07	1.24	46.0
Approach		404	10.0	404	10.0	0.584	12.4	LOS B	6.0	45.7	0.97	1.07	1.24	43.9
All Vehicles		1860	13.4	1860	13.4	0.584	8.6	LOS A	6.0	45.7	0.69	0.70	0.74	54.2



# Appendix D – Absolute Minimum Intersection Upgrade at SH24 / Tower Road / Burwood Road Roundabout



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 Version 4.0 - March 2020



**KEY:**

- EXISTING PROPERTY BOUNDARY
- ROAD PAVEMENT
- FOOTPATH
- BERM

NO.	DATE	ISSUE/REVISION DETAIL	BY	CHK	APPR
C	29.06.2022	UPDATED LENGTH OF SPLITTER ISLANDS	SB	CI	CI
B	09.06.2022	ADDED RAISED SAFETY PLATFORMS	LV	CI	CI
A	11.04.2022	FOR PLAN CHANGE APPLICATION	NL	CI	CI

DESIGNED	CHECKED
NL	CI
DRAWN	APPROVED
NL	CI

**bbo**  
 BLOXAM BURNETT & OLLIVER

CLIENT  
**CALCUTTA Veros**

PROJECT  
 CALCUTTA FARMS INDUSTRIAL ZONE PLAN CHANGE

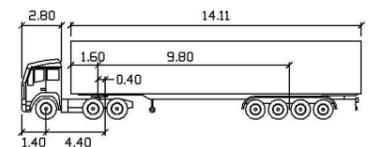
DRAWING  
 SH24 / TOWER ROAD ROUNDABOUT  
 OPTION 4- REQUIRED MINIMUM  
 UPGRADE WITH ADDED TURNING LANES

STATUS  
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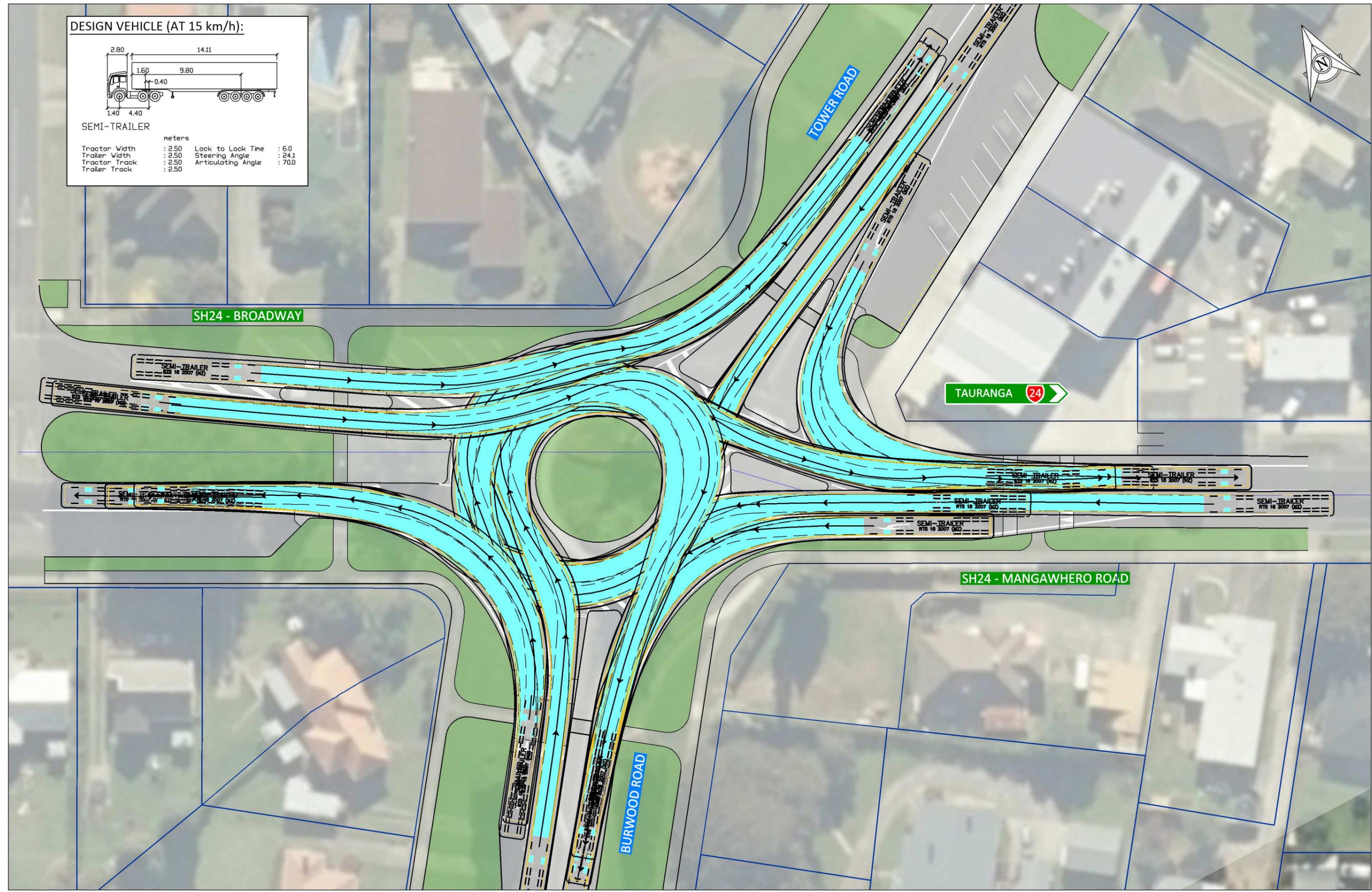
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Version 4.0 - March 2020

**DESIGN VEHICLE (AT 15 km/h):**



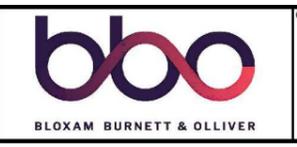
**SEMI-TRAILER**

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Tractor Width	: 2.50
Tractor Track	: 2.50
Tractor Wheelbase	: 4.40
Trailer Width	: 2.50
Trailer Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 24.1
Articulating Angle	: 70.0



NO.	DATE	ISSUE/REVISION DETAIL	BY	CHK	APPR
B	09.06.2022	UPDATED VEHICLE TRACKING	SB	CI	CI
A	11.04.2022	FOR PLAN CHANGE APPLICATION	NL	CI	CI

DESIGNED	CHECKED
NL	CI
DRAWN	APPROVED
NL	CI



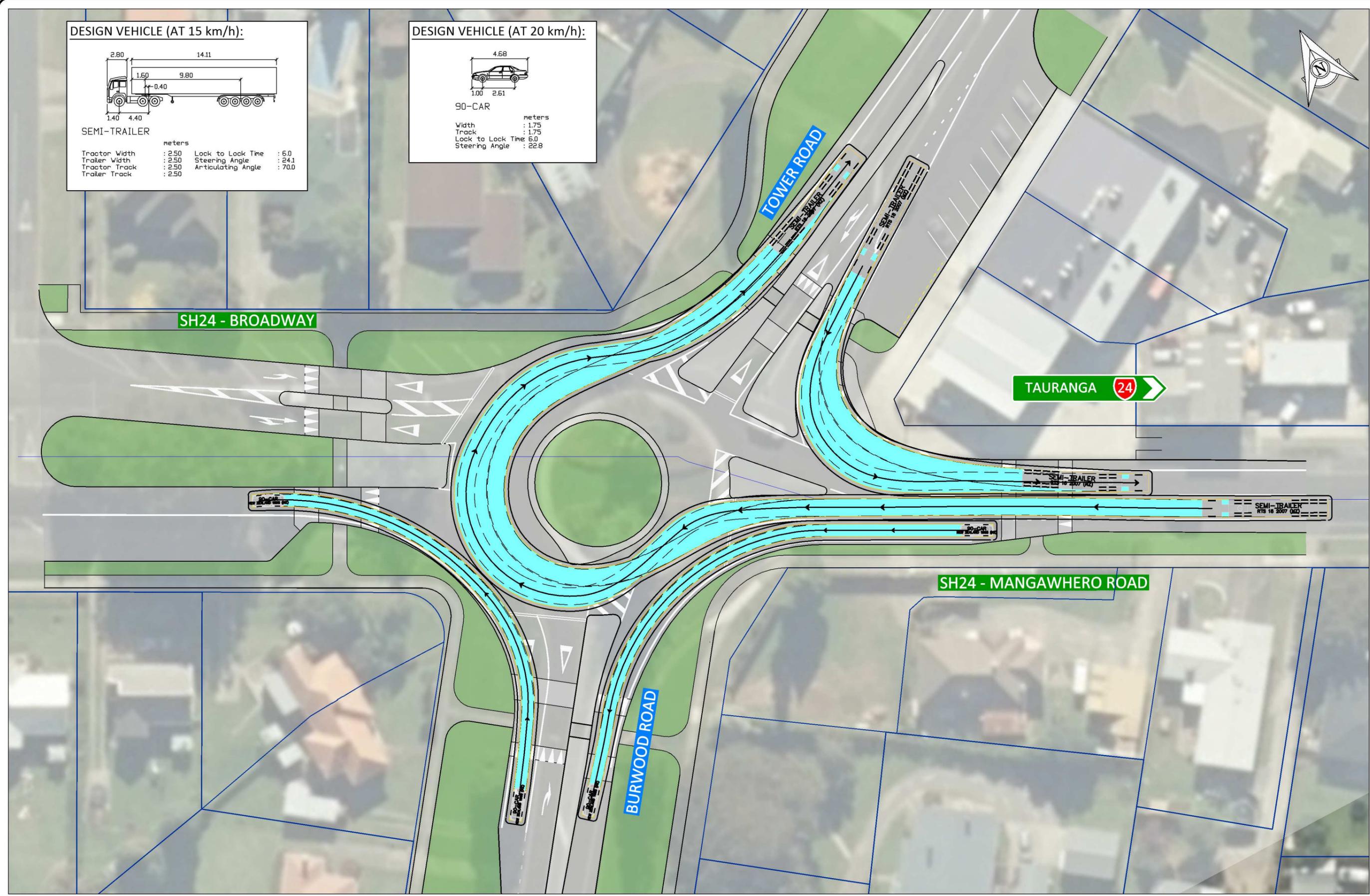
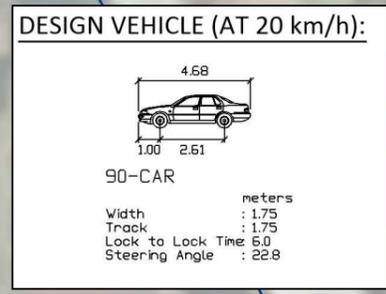
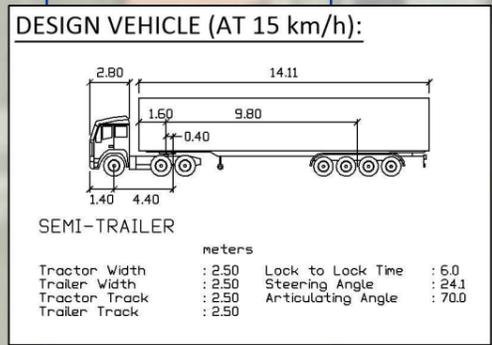
CLIENT  
**CALCUTTA Veros**

PROJECT  
CALCUTTA FARMS  
INDUSTRIAL ZONE PLAN CHANGE

DRAWING  
SH24 / TOWER ROAD ROUNDABOUT  
OPTION 4- SWEEP PATH ANALYSIS  
RTS18 SEMI-TRAILER  
SHEET 1

STATUS	
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11.04.2022	1:500
DRAWING NUMBER	REVISION
146930-02-0235	B

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Version 4.0 - March 2020



DESIGNED	NL	CHECKED	CI
DRAWN	NL	APPROVED	CI
DATE	11.04.2022	ISSUE/REVISION DETAIL	

SB	CI	CI
NL	CI	CI
BY	CHK	APPR



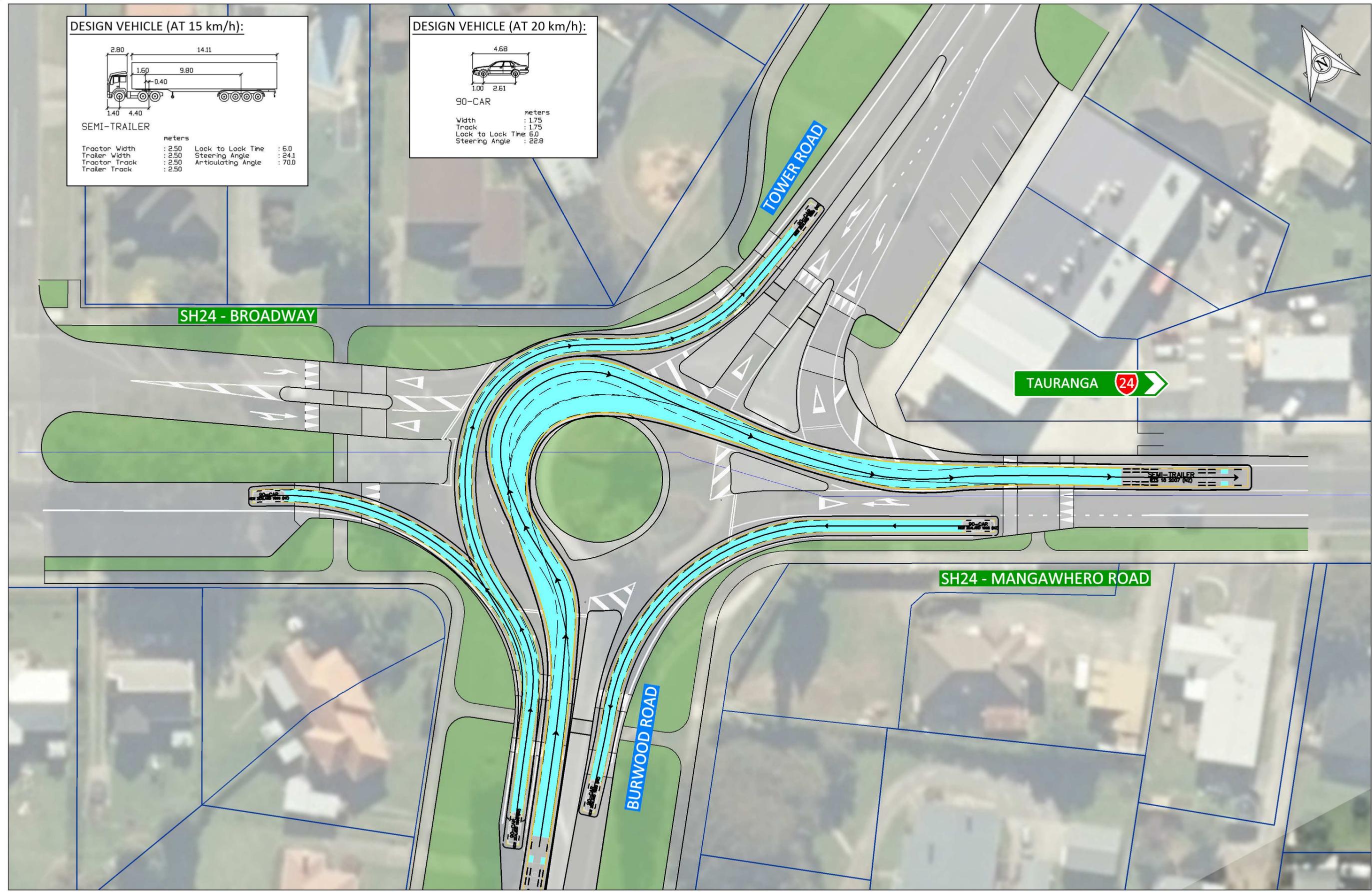
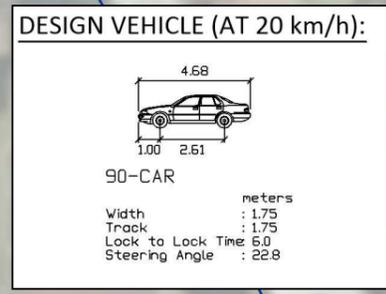
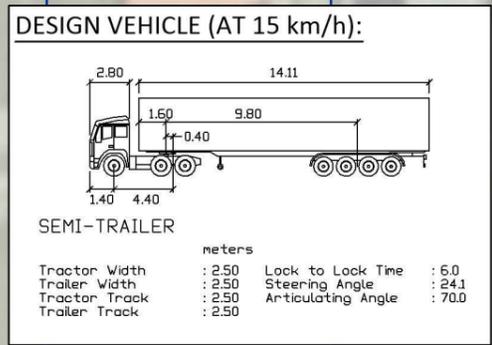
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**CALCUTTA Veros**

PROJECT  
CALCUTTA FARMS INDUSTRIAL ZONE PLAN CHANGE

DRAWING  
SH24 / TOWER ROAD ROUNDABOUT  
OPTION 4- SWEEP PATH ANALYSIS  
RTS18 SEMI-TRAILER AND 90-CAR  
SHEET 2

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 Version 4.0 - March 2020



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DRAWN	NL	APPROVED	CI
DATE	11.04.2022	ISSUE/REVISION DETAIL	
SB	CI	CI	CI
BY	CHK	APPR	

mix model version:		
NL	CI	CI
BY	CHK	APPR



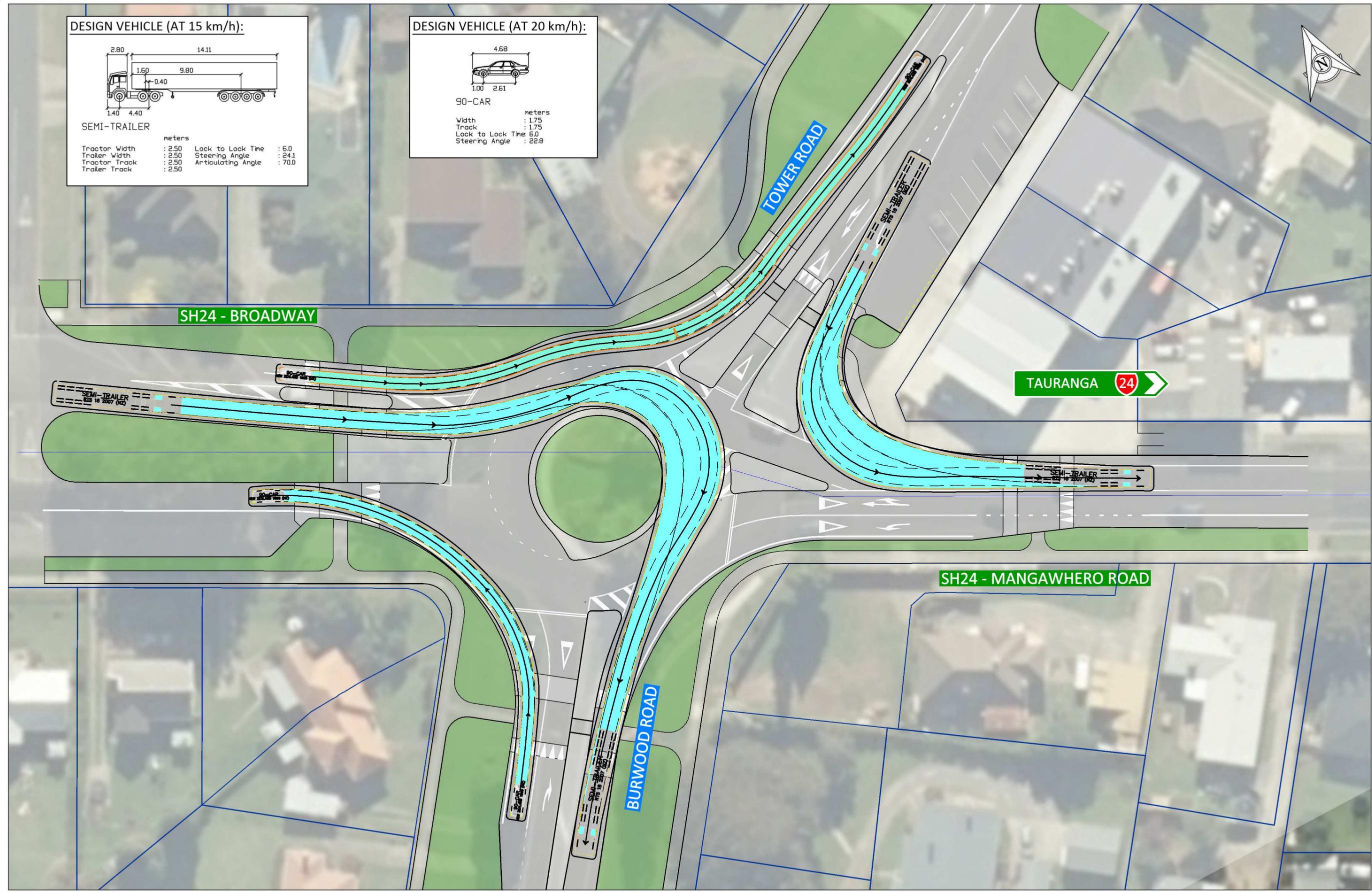
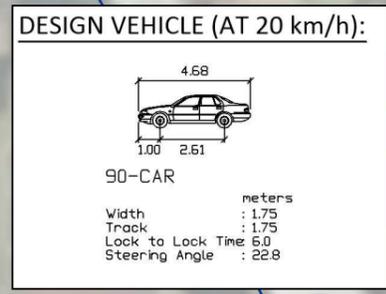
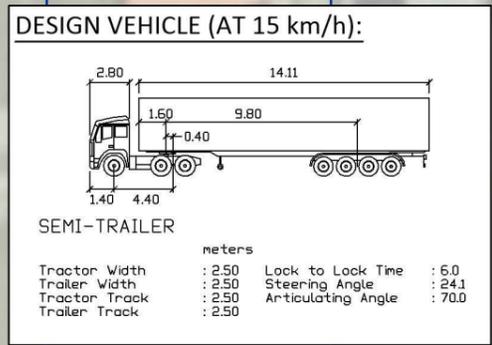
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PROJECT  
**CALCUTTA FARMS INDUSTRIAL ZONE PLAN CHANGE**

DRAWING  
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 OPTION 4- SWEEP PATH ANALYSIS  
 RTS18 SEMI-TRAILER AND 90-CAR  
 SHEET 3**

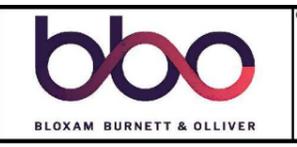
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Version 4.0 - March 2020



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DATE	11.04.2022	ISSUE/REVISION DETAIL	

SB	CI	CI
NL	CI	CI
BY	CHK	APPR



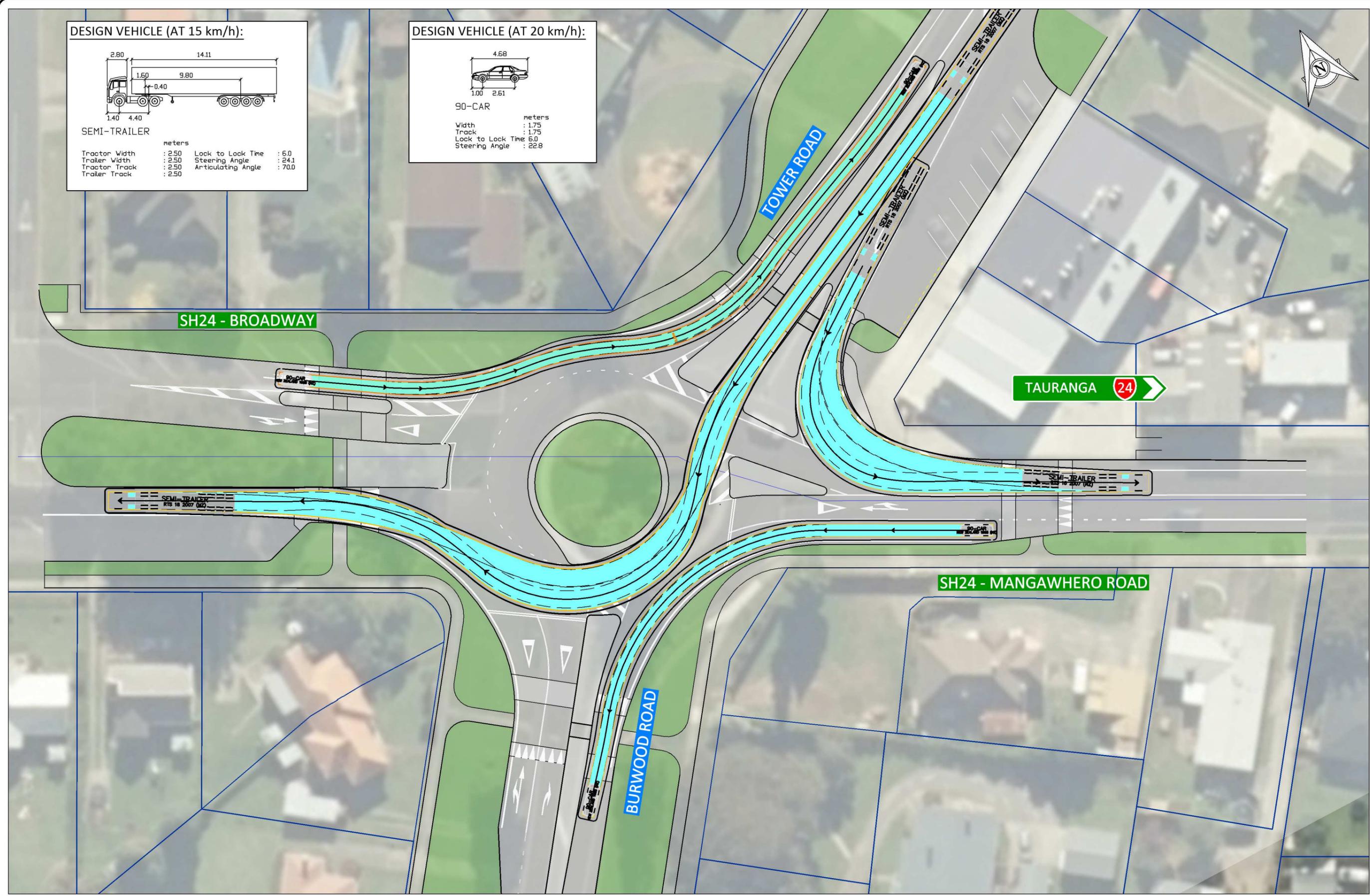
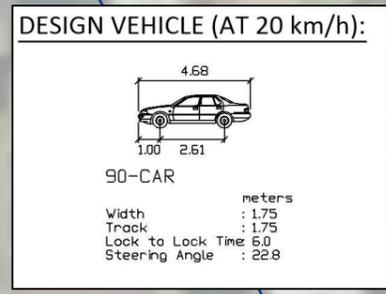
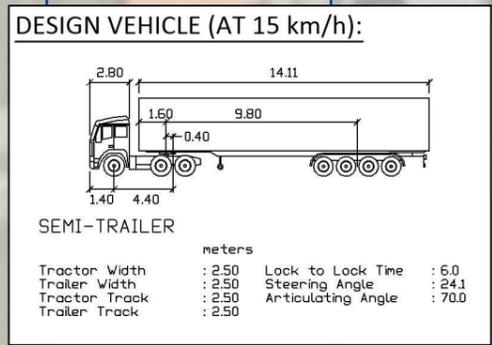
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**CALCUTTA Veros**

PROJECT  
CALCUTTA FARMS INDUSTRIAL ZONE PLAN CHANGE

DRAWING  
SH24 / TOWER ROAD ROUNDABOUT  
OPTION 4- SWEEP PATH ANALYSIS  
RTS18 SEMI-TRAILER AND 90-CAR  
SHEET 4

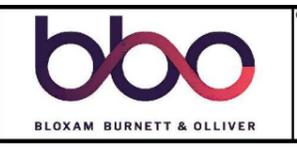
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Version 4.0 - March 2020



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DATE	09.06.2022	ISSUE/REVISION	DETAIL
BY	SB	CHK	APPR

mix model version:	
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CLIENT  
**CALCUTTA Veros**

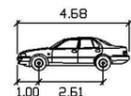
PROJECT  
CALCUTTA FARMS INDUSTRIAL ZONE PLAN CHANGE

DRAWING  
SH24 / TOWER ROAD ROUNDABOUT  
OPTION 4- SWEEP PATH ANALYSIS  
RTS18 SEMI-TRAILER AND 90-CAR  
SHEET 5

STATUS <b>PRELIMINARY</b>	
DATE	11.04.2022
SCALE (ORIGINAL SIZE A3)	1:500
DRAWING NUMBER	146930-02-0239
REVISION	A

100mm  
 SCALE FOR VALIDATING SIZE OF A3 PLOT ONLY  
 0  
 C:\Users\swa\OneDrive - Bloxam Burnett & Olliver\146930-02 - Calcutta Farms\Drawings\146930-02-0240.dwg 29/06/2022 5:26 pm sva Plotted: 29 Jun 2022 5:26 pm  
 Version 4.0 - March 2020

**DESIGN VEHICLE (AT 20 km/h):**



90-CAR  
 meters  
 Width : 1.75  
 Track : 1.75  
 Lock to Lock Time : 6.0  
 Steering Angle : 22.8

EXISTING VEHICLE CROSSING  
 2 TOWER ROAD

TOWER ROAD

SH24 - BROADWAY

TAURANGA 24

SH24 - MANGAWHERO ROAD

EXISTING VEHICLE CROSSING  
 1 BURWOOD ROAD

BURWOOD ROAD

NEW VEHICLE CROSSING  
 2A BURWOOD ROAD



DESIGNED	CHECKED			
NL	CI			
DRAWN	APPROVED			
NL	CI			
DATE	ISSUE/REVISION DETAIL	SB	CI	CI
29.06.2022	FOR PLAN CHANGE APPLICATION			
		BY	CHK	APPR



CLIENT  
 PROJECT  
 CALCUTTA FARMS  
 INDUSTRIAL ZONE PLAN CHANGE

DRAWING  
 SH24 / TOWER ROAD ROUNDABOUT  
 OPTION 4- SWEEP PATH ANALYSIS  
 90-CAR FROM VEHICLE CROSSINGS  
 SHEET 6

STATUS		<b>PRELIMINARY</b>	
DATE	SCALE (ORIGINAL SIZE A3)	REVISION	
29.06.2022	1:500		
DRAWING NUMBER	REVISION		
146930-02-0240	A		

# Appendix E – Consultation with Waka Kotahi and MPDC



# Memo

**To** Waka Kotahi / Matamata – Piako District Council  
**From** Siva Balachandran  
**Date** 8 April 2022  
**Job No.** 146930.02  
**Job name** Calcutta Farms Ltd - Industrial Zone Plan Change  
**Subject** **Responses to Waka Kotahi and MPDC comments on Plan Change**

## 1. Introduction

This memorandum is in response to the comments received from Waka Kotahi (email dated 25 January 2022) and from Matamata – Piako District Council (letter prepared by Gray Matter dated 08 February 2022). The memorandum is meant to be read in conjunction with the updated ITA. My responses to the comments are outlined below.

## 2. Waka Kotahi (WK) Comments

*(a) Further information to further define relative locations of existing and proposed key transportation infrastructure.*

**Response:** The Integrated Transport Assessment (ITA) has been updated to reflect the route positions of existing and proposed key transportation infrastructure. Refer to Section 4.

*(b) Consideration should be given to seasonal correction factors to determine whether the turning count information is likely to be representative of annual average movements at the locations surveyed.*

**Response:** To determine an appropriate factor to apply to the April 2021 turning counts at the surveyed site, traffic counts from the Kaimai telemetry site on SH29 to the east of Matamata has been assessed. While this telemetry site is not close to the surveyed sites (i.e. approximately 26 km to the east), it is considered to be the closest information available to Matamata. The Kaimai telemetry site indicates a seasonal factor of 1.04 during the survey dates. This is less than 5% change to the surveyed turning movement counts presented in the ITA.

NZ Transport Agency research report 453 – Trips and parking related to land use November 2011 (Report 453) classifies the survey locations as Group 2 (suburban areas and provincial centres) which are sites on the periphery or within the urban areas of main and provincial centres where low to moderate effects of holiday traffic activity can be discerned. Table B.2 of Report 453 states that the scale factor to obtain annual average week turning movements is approximately 0.98 to 0.99 during the middle of April.

Moreover, the trip generation predicted for the permitted activities (as shown in Table 3 in the ITA) are considered to be on the conservative side. Therefore, I conclude that the turning movement counts surveyed



on-site are representative of annual average movements and the modelling undertaken as part of the ITA does present the worst-case scenarios (more conservative).

- (c) *Compared with ITE Trip Generation Manual figures, the 60% entry / 40% exit during the AM peak appears unlikely. Similarly, compared with ITE Trip Generation Manual figures, the 30% entry / 70% exit during the PM peak appears unlikely.*

**Response:** The entry and exit ratios adopted in the ITA are representative of the Rockford Street industrial site based on surveyed turning movement counts at the Waihou Street, Garland Street and Rockford Street intersections during peak periods. Therefore, I believe the entry and exit ratios are appropriate for the Plan Change site as the activities are expected to be similar in nature to that from Rockford Street industrial area.

The following ratios were obtained from the ITE Trip Generation Manual:

- Industrial Park (a mix of manufacturing, service and warehouse facilities)
  - o 86% entry / 14% exit during AM peak period
  - o 20% entry / 80% exit during PM peak period

Sensitivity testing could be undertaken. However, in my opinion, the modelling results will not be affected significantly as the access roundabout is performing at LOS A in the “Baseline 2031 + Proposed Rezoning” scenario while the SH24 / Tower Road roundabout is already performing at capacity (LOS F). Therefore, any sensitivity tests will still result in the same outcome with an upgrade required at the SH24 / Tower Road roundabout.

- (d) *The roundabout has been located to enable upgrading to a four-leg roundabout in the future. Please advise if the concept design can accommodate the fourth leg without rebuilding the roundabout. We consider it preferable for the midpoint of the central island to be aligned with the centre-line of SH24. A single circulating lane is proposed for the site entry roundabout, along with single entry and exit lanes. It would be useful to know whether the road reserve designations proposed as part of the roundabout design are such that additional entry, exit, and / or circulating lanes could be readily established in the event that additional capacity is needed at the roundabout.*

**Response:** As stated in the ITA, the position of the roundabout is proposed with a bias towards the plan change site boundary. This is to avoid encroaching into the 12 ha industrial block of land on the opposite side. However, the roundabout is located to enable upgrading to a four-leg roundabout in future should development occur on the block of land opposite. If development of that land was confirmed in the short term as likely to occur, the roundabout could be designed to be located centrally on SH24 to assist with better integration with the MPDC owned land. A concept plan is currently being prepared to illustrate a four-leg roundabout on SH24 with the intent to future proof the access arrangement and understand and its effects on Calcutta Farm’s and the neighbouring land.

The road reserve designations shown in the concept plan only accommodate a single entry, exit and circulating lane. The modelling undertaken for the new SH24 access roundabout indicate that the roundabout performs at LOS A in the “Baseline 2031 + Proposed Rezoning” scenario. Therefore, I conclude that a single lane roundabout is sufficient to accommodate the future traffic volumes identified in the ITA and also has spare practical capacity to accommodate any developments that have not been accounted for in the ITA (i.e. not consented / permitted).

- (e) *It is agreed that a 100 km/h speed limit is unlikely to be the safe and appropriate speed for SH24 once the development is established. However, we question whether 50 km/h as described in the ITA is the appropriate speed limit. The proposal for the speed limit location to be relocated 325 m south-east of the proposed SH24 roundabout, would extend the 50 km/h speed limit by 1.53 km from its present location at O/1.55 to the 325 m location at RP O/3.08. While the large trees along the southern (true right-hand) side of SH 24 support an argument for a speed limit less than 100 km/h, it seems unlikely*



*that a 50 km/h speed limit would be regarded as appropriate by road users. While we haven't completed any analysis, it may be that the speed limit is reduced to 80 km/h in the interim and to 60 km/h once there has been further and relatively extensive development along both sides of the corridor. In any case, the basis on which the 325 m location has been determined is not clear.*

**Response:** Following my meeting with WK and MPDC on 16 March 2022, it was understood that the speed review process of SH24 has not concluded however it was likely that the current posted speed limit of 100 km/h be reduced to 80 km/h in the interim stage and to 60 km/h once there has been further development along the state highway corridor. Based on this discussion, the ITA has been updated with the following changes:

- The posted speed limit along the site frontage is proposed to be changed from the existing 100 km/h to 80 km/h if the rezoning is approved.
- A speed threshold treatment with new gated speed limit signs is proposed approximately 360 m south-east of the proposed SH24 roundabout at RP 0 / 3.107 as illustrated in Drawing 146930-02-0221. The location of the speed threshold treatment is indicative, however it achieves a stopping sight distance of 225 m for a truck (i.e. 110 km/h operating speed) from the left turn bend southeast of the plan change site. Although, it is unlikely that trucks are operating at 110 km/h along this section, the location is based on a worst-case scenario. As mentioned, the location of the speed threshold is indicative, and the design and location of the speed threshold can be confirmed during detailed design.
- A pedestrian refuge island is proposed along the flush median on SH24 instead of a raised safety platform zebra crossing that was previously proposed by BBO. WK had confirmed that a zebra crossing was not warranted in this location considering that speed limit is likely to be 80 km/h along this section instead of 50 km/h. BBO had highlighted that the introduction of a pedestrian refuge island would mean that cyclists travelling eastbound will have to cross SH24 closer to the new access roundabout and WK confirmed that the arrangement was acceptable considering the fact that there are no dedicated crossing facilities for cyclists currently on SH24. There is insufficient median width to introduce a staggered crossing.
- The design speed for the SH24 access roundabout is maintained at 80 km/h and is considered acceptable considering that the operating speed along this section of SH24 will reduce to between 50 km/h and 60 km/h when the roundabout is introduced. However, the design of the roundabout may need to be reviewed once there has been confirmation from WK as to what the speed limit on SH24 will be changed to.

*(f) While the ITA appears to be reliant on reduced speed limits on SH24 to meet criteria described by the PPM, I do not consider the comparison to the separation between Garland and Rockford to be appropriate given that Garland is closer to the urban centre of Matamata and the spacing between Garland and Rockford (345 m) is slightly greater than the spacing between Rockford and the proposed roundabout (325 m).*

**Response:** The SH24 access roundabout achieves a separation distance of approximately 290 m to SH24 / Rockford Street T-intersection from the centre of the roundabout. While I do agree that the spacing between Garland Street intersection and Rockford Street intersection is greater than what is achieved between Rockford Street intersection and the new access roundabout, the introduction of a roundabout access to the subject site will reduce the operating speed along the site frontage to between 50 km/h and 60 km/h. Therefore, the operating speed along the site frontage is expected to be similar or slightly less than that along the section between Garland Street and Rockford Street. Hence, I do still maintain my conclusion that the shortfall in separation distance is not considered critical at this location.

*(g) From a state highway perspective, we consider it unlikely the internal transport network will have a significant impact on SH24 provided the internal roads proposed promote movement on local roads rather than forcing or strongly encouraging movements that could be on local roads on to the state*



highway network. In that regard, it would be useful for you to provide more clarity as to the intended configuration of the road network within the overall Calcutta site (though recognise this may be outside the scope of this plan change).

**Response:** Please refer to Figure 13 in the ITA which illustrates an indicative internal road network. Please note this figure will have to be updated following the outcome of this Plan Change.

(h) *While it is accepted there is likely to be less demand for walking and / or cycling to the east of the site access, it is unclear how cyclists will be accommodated to the east of the roundabout. A 1.5 m wide footpath is proposed, which implies that cyclists are expected to travel on road along SH24 where operating speeds are likely to be highest. We have concerns regarding the proposed zebra crossing on a raised safety platform to the west of the site access. I agree that a raised safety platform should reduce vehicle operating speeds, however, I question the appropriateness of the solution for the state highway. Please consider a pedestrian/median refuge instead.*

**Response:** The introduction of the speed threshold treatment as well as the new access roundabout will reduce the operating speed along the site frontage. Cyclists travelling westbound will utilize the new off and on cycle ramps and crossing points closer to the roundabout to manoeuvre through the roundabout. This arrangement is the same for eastbound cyclists for which the safety risk was accepted by WK safety engineer (refer to response to item (e)). As for the proposed crossing facility to the west of the site access, please refer to response to item (e).

(i) *As noted above, I agree with the use of a 15.4 trip rate for industrial development, but question the applicability of the 12.5 trip rate to which reference is made.*

**Response:** The intersection count surveys that were undertaken were used to determine the trip generation rate of the Rockford Street industrial area. The surveyed industrial trip rate was calculated to be 11.0 trips per developable hectare and 12.5 trips per developable hectare during the morning and evening peak periods respectively.

However, this has not been applied to the Plan Change area. Instead, a higher trip generation rate of 15.4 trips per gross hectare per peak hour has been adopted for this assessment to provide a degree of confidence to the forecasting and less need to rely on trip-based monitoring for the site.

The 12.5 trips per developable hectare was only used for the remaining undeveloped lots within the Rockford Street industrial area which I consider appropriate as it represents the current nature of activities within the industrial area.

(j) *The basis on which baseline traffic associated with permitted development has been added to existing traffic volumes is not clear, therefore, it is difficult to determine whether the modelling results are likely to be indicative of the future performance of features of the transport network.*

**Response:** Figures 18 and 19 of the updated ITA illustrate the basis on which the baseline traffic associated with permitted development has been added to the existing traffic volumes.

(k) *Based on the existing configuration of the Tower Road approach to the roundabout illustrated in Figure 21, we consider that the approach would operate as a continuous lane and a short left turn lane rather than as a single lane as illustrated.*

**Response:** Modelling has been updated. It is to be noted that there was negligible difference in the modelling outcome.



- (l) *Figure 22 illustrates a redesigned roundabout with a smaller central island and more approach lanes. Comparing the existing roundabout with boundary locations, it appears that the boundaries to the north and south of the roundabout (between SH24 and Tower Road, and SH24 and Burwood Road respectively) are very close to the roundabout. Therefore, the question arises as to whether the configuration illustrated in Figure 22 can be constructed. It is not clear how pedestrians and cyclists would be accommodated at the reconfigured roundabout illustrated in Figure 22.*

**Response:** Drawing 146930-02-0234 illustrates the feasibility of upgrading the SH24 / Tower Road / Burwood Road roundabout without encroaching into neighbouring properties. The proposed upgrade design was to mitigate the capacity issue of the roundabout. As for pedestrians and cyclists, typical kerb cut-down crossing points at the roundabout splitter islands will be provided which is an improvement to the existing arrangement where kerb cut-down crossing is only provided at the Burwood Road approach. A raised safety platform is also provided along the Mangawhero Road (SH24) approach such that vehicle speeds would be sufficiently low to achieve a safe system crossing point. There is an opportunity to provide safer crossing facilities such as raised safety platforms on other approaches. However, the cost of these improvements is to be shared equally within all affected parties (i.e. Waka Kotahi, MPDC and Calcutta Farms).

- (m) *The site access roundabout is illustrated as having a 44 m diameter central island (Figure 25) and, as noted previously, a proposed speed limit of 50 km/h. The Tower Road roundabout, which is within a 50 km/h speed limit area, is illustrated (Figure 21) as having an existing central island diameter of 28 m, which the Applicant proposes to reduce to 20 m (Figure 22). The ITA does not appear to explain why it is acceptable for one roundabout to have a 44 m diameter, but another where traffic volumes are higher to have a 20 m diameter. It would be useful for the ITA to include discussion regarding these differences.*

**Response:** The proposed access roundabout was designed based on a design speed of 80 km/h as requested by WK during the initial consultation and this aligns with the new recommended speed limit of 80 km/h. The posted speed limit at SH24 / Tower Road / Burwood Road roundabout is 50 km/h. Based on *Austrroads Guide to Road Design Part 4B: Roundabouts*, the minimum central island radius of a two-lane roundabout at 50 km/h and 80 km/h speed environments are 8 m and 20 m respectively.

- (n) *Reference is made to "a safe and efficient access solution.", however, this appears to be reliant on reducing the speed limit on SH24 to a level that may be lower than is safe and appropriate.*

**Response:** The posted speed limit is now proposed to be 80 km/h. The access roundabout on SH24 is considered to provide a safe and efficient access solution to the Plan Change site for the following reasons:

- The roundabout is an ideal configuration for the future semi-urban environment as the design is intended to significantly reduce vehicle operating speeds on the approaches to the intersection;
- In addition to reducing vehicle speeds, the configuration reduces the likelihood and severity of crashes by minimising T-bone and preventing head-on type collisions; and
- The configuration minimises vehicle delays, especially for vehicles entering / exiting the proposed industrial development.

### 3. Matamata – Piako District Council (MPDC) Comments

- (o) *Provide an assessment of safety effects from the proposed changes at the SH24/ Broadway/ Tower Road roundabout.*

**Response:** As mentioned in item (l), the purpose of the proposed upgrade to SH24 / Tower Road / Burwood Road roundabout is to mitigate the capacity concern and accommodate the trips generated by the proposed rezoning. As for pedestrians and cyclists, typical kerb cut-down crossing points at the roundabout splitter islands will be provided which is an improvement to the existing arrangement where kerb cut-down crossing



is only provided at the Burwood Road approach. A raised safety platform is also provided along the Mangawhero Road (SH24) approach such that vehicle speeds would be sufficiently low to achieve a safe system crossing point. There is an opportunity to provide safer crossing facilities such as raised safety platforms on other approaches. However, the cost of these improvements is to be shared equally within all affected parties (i.e. Waka Kotahi, MPDC and Calcutta Farms).

*(p) Provide assessment of impact on manoeuvring at the Tower Road angle car parks*

**Response:** The Tower Road angle car parks will remain as per existing. There will be no reduction in supply and there will be sufficient manoeuvring width. However, due to the introduction of the additional left turn lane on Tower Road, vehicles exiting the car park spaces to head south or west will have a relatively short distance to weave across the left turn lane in order to merge with the through / right turning traffic on Tower Road. The safety risk is considered acceptable as the speed approaching the roundabout is expected to be relatively low (30 km/h to 40 km/h). A solution to this weaving issue would be to shift the taper of the left turn lane further north and hence provide more storage area. This would provide the vehicles a longer distance to cut across the left turn lane and merge with the through / right turning traffic on Tower Road as well as provide an increased stopping sight distance for vehicles travelling south. This can be addressed during detailed design.

*(q) Confirm property impact at 1A Mangawhero Road and if confirm if acquisition has been agreed with the owner.*

**Response:** Drawing 146930-02-0234 illustrates the feasibility of upgrading the SH24 / Tower Road / Burwood Road roundabout without encroaching into neighbouring properties.

*(r) Provide vehicle tracking for movements at the SH24/Broadway/Tower Road roundabout for all options.*

**Response:** Please refer to Appendix D of the updated ITA.

*(s) Review the proposed local road cross-section to remove the flush median and provided dedicated parking lanes on both sides of the road.*

**Response:** The ITA has been updated to reflect the revised cross section. Refer to Figure 15.

*(t) Confirm whether the proposed overland flow paths will provide facilities to support walking and cycling.*

**Response:** There is also an opportunity to provide walking and cycling facilities along the overland flow paths, however, the exact location and design for them will be confirmed at the time of subdivision.

*(u) Confirm whether the path in the eastern stormwater swale is to be 1.5m or 3m wide.*

**Response:** A 3 m wide shared path is proposed along the frontage of the site to the west of the new roundabout access and a 1.5 m wide footpath is also proposed along the frontage of the site to the east of the new roundabout access. Paths along the stormwater swale around the site are proposed to be 3 m wide shared paths.

*(v) Provide evidence of consultation with Waka Kotahi regarding vesting of land west of the site to provide the proposed shared path.*

**Response:** Proposed shared paths west of the site up to the pedestrian refuge island runs through the adjacent property also owned by Calcutta Farms. Therefore, the 10m landscape buffer can continue onto the



adjacent land and be maintained by Calcutta Farms. They need not be vested with WK and hence no consultation on this matter is required. Path may need to be protected via easement in the future if the land is not vested as part of the roundabout works.

*(w) Provide evidence of consultation with WRC related to PT access to the proposed development and preferred locations for future bus stops.*

**Response:** BBO had consulted with WRC on the wider plan change previously and PT was not raised as a concern. However, consultation with WRC will be undertaken again to confirm if the proposed changes to PT routes are supported by WRC. The ITA will be updated accordingly once we have received a response from WRC.

*(x) Confirm how maintenance vehicle access will be provided to the stormwater devices shown on the DAP. (More detail may be provided in the stormwater assessment, but we have not reviewed that information)*

**Response:** This is a detailed design matter that will be addressed at the time of subdivision / design of the infrastructure. The DAP just provides the general location / arrangement at this time.

*(y) Plan Change alignment with National Road to Zero strategy for 2020 - 2030 to be included.*

**Responses:** Please refer to Sections 8.5 and 8.6.

Yours sincerely

**Bloxam Burnett & Olliver**

**Siva Balachandran**

**Traffic & Transportation Engineer**

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Calcutta Plan Change - Further Information Response

23/05/2022

Gray Matter Letter dated 8 February 2022		Memo dated 8 April 2022	Gray Matter Response 23-05-22	
Information Request	Reason for requiring further information	BBO Response	Comments	Action/Recommendation
Provide an assessment of safety effects from the proposed changes at the SH24/ Broadway/ Tower Road roundabout.	Dual lane roundabouts can be challenging for pedestrians and cyclists and no specific consideration of these users has been provided. Reducing the central island could also result in higher circulating speeds at the roundabout.	As mentioned in item (l), the purpose of the proposed upgrade to SH24 / Tower Road / Burwood Road roundabout is to mitigate the capacity concern and accommodate the trips generated by the proposed rezoning. As for pedestrians and cyclists, typical kerb cut-down crossing points at the roundabout splitter islands will be provided which is an improvement to the existing arrangement where kerb cut-down crossing is only provided at the Burwood Road approach. A raised safety platform is also provided along the Mangawhero Road (SH24) approach such that vehicle speeds would be sufficiently low to achieve a safe system crossing point. There is an opportunity to provide safer crossing facilities such as raised safety platforms on other approaches. However, the cost of these improvements is to be shared equally within all affected parties (i.e. Waka Kotahi, MPDC and Calcutta Farms).	<b>Not satisfied</b> A detailed assessment of safety effects have not been provided. The response comments on the purpose of mitigating capacity issues at the roundabout as a result of the plan change. However, reducing the central island may result in faster circulating speed at the roundabout. The central island location has shifted which may make some of the entry paths faster. It is also unclear if minimum entry path and sight distance checks have been completed.  The proposed pedestrian refuge island arrangement on SH24 (Mangawhero) may be confusing for approaching drivers. An RSP appears to be a better option as it would manage speeds and would also result in a less confusing layout.	<b>Update drawings</b> Provide evidence of compliance with minimum entry path requirements and sight distance requirements at the roundabout. Assess the effects of faster circulating speeds at the roundabout and confirm if mitigation is required. An RSP on the approaches may assist with approach speeds and provide safer crossing points for pedestrians. Summary of key roundabout design elements to consider: - Entry and circulating speeds in particular on the Tower Road approach - Pedestrian crossing on SH24 (Broadway). RSPs are preferred. - Speed management on Tower Road northeast of the on-street angle parking spaces to minimise the risk of rear end or side on crashes within the left turn lane. - Ensure path extends to RSP on SH 24 (Mangawhero) - Revise swept paths (see swept path query below)
Provide assessment of impact on manoeuvring at the Tower Road angle car parks	Effects on parking supply and adjacent landowners needs to be understood	The Tower Road angle car parks will remain as per existing. There will be no reduction in supply and there will be sufficient manoeuvring width. However, due to the introduction of the additional left turn lane on Tower Road, vehicles exiting the car park spaces to head south or west will have a relatively short distance to weave across the left turn lane in order to merge with the through / right turning traffic on Tower Road. The safety risk is considered acceptable as the speed approaching the roundabout is expected to be relatively low (30 km/h to 40 km/h ). A solution to this weaving issue would be to shift the taper of the left turn lane further north and hence provide more storage area. This would provide the vehicles a longer distance to cut across the left turn lane and merge with the through / right turning traffic on Tower Road as well as provide an increased stopping sight distance for vehicles travelling south. This can be addressed during detailed design .	<b>Not satisfied</b> The response provides commentary on vehicles weaving. However, there is also a risk that vehicles will encroach into the left turn lane while reversing out of the on street parking spaces. There appears to be sufficient manoeuvring space within the existing shoulder to reverse out of the parking spaces and enter the lane in a forward facing direction. However, it appears that the shoulder width will be reduced to accommodate the new left turn lane resulting in vehicles reversing into the live lane.	<b>Update drawings</b> The layout may result in an increased crash risk at the on-street parking spaces. No mitigation has been recommended in the ITA. We recommend that further assessment is completed and recommendations for mitigation are provided to minimise the risk of crashes on Tower Road. A speed threshold (e.g. RSP) northeast of the on-street parking spaces would assist with controlling speeds on the approach and minimise the risk of rear end/side-on crashes. It would also provide a crossing point further from the roundabout which should be easier for pedestrians to use when travelling to/from the north along Tower Road.
Confirm property impact at 1A Mangawhero Road and if confirm if acquisition has been agreed with the owner.	Effects on adjacent landowners needs to be understood	Drawing 146930-02-0234 illustrates the feasibility of upgrading the SH24 / Tower Road / Burwood Road roundabout without encroaching into neighbouring properties.	<b>Satisfied in part</b> roundabout design has been updated to allow for all works within the road reserve. However, there may be other implication to the roundabout i.e. minimum entry path requirements not complying (refer items above)	<b>Update drawings</b> Although no land is required there are some concerns with the roundabout design which need to be addressed. Refer Items above.
Provide vehicle tracking for movements at the SH24/Broadway/Tower Road roundabout for all options.	Unclear if vehicles can simultaneously complete manoeuvres at the roundabout.	Please refer to Appendix D of the updated ITA.	<b>Satisfied in part</b> Vehicle tracking has been provided. The vehicle tracking indicates that if a semi-trailer is right turning from SH24 to Tower Road a vehicle travelling through from Burwood Road to Tower Road will be unable to complete the movement simultaneously. The Tower Road exit leg cannot accommodate simultaneous exits as it is only single lane.	<b>Update drawings</b> to ensure that where simultaneous movements are possible at the roundabout that these can be accommodated.
Review the proposed local road cross-section to remove the flush median and provided dedicated parking lanes on both sides of the road.	The purpose of a flush median on a local road is unclear. Cross-section should maximise potential for future on-street parking.	The ITA has been updated to reflect the revised cross section. Refer to Figure 15.	<b>Satisfied</b> ITA has been updated which indicates that the local road cross section no longer includes a flush median and parking is provided on both sides of the road.	No further action required
Confirm whether the proposed overland flow paths will provide facilities to support walking and cycling.	Access to and connectivity within the area would be enhanced if these overland flow paths also include facilities to support walking and cycling.	There is also an opportunity to provide walking and cycling facilities along the overland flow paths, however, the exact location and design for them will be confirmed at the time of subdivision.	<b>Not satisfied</b> The response identifies that there is an opportunity. However, the exact location of any walking and cycling paths within the overland flow paths will be provided at the time of subdivision.	It would be prudent to identify walking and cycling connections at plan change stage to better understand how pedestrian and cycling connectivity will be provided. This could potentially be addressed through the plan provisions, e.g. assessment criteria or rules requiring public walking access along these connections
Confirm whether the path in the eastern stormwater swale is to be 1.5m or 3m wide.	The width of the path within the swale is described as both 1.5m and 3m wide.	A 3 m wide shared path is proposed along the frontage of the site to the west of the new roundabout access and a 1.5 m wide footpath is also proposed along the frontage of the site to the east of the new roundabout access. Paths along the stormwater swale around the site are proposed to be 3 m wide shared paths.	<b>Satisfied</b>	No further action required
Provide evidence of consultation with Waka Kotahi regarding vesting of land east of the site to provide the proposed shared path.	Consultation is required to confirm whether the proposed shared path and vesting of land are supported by Waka Kotahi.	Proposed shared paths west of the site up to the pedestrian refuge island runs through the adjacent property also owned by Calcutta Farms. Therefore, the 10m landscape buffer can continue onto the adjacent land and be maintained by Calcutta Farms. They need not be vested with WK and hence no consultation on this matter is required. Path may need to be protected via easement in the future if the land is not vested as part of the roundabout works.	<b>MPDC to confirm</b> No consultation has been completed with Waka Kotahi regarding vesting. The response states that Calcutta will maintain this land and that the path may need to be protected via an easement if the land is not vested to MPDC as part of the roundabout works.	MPDC to confirm if they are happy with this arrangement, as there are potential maintenance cost implications for MPDC.
Provide evidence of consultation with WRC related to PT access to the proposed development and preferred locations for future bus stops.	Consultation is required to confirm whether the anticipated changes to public transport routes are supported by WRC	BBO had consulted with WRC on the wider plan change previously and PT was not raised as a concern. However, consultation with WRC will be undertaken again to confirm if the proposed changes to PT routes are supported by WRC. The ITA will be updated accordingly once we have received a response from WRC.	<b>Not satisfied</b> The ITA does not provide any confirmation of consultation with WRC regarding future public transport connections. The Memo (BBO, 8 April 2022) states that WRC consultation will be undertaken and the ITA will be updated once BBO have received a response.	BBO to update ITA once WRC response has been received
Confirm how maintenance vehicle access will be provided to the stormwater devices shown on the DAP. (More detail may be provided in the stormwater assessment, but we have not reviewed that information)	The stormwater devices are remote from the proposed road network, and it is unclear how the RITS requirements will be achieved.	This is a detailed design matter that will be addressed at the time of subdivision / design of the infrastructure. The DAP just provides the general location / arrangement at this time.	<b>Not satisfied - to be addressed at detail design</b> The response does not address issues relating to safety between maintenance vehicles and pedestrians using the same path. This can be addressed at detailed design stage.	Safety between pedestrians and maintenance vehicles using the path will need to be addressed at detailed design stage.
Plan change alignment with National Road to Zero strategy for 202-2030		Please refer to Sections 8.5 and 8.6.	<b>Satisfied</b>	No further action required