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MEMO

DATE	30/04/2024
TO	Jason O'Dea jason.o'dea@waipadc.govt.nz
FROM	Wendy Chan wendy.chan@safesystemsolutions.co.nz 021 197 6802
RE	Waipa DC – Shared Path Walking and Cycling
PURPOSE	Safety and Design Review

BACKGROUND

The project is located at the Shakespeare Street and Cook Street roundabout in Leamington, Cambridge. There is high demand for crossing at the existing crossings, as this location serves as a major connection to residential neighbourhoods, nearby shops, and recreation reserves. The community has expressed interest in creating a safer crossing at this location. Plans are in place to upgrade this roundabout into a signalised intersection with safe active mode connections. However, in the interim, prior to future development, there is a short-term goal to enhance safety in a cost-effective manner, while ensuring that these improvements are taken into consideration for future development.

The proposed interim design aims to calm traffic speeds at the roundabout by increasing deflection and enhancing the visibility of the crossing. Additional measures include further calming traffic at the crossing point and providing adequate refuge space at the traffic medians for cyclists and pedestrians, which is currently lacking, particularly for cyclists, as it forces them to encroach into traffic lanes. These changes are designed to improve safety without compromising the potential for future comprehensive redesign efforts.

ASSESSMENTS

EXISTING TRANSPORT DATA

- ONF[1] –
  - Shakespeare Street – Urban Connectors (main connection between suburbs)
  - Cook Street – Activity Streets (shops, restaurants and recreation reserve,)
- Vehicles[2] AADT: Shakespeare Street – 13,000 veh/day (7.6% HCVs), Cook Street – 9,388 veh/day (11% HCVs)
- Public Transport:
  - Shakespeare Street is a bus route for route #20, with a frequency of one bus per hour per direction
  - Cook Street is a 'Hail2Ride'bus route

SPEED ENVIRONMENT

- Posted speed: 50 km/h
- Operating mean speed: Shakespeare Street – 46 km/h, Cook Street – 42 km/h

DESIGN IMPROVEMENTS

The proposed design has included the following upgrade to the roundabout:

- Widening of roundabout apron to improve horizontal deflection and reduce circulating speed

[1] One Network Framework (ONF) based on NZTA MegaMaps
[2] Vehicle volume based on NZTA MobileRoads estimated on 26/06/2023

- Implementing 'Keep Clear' marking to prevent vehicles queuing across entry lanes
- Kerb buildout at the northwestern corner to reduce vehicle turning speed
- Staggered raised courtesy crossings at the northern approach with traffic island, footpath realignment and tactile pavers to reduce approaching speed as well as to enhance crossing distance for both pedestrians and cyclists.
- Footpath widening to 2.5 m to better accommodate the shared use between path users
- Shared path marking and signages to highlight the potential shared use between path users

The design drawing is attached in Appendix A

SITE OBSERVATIONS

The design review team undertook a site walkover on a fine day, 24th April 2024, at 2:00 PM. The site visit photos are included in Appendix B, and below is a brief summary of the findings from the site visit:

- The existing footpath on Cook Street is narrowed and has been observed to be shared by both pedestrians and cyclists
- Number of high use driveways located on Cook Street near the roundabout
- Large volume of heavy commercial vehicles including truck and trailers (T&T) were observed
- The existing crossing points generally have clear visibilities
- There was skid marking on the front berm area of northwestern corner of the roundabout
- Existing pavement condition is poor at the roundabout with rutting, cracking, and flushing, especially under the wheel paths
- The kerbside area for the straight through southbound movement within the roundabout circulating is unused by any vehicle types
- Buses were observed using the round
- Vehicles were travelling without slowing down

DESIGN ASSUMPTIONS

The following design assumptions have been made during the review of the design:

- Design vehicle – 22 m T&T and 19.45 m semi-trailer
- Design speed – 30 km/h

DESIGN ASSESSMENTS

SPEED CHECKS

Design

Design has proposed kerb buildout at the northwestern corner of the roundabout, staggered raised courtesy crossings at the northern approach and increased the radius of the concrete apron in attempt to reduce the speed.

Review Comments

The reviewer has undertaken 85th percentile car and 6 m van tracking through the designed roundabout; the speeds of these vehicles can exceed 50 km/h.

The design, which includes kerb buildouts at the northwestern corner and an increased apron at the roundabout, has not yet achieved the intended speed reduction for smaller vehicles. Refer to Appendix C for detail of the review comments.

VEHICLE TRACKING CHECKS

Design

The design includes tracking checks for a 19.45m semi-trailer turning left from Cook Street to the northern approach of Shakespeare Street, as well as for a 17.9m semi-trailer traveling straight through in the northbound direction. This is to ensure that the kerb buildout at the northwestern corner of the roundabout does not impede these

vehicle movements. The vehicle tracking has been attached in Appendix A of this memo report.

Review Comments

Larger vehicles including 22 m T&T and 19.45 m semi-trailer vehicles have been observed travelling the roundabout in multiple directions. The reviewer has also been informed that Fonterra's milk truck of up to 22 m T&T will be navigating in all directions of the roundabout.

SIGHT DISTANCE CHECK

The reviewer has undertaken both the NZTA Approach Sight Distance (ASD) and Crossing Sight Distance (CSD) assessments at the new crossing points. The results show that the sight distances are compliant. Refer to Drawing C100 for Visibility Plan. Clear visibilities were also observed at all existing crossing points during the site visit. No further action required.

RECOMMENDATIONS

To enhance the safety and design of the roundabout, the following improvements are recommended. These are detailed in the markup drawings attached in Appendix D:

VEHICLE TRACKING

The reviewer has assessed all movements of:

- both 22 m T&T and 19.5 m semi-trailer at the roundabout, using the mountable roundabout apron (refer to Drawing C090-091 in Appendix D).
- Both 6 m van and 8.3 m rigid truck, not using the roundabout apron (refer to Drawing C092-093 in Appendix D).

The following recommended improvements are based on these assessments, refer to Drawing C020 in Appendix D for the markup sketch.

SPEED REDUCTION

- **Increase in roundabout central island radius** by approximately 1.2 m can be considered without impeding the movements of 22 m T&T and 19.45 m semi-trailer tracking movements as shown in Drawing C090-C091 in Appendix D. This is optional if budget is constrained.
- **Further widen concrete mountable apron radius** by an additional 1.1 m, to reduce turning speed of smaller vehicles to <30 km/h. This will require shifting the edge line of the traffic island towards it by 0.4 m. However, the retained 1.5 m offset from the traffic island will provide sufficient buffer and delineation.
- **Further widening of the kerb buildout,** at the northeastern corner to reduce vehicle speeds by straighten the approach of vehicles from Cook Street to the roundabout, calm turning speeds, and increase horizontal deflection.
- **Lanes narrowing and realignment** by Lanes narrowing and realignment by proposing side islands and edge lines. This improves visibilities, reduce crossing distances, reduce speed around the roundabout and better ties-into existing road marking.
- **Mountable concrete apron** at southeastern corner of the roundabout to control turning speed of smaller vehicles, without impeding heavy commercial vehicle tracking as shown in Drawing C092-093 in Appendix D. The concrete apron can be replaced with diagonal shoulder marking but with reduced effectiveness as all vehicles would be able to encroach.
- **Diagonal shoulder marking** for the southbound movement to provide a visually narrower circulating width to reduce traffic speed. This is an unused area by all vehicles as observed on site. The diagonal shoulder markings could be replaced with a kerb build-out to enhance effectiveness.

RAISED SAFETY PLATFORMS (SHAKESPEARE STREET NORTHERN APPRAOCH)

- **The approach ramp** for the proposed raised safety platform for the northbound direction of Shakespeare Street is not orientated perpendicularly to the traffic flow. This misalignment could cause the front wheels of a vehicle to rise and fall not concurrently, potentially leading to instability and affect the safe operation of motorcyclists and larger vehicles such as buses and heavy commercial vehicles.
- **Swedish-style** speed table should be considered to enhance safety and riding experience for buses and the high volume of heavy commercial vehicles. This may require minor realignment of the vehicle crossing at 60 Shakespeare Street.

WALKING AND CYCLING SAFETY

Due to the high demand of pedestrians and cyclists in this area, the following recommendations to enhance their safety:

- **Cycle holding rail** at the crossing, especially at the northern approach where a large number of cyclists were observed crossing the road.
- **High number of commercial driveways** on Cook Street, which conflicted with the shared path. It is recommended to implement the NZTA 'High-Use Driveway Treatment' across these driveways to highlight the presence of high conflict zone.
- **An accessway** adjacent to 58 Shakespeare Street provides access to Sheridan Crescent. Its direct alignment with the crossing point may increase the risk of cyclists crossing without checking.

TRAFFIC SERVICES

The following are some minor improvements to road markings and signages:

- The '**dragon tooth' markings** at the proposed raised safety platform are upside down
- The **'Keep Clear' marking** outer edges should be perpendicular to the traffic flow, as it serves as a holding line for the stopping vehicles. It is recommended to monitor drivers' behaviour, the 'Keep Clear' marking could be upgraded to yellow hatch markings to increase awareness.
- **Missing signages** as follow:
    - R2-3 'Priority Give Way Roundabout' signs must be provided on the left side of the approaches to the roundabout according to TCD manual. R2-3 sign should also be installed on the islands as per TCD Part 4 manual.
    - A13-1 'Intersection Direction' sign is typically installed at the corner of the traffic islands to enhance guidance for vehicles, especially in low light conditions. If it is observed that vehicles, particularly larger trucks, frequently collide with the corner of the islands, additional measures such as painting the corners white or installing W14-1 'Lane Management Diverge' signs may be considered.
- **New signages** to be considered:
    - R3-13.2 'Keep Right' signs at the proposed side islands to delineate vehicles away from the side islands
- **Tactile pavers**
    - Warning tactile pavers are required to span the full width of the crossing, in accordance with RTS14: Guidelines for Facilities for Blind and Vision-Impaired Pedestrians (RTS14), to ensure they are not missed by visually impaired pedestrians.
    - Directional tactile pavers are required only where the path deviates from the continuous accessible route, as stated in the RTS14 guidelines.

STORMWATER CONSIDERATIONS

- It is uncertain whether stormwater design was considered for the new raised safety platform on Shakespeare Street. Given the downhill grade to the north, stormwater

consideration such as catchpits should be installed upstream of the raised safety platform.

- Other considerations for recommendations:
    - Side islands have been considered instead of kerb buildouts at the other approaches due to drainage considerations.
    - The mountable concrete apron proposed at the southeastern corner of the roundabout has created a gap with the existing kerb, and a cut-through with the proposed side islands to facilitate surface water drainage.

UTILTIY SERVICES CONSIDERATION

Underground utility services were not assessed in the design review; however, the construction of the roundabout upgrade, including central island widening, concrete mountable apron, kerbs and channels, raised safety platform, and pavement reinstatements, could potentially conflict with existing underground services. Therefore, it is recommended that all utility services to be located prior to the commencement of construction.

PAVEMENT CONSIDERATIONS

The existing pavement at the roundabout is deteriorating, and the proposed raised safety platform is likely to exacerbate this due to the fatigue movements from vehicles braking, stopping, and accelerating. It is recommended to rehabilitate the pavement adjacent to the proposed raised safety platform.

APPENDIX