Appendix 7: Integrated Transport Assessment

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Planning. Traffic. Development.

Integrated Transport Assessment

prepared for

DUNWEAVIN 2020 LIMITED

PC76 East Maddisons Road, Rolleston

March 2021

Integrated Transport Assessment

prepared for

Dunweavin 2020 Limited

PC76 East Maddisons Road, Rolleston

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Table of Contents

List of Figures and Tables

Appendices

Introduction

1. Dunweavin 2020 Limited have commissioned Novo Group to prepare an Integrated Transport Assessment (ITA) for Plan Change 76 seeking residential re-zoning of a block of land at 605, 617 and 627 East Maddisons Road, Rolleston.

2. This report provides an assessment of the transport aspects of the proposal. It also describes the transport environment in the vicinity of the site, describes the transport related components of the proposal. It has been prepared broadly in accordance with the Integrated Transportation Assessment Guidelines specified in New Zealand Transport Agency Research Report 422.

3. The proposal entails a change in zoning from Rural to Residential of a block of land to accommodate approximately 156 future residential dwellings. The location is shown in **Figure 1**.

Figure 1: Site Location (source Canterbury Maps)

The Proposal

4. It is proposed to re-zone the site for residential use, for a total of 156 residential dwellings.

5. The proposed road layout is shown in **Figure 2** and includes a local road connection to East Maddisons Road and to Lennon Drive, as well as two future road connections to the adjoining PC70 area (one south and one west). There are also two off-road pedestrian and cycle connections (green lines) to East Maddisons road near the northern and southern ends of the ODP.

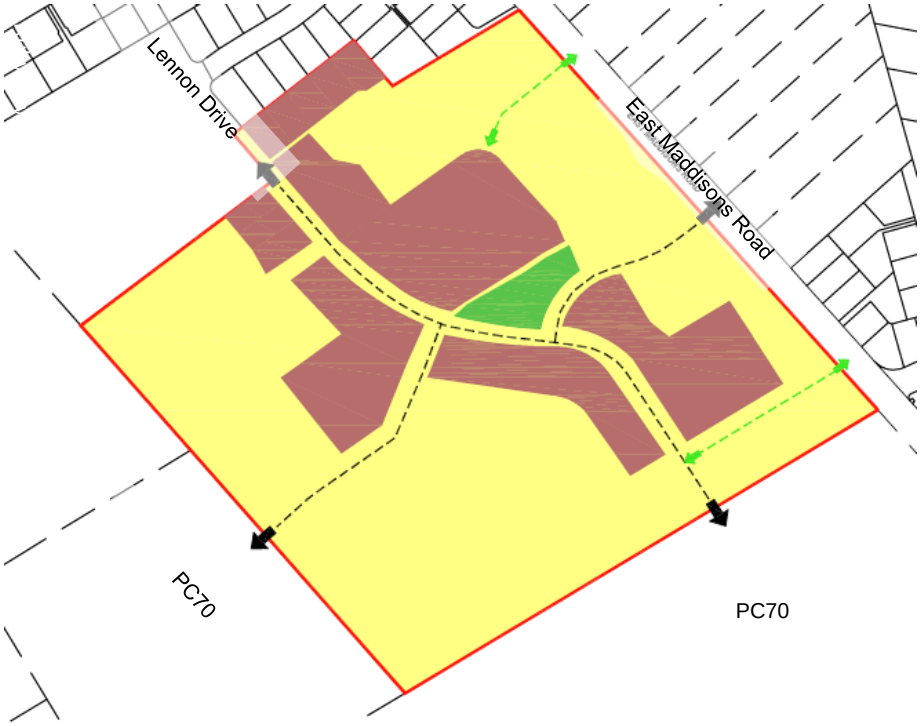


Figure 2: Proposed Road Layout

6. The NZ Transport Agency Research Report 453 (*Trips and Parking Related to Land Use*) suggests an 85th percentile traffic generation rate of 0.9 vehicle movements per dwelling per hour in the peak hours. The ITE *Trip Generation* guidebook suggests a split of 63% arrivals and 37% departures in the weekday PM peak and 25% arrivals and 75% departures in the AM peak. This suggests **140 trips** in the **evening peak hour** of which 88 are arrivals and 52 are departures (35 arrivals and 105 departures in the morning peak hour).

7. It is anticipated that the roads and intersections be generally laid out in accordance with the Transport Standards of the District Plan.

Transport Environment

Existing Road Network

8. The site fronts East Maddisons Road and Lennon Drive and these roads are described in detail below along with a summary of other nearby transport infrastructure and future road networks.

East Maddisons Road

9. East Maddisons Road is classified as a local road at the application site and a collector road further to the north (between Oak Tree Lane and Brookside Road) under the Operative District Plan. The Proposed Plan extends the Collector Road classification from Brookside Road to Selwyn Road.

10. East Maddisons Road has a 60km/h speed limit, reducing to 50km/h from a point 780m north of Goulds Road. It is anticipated that the speed limit would reduce to 50km/h through to Goulds Road as the application site and adjoining land is developed for residential use.

11. Near the site, East Maddisons Road Road typically has a 6m wide carriageway with flush grass berms. It is anticipated this would be upgraded to kerb and channel and a formation consistent with the collector road requirements of the District Plan.

12. The Mobile Road website indicated existing traffic volumes are around 1,300 vehicles per day, on the adjacent section of East Maddisons Road.

Lennon Drive

13. Lennon Drive is a local road with an 8m wide sealed carriageway with kerb and channel. Lennon Drive has been recently constructed as part of the subdivision of the adjacent land to the north. It will have a 50 km/h speed limit and one traffic lane in each direction when fully opened.

14. Lennon Drive also connects with East Maddisons Road via Brenley Drive, Chris Drive. No existing traffic volumes were available for Lennon Drive, although as a local road servicing a limited number of residential properties the future traffic volume is anticipated to be reasonably low.

Other Roads

15. East Maddisons Road connects to the wider network via Goulds Road (south) and Brookside Road (north) which ultimately provide connections to key landuse destinations such as the town Centre, travel towards Lincoln (Goulds Road to Lincoln Rolleston Road) and to State Highway 1 for travel to a variety of locations including Christchurch.

Peak Hour Traffic Volumes

16. Peak hour traffic volumes have been provided from the Councils Paramics Model for a 2028 base model and a 2028 adjusted model that allows for nearby Plan Change areas; it

is noted that this is an interim model[1] although it is considered to be acceptable for the purposes of this assessment[2]. The traffic volumes for each model are shown in **Appendices 1 and 2**.

Crash History

17. The NZ Transport Agency Crash Analysis System (CAS) has been reviewed to identify crashes that have been reported on the frontage roads between 2011 and 2021. The output from the CAS database is included in **Appendix 3** and identified the following three crashes:

    - East Maddisons Road (35m south of Rockburn Street) associated with a driver loosing control, there was one serious injury. Alcohol was listed as a suspected factor. 2019.

    - East Maddisons Road – Goulds Road intersection, a vehicle southbound on Goulds Road lost control turning right. Speed was listed as a contributing factor. 2017.

    - Goulds Road – 100m north of East Maddisons Road, as a result of a farm animal straying during dark and misty/ foggy conditions. 2013.

18. The East Maddisons Road / Goulds Road intersection has been re-aligned (approx. early 2019) and there were no reported crashes since this time.

Future Road Networks

19. The Rolleston Structure plan shows an indicative local road connection from the application site to East Maddisons Road and continuing through the land west of the site, which is reflected in the proposed ODP layout. This is illustrated in **Figure 3**.

20. It also shows the future extension of Shillingford Boulevard west, and a roundabout controlled intersection with Goulds Road as an East-West collector (distributor) connection. Council have indicated the timing of this extension is anticipated to be 2029/2030.

[1] We understand that the model is to be updated in the future for all Plan Changes in Rolleston.

[2] We are aware that other Plan Changes are being lodged in the vicinity of this site that will lead to additional traffic on the surrounding road network. That said, the status of those Plan Changes is not certain (i.e., they have not been approved / submissions on the proposed Plan have not closed, at the time of writing this report) and the adoption of the 2028 model forecasts is considered to be a reasonable basis for the future environment until such time as the status of other Plan Changes applications has been determined.

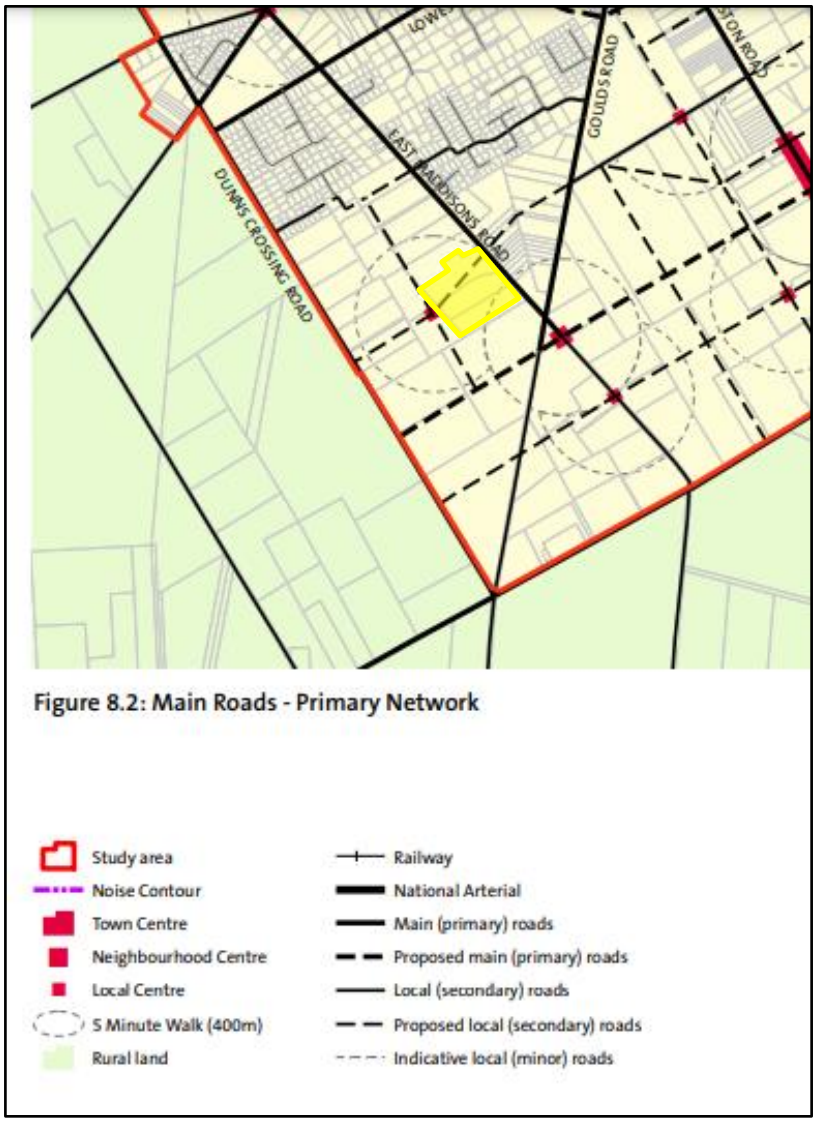


Figure 3: Extract from Figure 8.2 of the Rolleston Structure Plan

Passenger Transport

21. The nearest bus route is the #5 on East Maddisons Road approximately 1.5km north of the site which provides a connection to Rolleston Town Centre and Christchurch. This route typically has two buses per hour and includes some express services in the peak hour[3].

22. From the park and ride in the Town Centre the #820 Bus Route also provides an hourly service connecting with Burnham and Lincoln.

23. The Rolleston Structure Plan indicates (Figure 8.5 of the Structure Plan) a future orbital bus route which would travel along East Maddisons Road, past the application site and potential future services through the area via local road connections.

[3] A timetable is available here: https://www.metroinfo.co.nz/timetables/5-rolleston-newbrighton/

Active Transport Modes

24. There are no existing cycle routes in close proximity to the site however the Rolleston Structure Plan identifies (at Figure 8.4) future cycle routes (blue lines) along several routes near the site as illustrated below.

Figure 4: Extract from Figure 8.4 of the Rolleston Structure Plan showing future cycle routes (blue lines)

Assessment of Effects

25. The following assessment considers the transport related effects arising from the proposed road layout, connections with the existing road network and wider transport effects associated with traffic generation from the future 156 residential lots.

Road Layout

26. The proposed road layout does not include any collector or arterial road connections although it has a main local road connection to East Maddisons Road, which is located centrally within the site to be generally consistent with the Rolleston Structure Plan and to achieve sufficient separation distances from other intersections. This road also connects through to the adjacent land to the west.

27. Another local road connection runs generally North – South through the site between Lennon Drive and a future road connection to the land to the south.

28. The remaining proposed roads provide for property access. Some properties may also take access directly from East Maddisons Road.

29. Pedestrian and cyclist connectivity to East Maddisons Road is also improved by provision off-road connections near the northern and southern end of the site.

30. Overall, the layout is generally consistent with the Rolleston Structure Plan, adjacent plan change areas and is appropriate for the future residential use proposed.

Connections to Existing Road Network

31. As outlined above, the proposal is anticipated to result in 140 trips in the evening peak hour of which 88 are arrivals and 52 are departures (35 arrivals and 105 departures in the morning peak hour).

32. It is assumed that 90% of the trips (126 trips) generated within the proposed area will occur via one of the proposed roads and the remaining 10% have direct property access to East Maddisons Road. The majority of vehicles are anticipated to use the main road connection to East Maddisons Road with 5% attributed to the Lennon Drive. In the future, once the adjacent ODP (PC70) is developed, some trips may also occur via the west and south connections. Initially it is assumed that 85% of traffic uses proposed road intersection with East Maddisons Road which equates to 119 trips[4].

33. Trip destinations are anticipated to be split reasonably evenly between the Lowes Road / Brookside Road connections and towards Goulds Road. As such the following turning movements are anticipated at the main road connection with East Maddisons Road.

Figure 5: Traffic Distribution at Proposed Road intersection with East Maddisons Road

Location		AM Peak[5]	PM Peak[6]
Proposed Road (Departure)	Left turn (onto East Maddisons Rd)	45	22
	Right turn (onto East Maddisons Rd)	45	22
East Maddisons Road Western Arm)	Right (onto Proposed Road)	15	38
East Maddisons Road (Eastern Arm)	Left (onto Proposed Road)	15	38

34. The proposed Road- East Maddisons Road intersection has been modelled using the SIDRA Intersection Software based on AM and PM peak hours of the 2028 link volumes[7] (from the adjusted model which allows for PC70 and known nearby development). The results show that all movements will operate well (Level of Service A[8]), based on a basic giveway controlled intersection and no additional turning lanes. The summary reports are provided in **Appendix 4.**

[4] 140 trips x 85% using main road connection to East Maddisons Road = 119 trips
[5] The ITE Trip Generation guidebook suggests a split of 25% arrivals and 75% departures in the AM Peak.
[6] The ITE Trip Generation guidebook suggests a split of 63% arrivals and 37% departures in the PM Peak.
[7] Refer to **Appendix 2.**
[8] Level of Service A being the best of ratings from A to F.

35. The intersection is well separated from other intersections on East Maddisons Road. East Maddisons Road is straight and flat near the proposed intersection such that excellent visibility is afforded in each direction.

36. For the above reasons, subject to appropriate detailed design at subdivision, the anticipated traffic can be safely and efficiently accommodated via the proposed connections to the existing road network.

Wider Road Network

37. The proposed road layout is consistent with the future development of the wider road network which includes the extension of Shillingford Boulevard at the intersection with Goulds Road and an upgrade of that intersection to a roundabout controlled intersection (scheduled for 2029/2030). Following this and development of the adjacent PC70 area some traffic may also use this roundabout to access the wider road network.

38. Prior to the Shillingford Boulevard extension and roundabout, the traffic to and from the southwest and southeast would likely travel along East Maddisons Road to the "T" intersection with Goulds Road. As such the performance of this intersection has been considered in a SIDRA Model to ensure this intersection is capable of accommodating the increased volumes from the proposal prior to the Shillingford Boulevard Route. The additional traffic volumes from the development[9] have been added to the turning volumes for the 2028 base model (prior to the roundabout upgrade). The Base model allows for some traffic growth however does not include all surrounding proposed plan change areas. For completeness, the same intersection has also been modelled using the adjusted Model which includes additional traffic from the PC70 area however does assume the roundabout upgrade has occurred. Under either scenario the intersection continues to operate at good levels of service (all movements LOS A or B). The summaries are included in **Appendix 5**.

39. It is noted that there may be a short period between these two scenarios, i.e., where some of the PC70 area has been developed prior to the roundabout upgrade resulting in slightly lower volumes overall than the adjusted model but with potentially higher turning volumes for some movements. Noting both scenarios modelled above show sufficient spare capacity, it can be reasonably concluded that the intersection would also accommodate any intermediate periods within acceptable levels of service.

40. Further trips onto the wider road network are likely to be dispersed relative to the destination. Analysis of the 2018 Census data[10] shows that commute to work trips outside of Rolleston were split broadly across the following destinations.

[9] It is assumed that 50% of site generated traffic travel via the Goulds Road intersection equating to: East Maddisons Road – i.e., 70 trips in the peak hour. These have been allocated to each turning movement proportionate to the turning volumes provided from the 2028 base and 2028 adjusted models.
[10] http://archive.stats.govt.nz/datavisualisation/commuterview/index.html?_ga=2.208046549.614093748.1538512253-1731882158.1453166719#

Table 1: Directions of Commute For Work and Education from Rolleston SW

Destination		Distribution
Wider Rolleston[11]	264	25%
Springston	78	7%
Lincoln	153	15%
Prebbleton	21	2%
Burnham	42	4%
Christchurch	462	44%
Bankside	27	3%

41. In terms of other arterial connections, the site has good access to Christchurch and Prebbleton via the arterial routes and CSM2 upgrades. Trips to Lincoln would be disbursed across the routes via East Maddisons and Selwyn Road or Goulds Road to Lincoln-Rolleston route.

42. The remaining trip distribution is dispersed across a variety of road connections and is not likely to have any noticeable impact on the capacity of any one part of the road network. As such, no further detailed analysis of the wider road network has been undertaken.

District Plan Objectives and Policies

43. The Operative and Proposed Plan Transport Related Objectives and Policies are considered in **Appendix 6** and the proposal is considered to be generally consistent with those provisions from a transport perspective.

Conclusion

44. The proposed rural to residential rezoning will provide for an estimated 156 future residential dwellings. The proposed road layout has been designed to integrate with the existing and based on the assessment above can be appropriately designed to operate within acceptable levels of service at the 2028 design year.

45. The proposal is consistent with the existing road hierarchy and future / planned roads and intersection upgrades. The timing of development appears to be able to be well co-ordinated both in terms of proposed roads and planned upgrades on the wider road network.

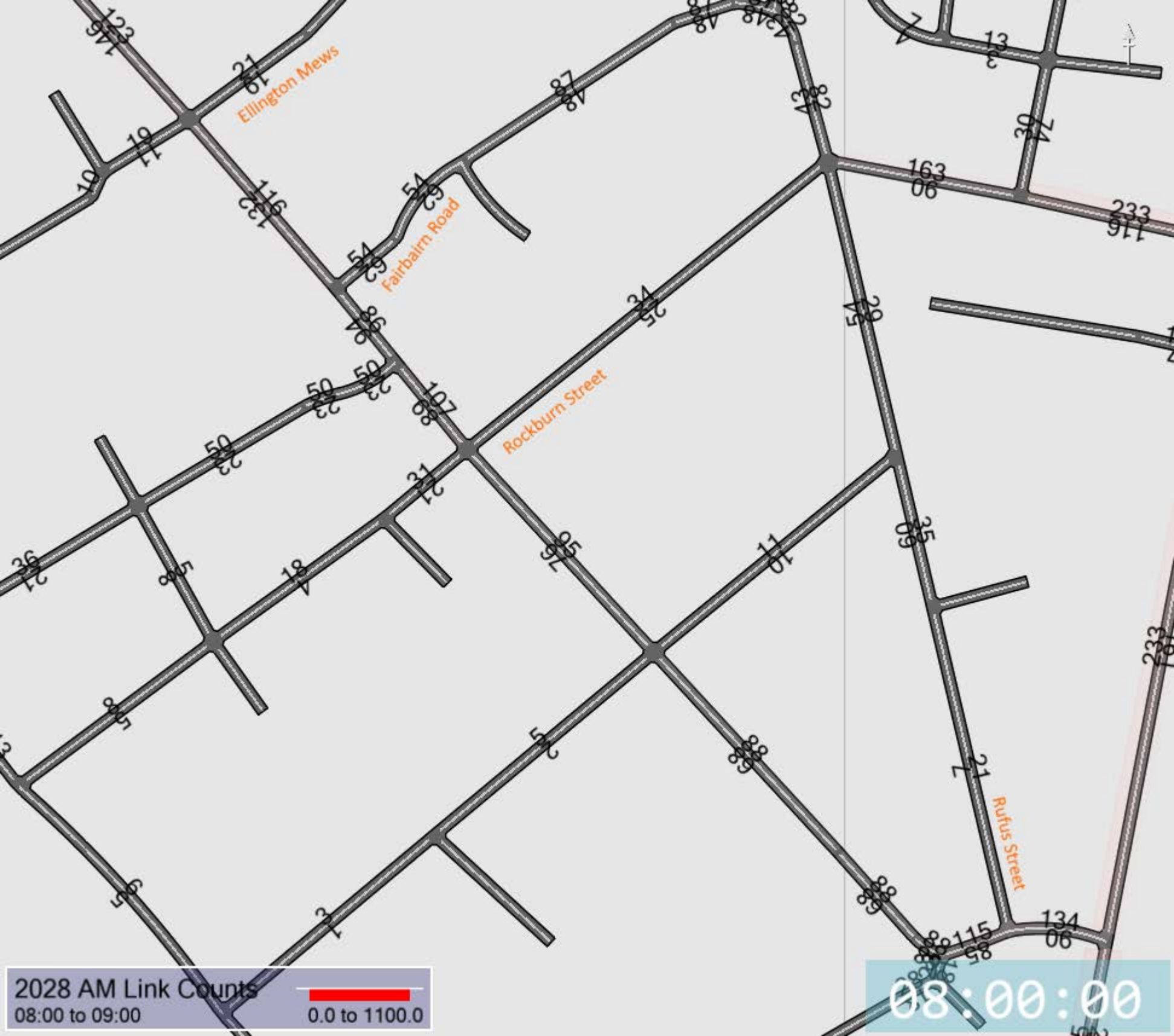
46. The proposal provides good connectivity for pedestrians and cyclists to East Maddisons Road for access to future “orbital” public transport routes.

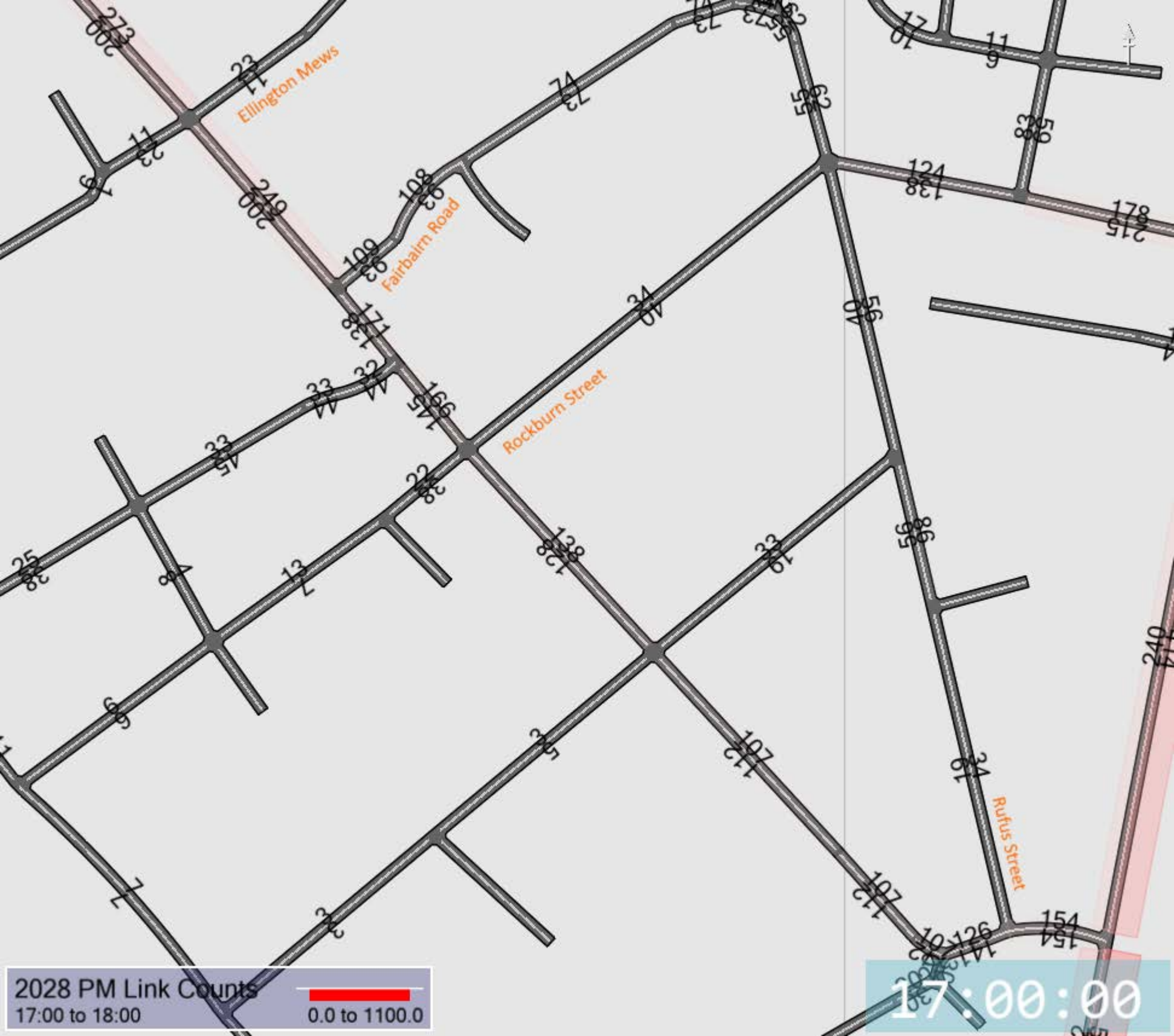
[11] Excluding live and work in Rolleston SW / work from home etc.

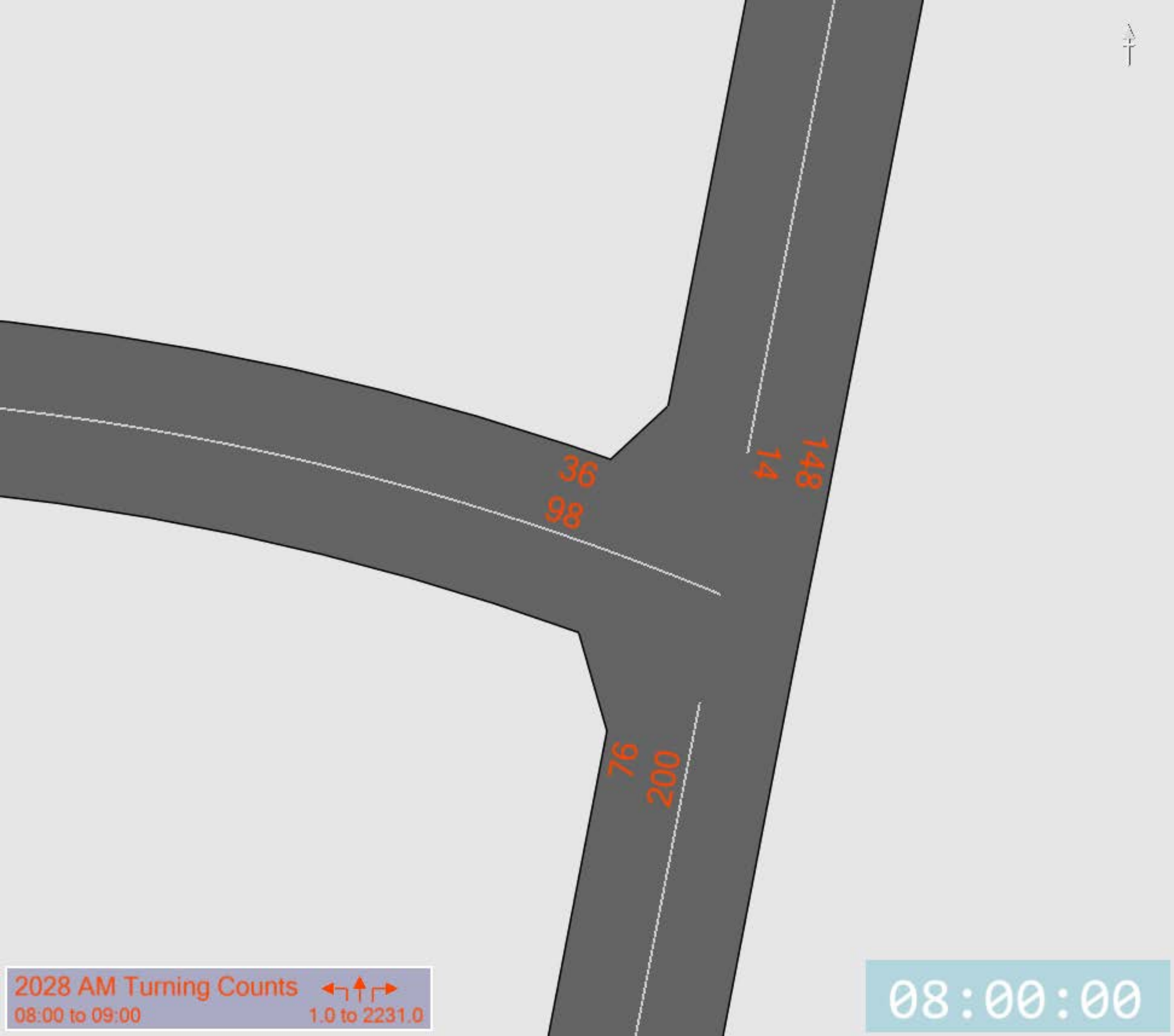
47. Overall, from a transport perspective there is no reason that the proposed development cannot be integrated into the transport network in a safe, efficient, and appropriate manner which provides for travel by all modes.

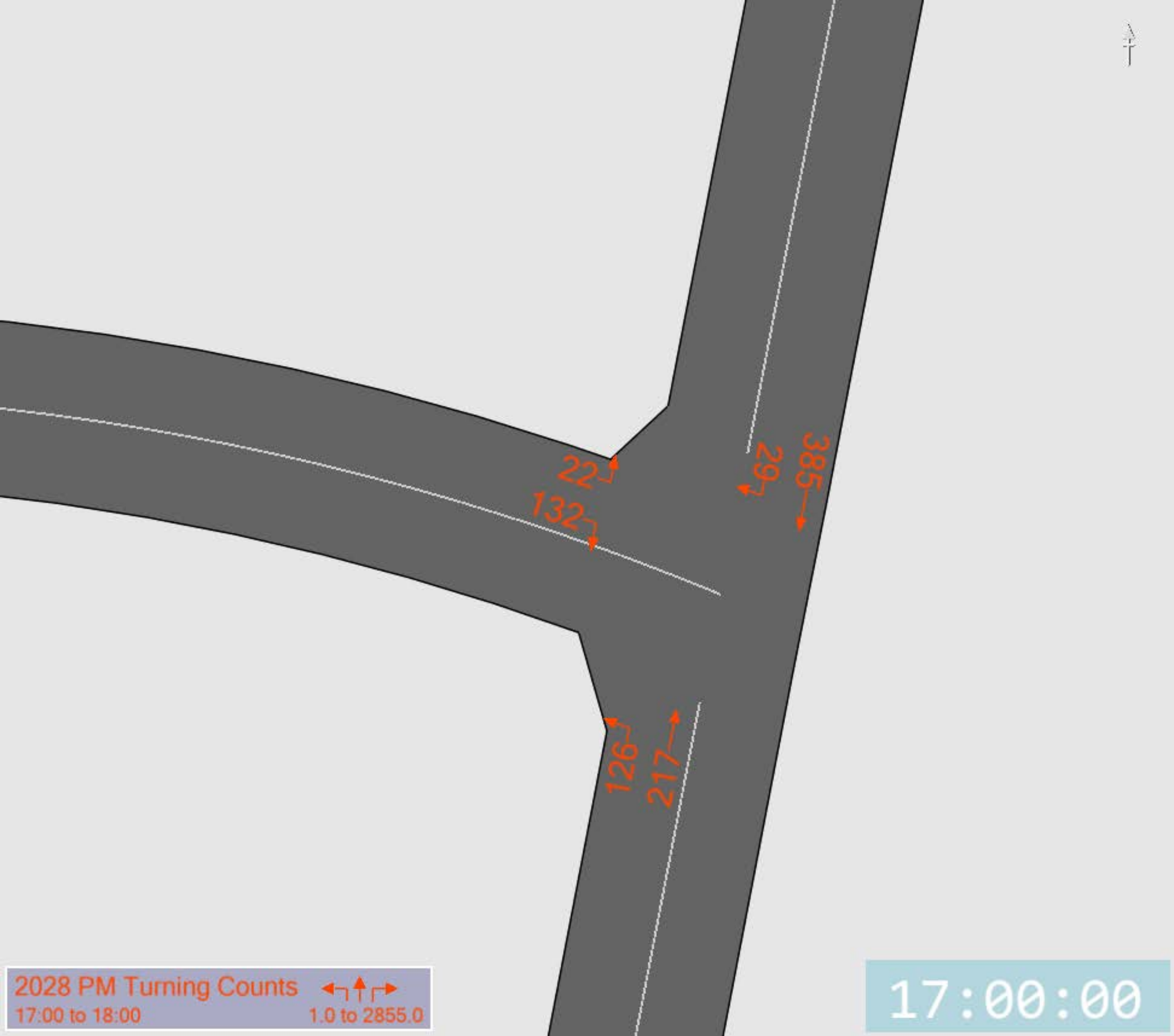
Appendix 1

2028 Base Model Traffic Volumes


Ellington Mews
Fairbairn Road
Rockburn Street
Rufus Street
2028 AM Link Counts
08:00 to 09:00
0.0 to 1100.0
08:00:00

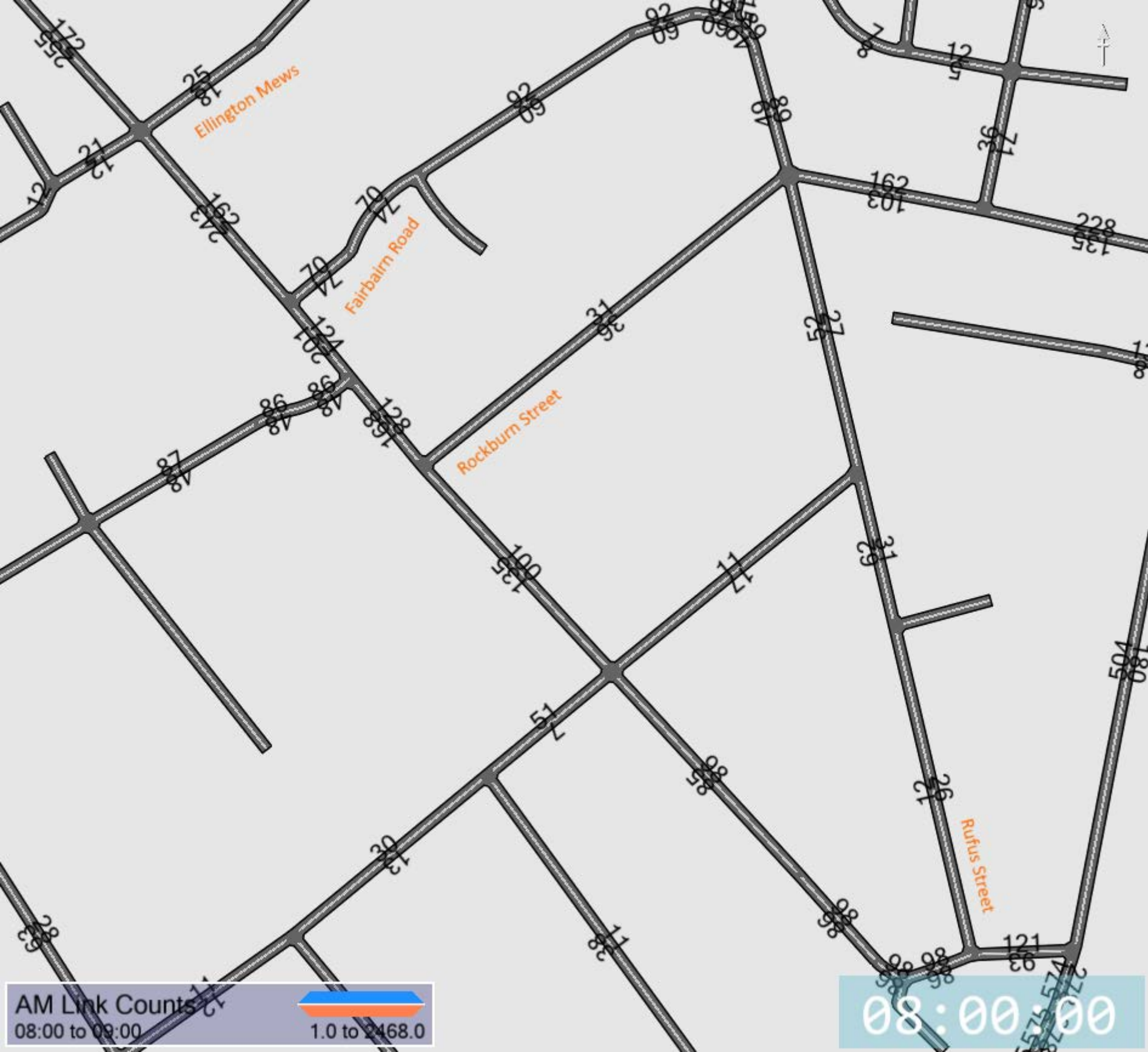

Ellington Mews
Fairbairn Road
Rockburn Street
Rufus Street
2028 PM Link Counts
17:00 to 18:00
0.0 to 1100.0
17:00:00

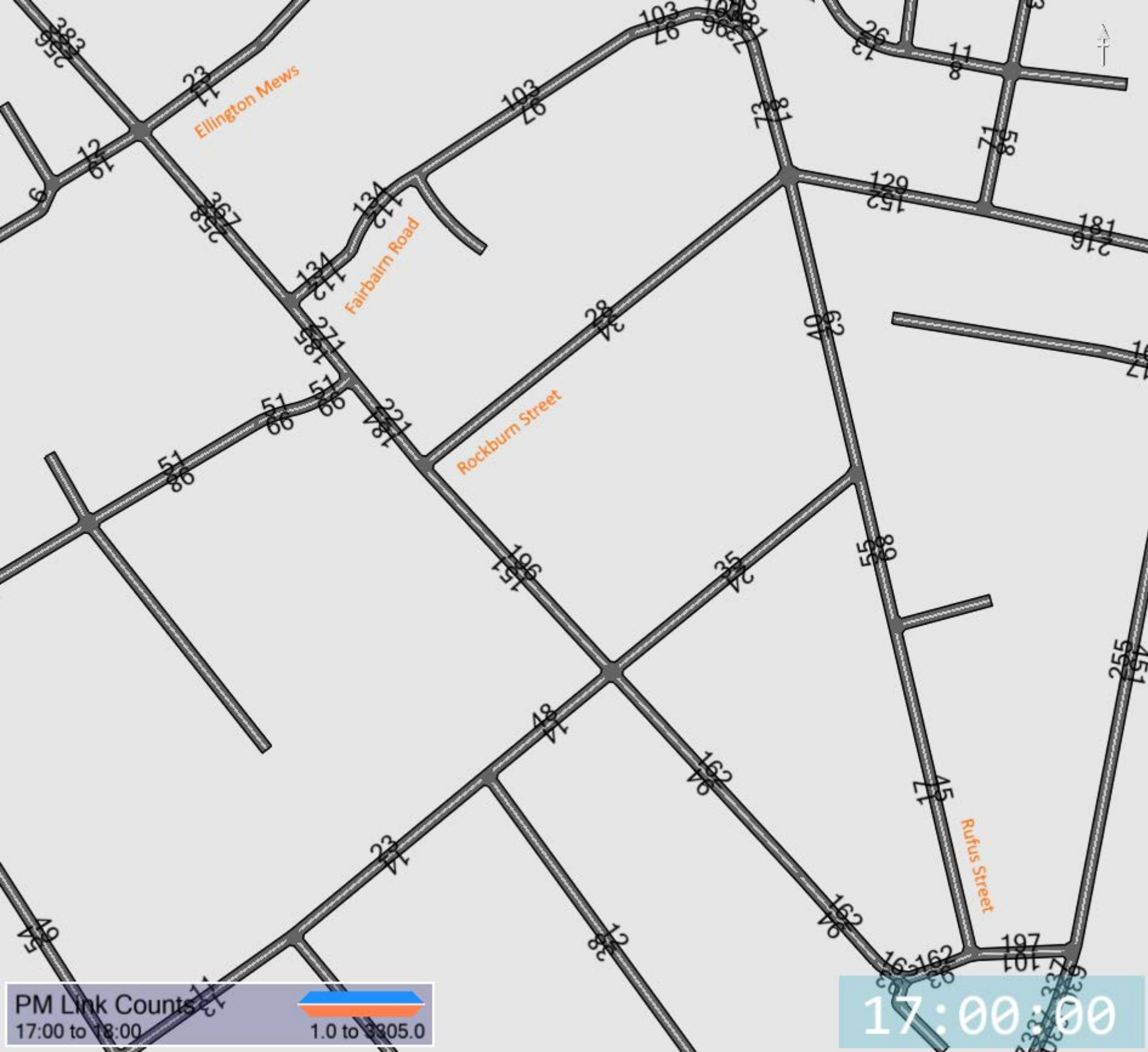

36
98
148
14
76
200
2028 AM Turning Counts
08:00 to 09:00
1.0 to 2231.0
08:00:00


22
132
29
385
126
217
2028 PM Turning Counts
17:00 to 18:00
1.0 to 2855.0
17:00:00

Appendix 2

2028 Adjusted Model Transport Volumes


Ellington Mews
Fairbairn Road
Rockburn Street
Rufus Street
AM Link Counts
08:00 to 09:00
1.0 to 2468.0
08:00:00


Ellington Mews
Fairbairn Road
Rockburn Street
Rufus Street
PM Link Counts
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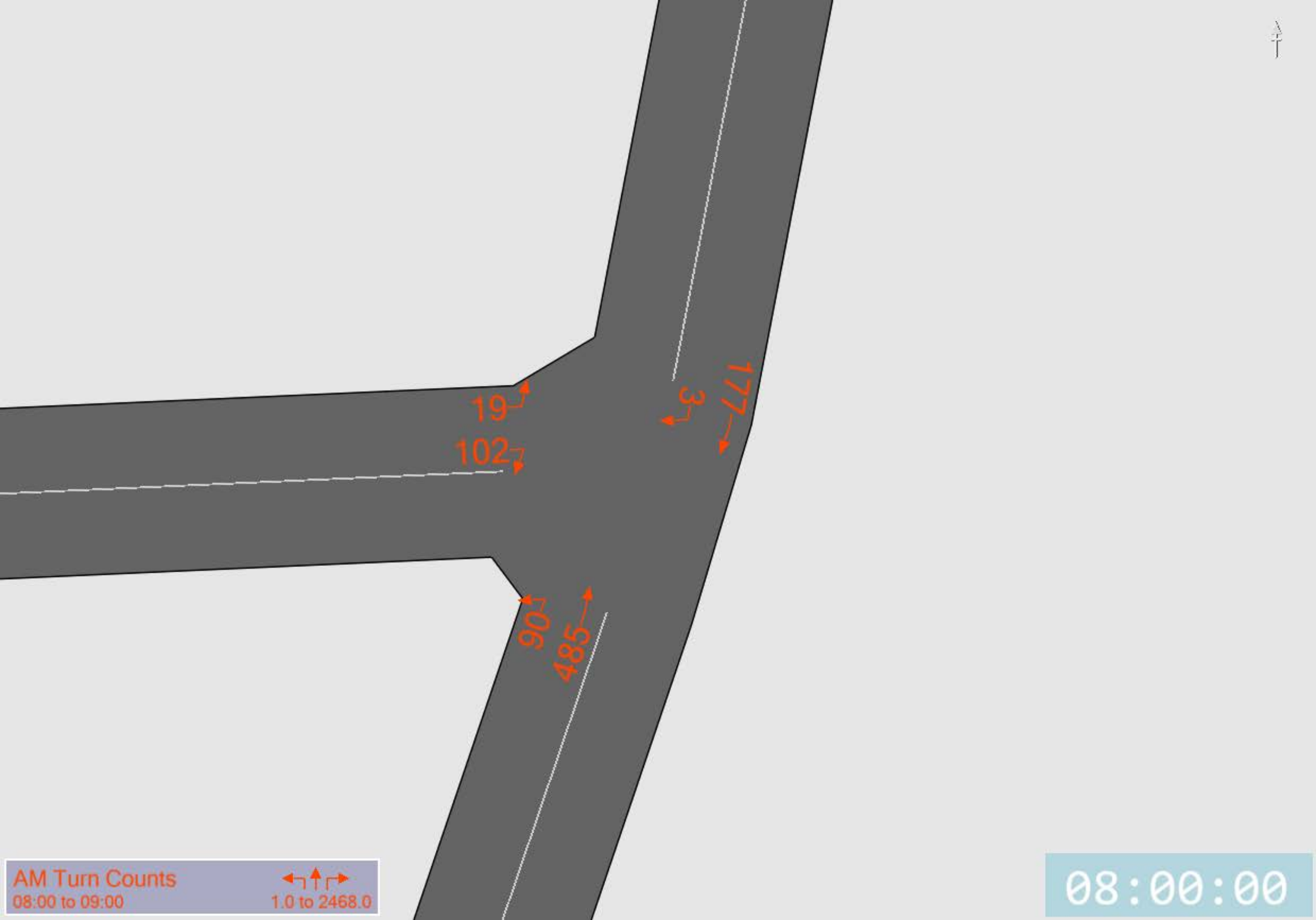
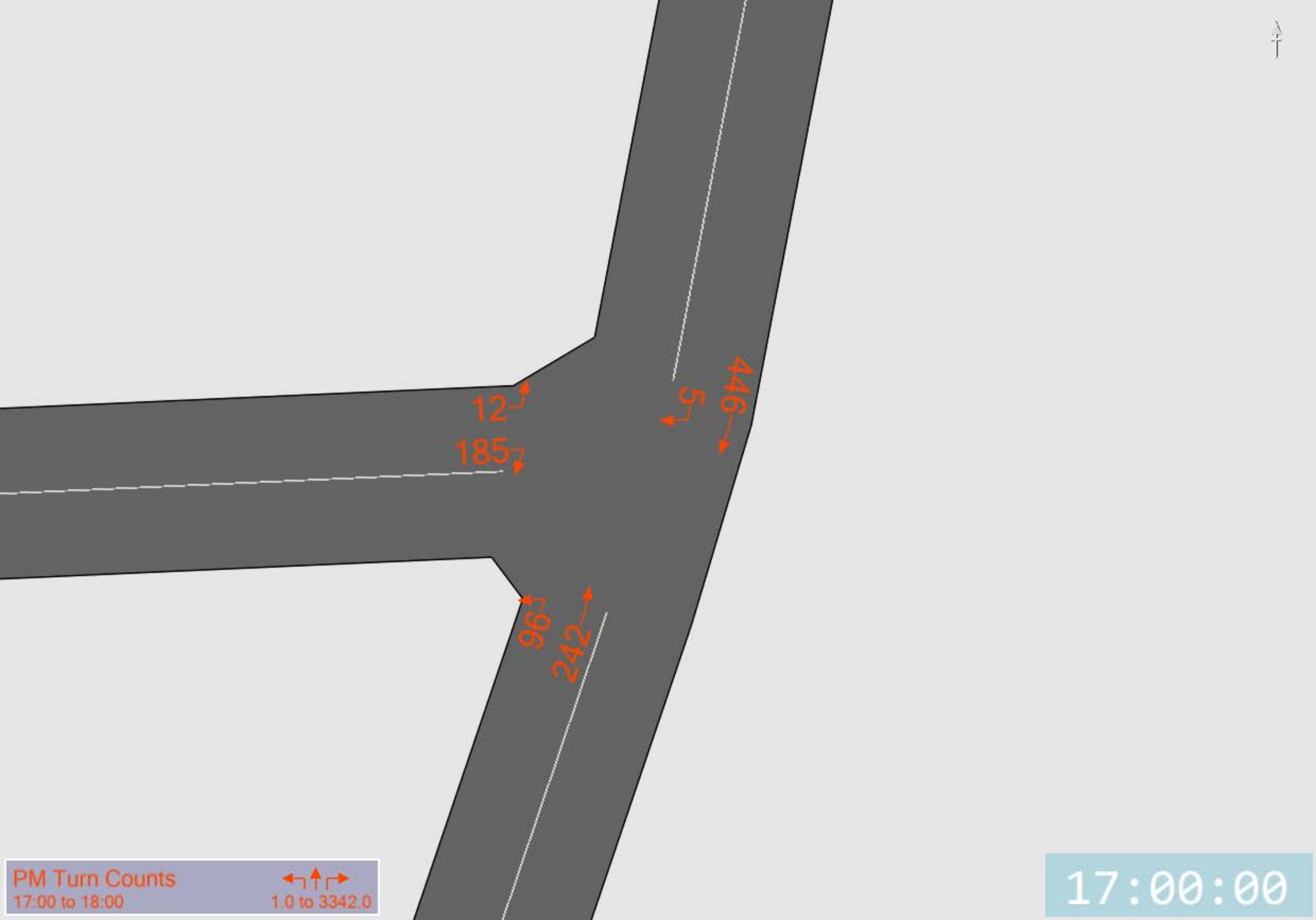
1.0 to 3305.0
17:00:00


19
102
3
177
90
485
AM Turn Counts
08:00 to 09:00
1.0 to 2468.0
08:00:00


12
185
5
446
96
242
PM Turn Counts
17:00 to 18:00
1.0 to 3342.0
17:00:00

Appendix 3

NZTA CAS Report

Untitled query

Saved sites

East Maddisons

Crash year

2011 — 2021

Plain English report

3 results from your query.

1-3 of 3

Crash road	Side road	Feature	Distance from side road/feature	Direction	Reference station	Route position	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Casualty count fatal	Casualty count serious	Casualty count minor	Social cost $(m)
EAST MADDISONS ROAD	GOULDS ROAD			I			1550092	5170086	172.381439	-43.620537	201737292	15/04/2017	Sat	02:25	Car/Wagon1 SDB on Goulds lost control turning right, Car/Wagon1 hit non specific pole	CAR/WAGON1, lost control when turning, speed approaching a traffic control	Dry	Dark	Fine	Crossroads	Give way	0	0	0	0.04
EAST MADDISONS ROAD	ROCKBURN STREET		35m	S			1549710	5170500	172.376740	-43.616779	201951814	28/03/2019	Thu	15:20	SUV1 NDB on EAST MADDISONS ROAD, ROLLESTON, SELWYN lost control; went off road to right, SUV1 hit ditch, fence	SUV1, alcohol suspected, too far right	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	1	0	0.97
GOULDS ROAD	EAST MADDISONS ROAD		100m	N			1550110	5170185	172.381668	-43.619648	201371891	13/07/2013	Sat	22:00	SUV1 NDB on GOULDS ROAD hit obstruction, SUV1 hit non specific animal	ENV: farm animal straying	Wet	Dark	Mist or Fog	Nil (Default)	Unknown	0	0	0	0.04

1-3 of 3

Appendix 4

SIDRA Intersection Summaries Proposed Road – East Maddisons Road

MOVEMENT SUMMARY

Site: 101 [Proposed Road East Maddisons AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Proposed Road														
1	L2	45	0.0	47	0.0	0.079	5.0	LOS A	0.3	2.0	0.26	0.55	0.26	46.0
3	R2	45	0.0	47	0.0	0.079	5.6	LOS A	0.3	2.0	0.26	0.55	0.26	45.7
Approach		90	0.0	95	0.0	0.079	5.3	LOS A	0.3	2.0	0.26	0.55	0.26	45.9
East: East Maddions Eastern Arm														
4	L2	15	0.0	16	0.0	0.079	4.6	LOS A	0.0	0.0	0.00	0.05	0.00	49.2
5	T1	135	0.0	142	0.0	0.079	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	49.7
Approach		150	0.0	158	0.0	0.079	0.5	NA	0.0	0.0	0.00	0.05	0.00	49.6
West: East Maddisons Western Arm														
11	T1	100	0.0	105	0.0	0.063	0.1	LOS A	0.1	0.7	0.08	0.07	0.08	49.4
12	R2	15	0.0	16	0.0	0.063	5.1	LOS A	0.1	0.7	0.08	0.07	0.08	48.5
Approach		115	0.0	121	0.0	0.063	0.7	NA	0.1	0.7	0.08	0.07	0.08	49.3
All Vehicles		355	0.0	374	0.0	0.079	1.8	NA	0.3	2.0	0.09	0.19	0.09	48.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Proposed Road East Maddisons PM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Proposed Road														
1	L2	22	0.0	23	0.0	0.043	5.0	LOS A	0.1	1.0	0.28	0.56	0.28	46.0
3	R2	22	0.0	23	0.0	0.043	6.3	LOS A	0.1	1.0	0.28	0.56	0.28	45.6
Approach		44	0.0	46	0.0	0.043	5.7	LOS A	0.1	1.0	0.28	0.56	0.28	45.8
East: East Maddions Eastern Arm														
4	L2	38	0.0	40	0.0	0.100	4.6	LOS A	0.0	0.0	0.00	0.11	0.00	48.9
5	T1	151	0.0	159	0.0	0.100	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	49.3
Approach		189	0.0	199	0.0	0.100	0.9	NA	0.0	0.0	0.00	0.11	0.00	49.2
West: East Maddisons Western Arm														
11	T1	196	0.0	206	0.0	0.131	0.2	LOS A	0.3	2.0	0.12	0.09	0.12	49.2
12	R2	38	0.0	40	0.0	0.131	5.3	LOS A	0.3	2.0	0.12	0.09	0.12	48.3
Approach		234	0.0	246	0.0	0.131	1.0	NA	0.3	2.0	0.12	0.09	0.12	49.0
All Vehicles		467	0.0	492	0.0	0.131	1.4	NA	0.3	2.0	0.09	0.14	0.09	48.8

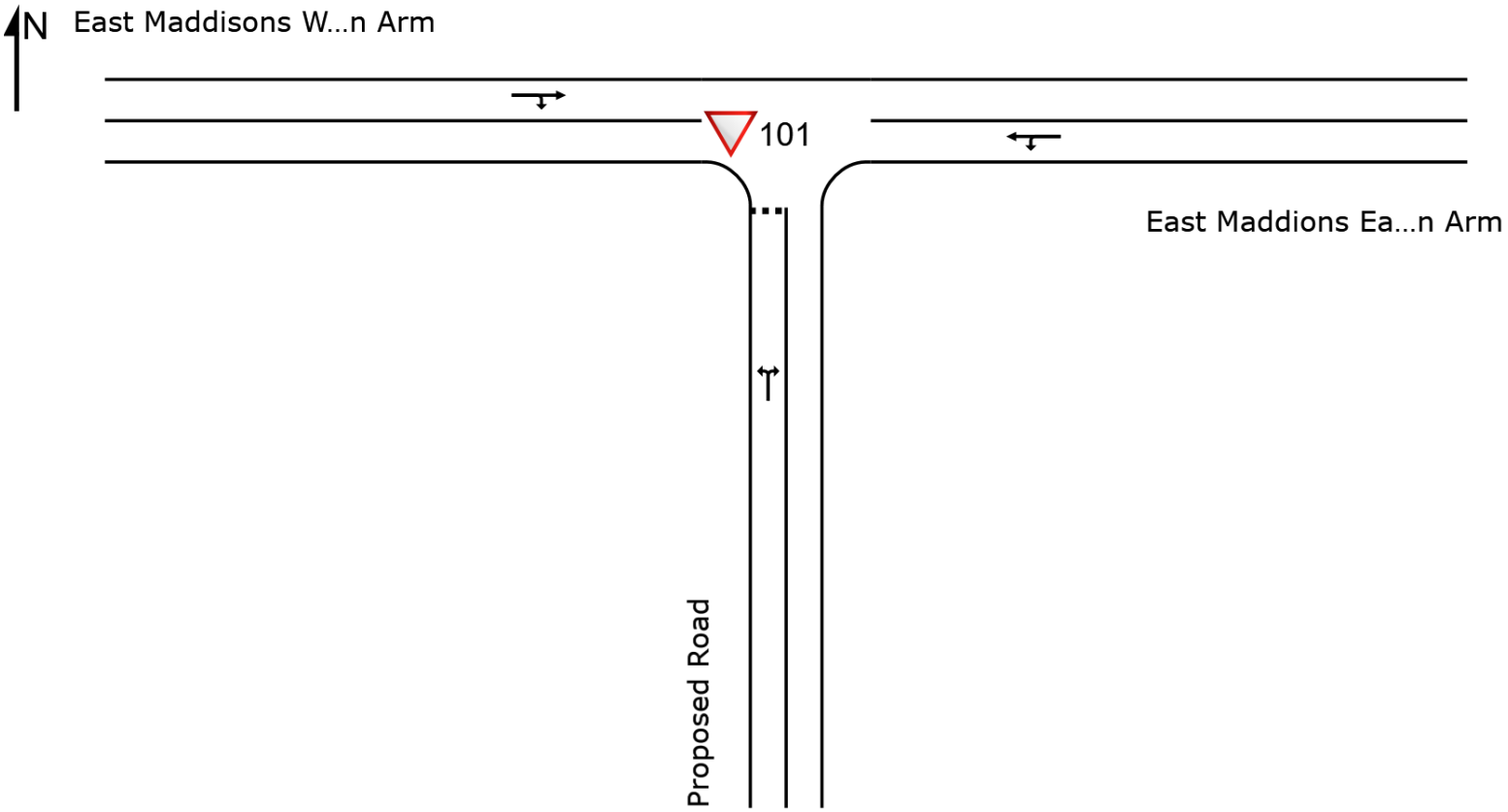
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Proposed Road East Maddisons AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

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



Appendix 5

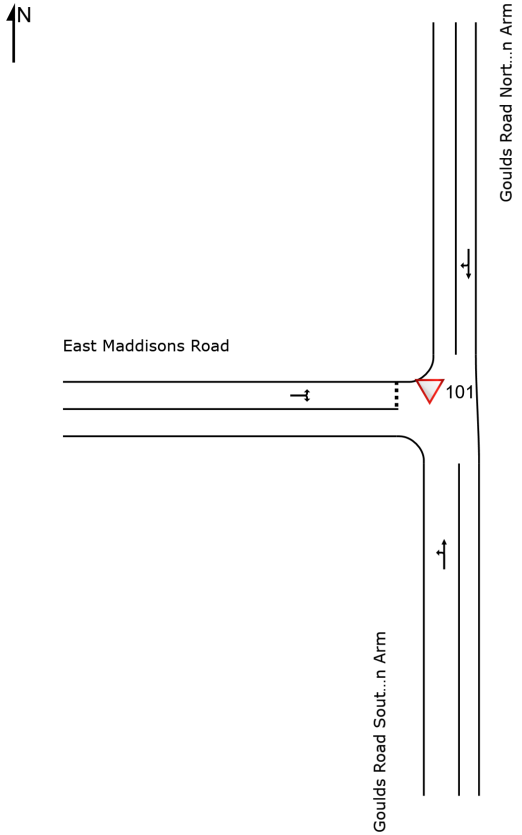
SIDRA Intersection Summaries East Maddisons Road – Goulds Road

SITE LAYOUT

Site: 101 [Goulds East Maddisons PM - Base (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

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



MOVEMENT SUMMARY

Site: 101 [Goulds East Maddisons AM -Base (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Goulds Road Southern Arm														
1	L2	79	0.0	83	0.0	0.144	5.6	LOS A	0.0	0.0	0.00	0.16	0.00	56.9
2	T1	208	0.0	219	0.0	0.144	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	58.5
Approach		287	0.0	302	0.0	0.144	1.6	NA	0.0	0.0	0.00	0.16	0.00	58.0
North: Goulds Road Northern Arm														
8	T1	154	0.0	162	0.0	0.095	0.1	LOS A	0.1	0.9	0.09	0.05	0.09	59.1
9	R2	15	0.0	16	0.0	0.095	6.6	LOS A	0.1	0.9	0.09	0.05	0.09	57.3
Approach		169	0.0	178	0.0	0.095	0.7	NA	0.1	0.9	0.09	0.05	0.09	59.0
West: East Maddisons Road														
10	L2	50	0.0	53	0.0	0.206	6.3	LOS A	0.8	5.3	0.40	0.68	0.40	52.3
12	R2	136	0.0	143	0.0	0.206	7.6	LOS A	0.8	5.3	0.40	0.68	0.40	52.2
Approach		186	0.0	196	0.0	0.206	7.3	LOS A	0.8	5.3	0.40	0.68	0.40	52.2
All Vehicles		642	0.0	676	0.0	0.206	3.0	NA	0.8	5.3	0.14	0.28	0.14	56.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [Goulds East Maddisons PM - Base (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Goulds Road Southern Arm														
1	L2	133	0.0	140	0.0	0.183	5.6	LOS A	0.0	0.0	0.00	0.22	0.00	56.5
2	T1	230	0.0	242	0.0	0.183	0.0	LOS A	0.0	0.0	0.00	0.22	0.00	58.0
Approach		363	0.0	382	0.0	0.183	2.1	NA	0.0	0.0	0.00	0.22	0.00	57.4
North: Goulds Road Northern Arm														
8	T1	407	0.0	428	0.0	0.247	0.2	LOS A	0.3	2.4	0.09	0.04	0.09	59.2
9	R2	31	0.0	33	0.0	0.247	7.3	LOS A	0.3	2.4	0.09	0.04	0.09	57.3
Approach		438	0.0	461	0.0	0.247	0.7	NA	0.3	2.4	0.09	0.04	0.09	59.1
West: East Maddisons Road														
10	L2	26	0.0	27	0.0	0.299	6.8	LOS A	1.2	8.3	0.55	0.82	0.65	50.2
12	R2	154	0.0	162	0.0	0.299	10.8	LOS B	1.2	8.3	0.55	0.82	0.65	50.0
Approach		180	0.0	189	0.0	0.299	10.2	LOS B	1.2	8.3	0.55	0.82	0.65	50.1
All Vehicles		981	0.0	1033	0.0	0.299	3.0	NA	1.2	8.3	0.14	0.25	0.16	56.6

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

MOVEMENT SUMMARY

Site: 101 [Goulds East Maddisons AM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Goulds Road Southern Arm														
1	L2	92	0.0	97	0.0	0.294	5.6	LOS A	0.0	0.0	0.00	0.09	0.00	57.4
2	T1	497	0.0	523	0.0	0.294	0.1	LOS A	0.0	0.0	0.00	0.09	0.00	59.0
Approach		589	0.0	620	0.0	0.294	0.9	NA	0.0	0.0	0.00	0.09	0.00	58.8
North: Goulds Road Northern Arm														
8	T1	181	0.0	191	0.0	0.101	0.1	LOS A	0.0	0.3	0.03	0.01	0.03	49.9
9	R2	3	0.0	3	0.0	0.101	7.6	LOS A	0.0	0.3	0.03	0.01	0.03	49.1
Approach		184	0.0	194	0.0	0.101	0.2	NA	0.0	0.3	0.03	0.01	0.03	49.8
West: East Maddisons Road														
10	L2	27	0.0	28	0.0	0.297	8.4	LOS A	1.2	8.1	0.62	0.87	0.72	50.0
12	R2	146	0.0	154	0.0	0.297	10.9	LOS B	1.2	8.1	0.62	0.87	0.72	49.9
Approach		173	0.0	182	0.0	0.297	10.5	LOS B	1.2	8.1	0.62	0.87	0.72	49.9
All Vehicles		946	0.0	996	0.0	0.297	2.6	NA	1.2	8.1	0.12	0.22	0.14	55.0

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MOVEMENT SUMMARY

Site: 101 [Goulds East Maddisons PM (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Goulds Road Southern Arm														
1	L2	101	0.0	106	0.0	0.179	5.6	LOS A	0.0	0.0	0.00	0.17	0.00	56.9
2	T1	255	0.0	268	0.0	0.179	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	58.4
Approach		356	0.0	375	0.0	0.179	1.6	NA	0.0	0.0	0.00	0.17	0.00	58.0
North: Goulds Road Northern Arm														
8	T1	471	0.0	496	0.0	0.259	0.0	LOS A	0.1	0.4	0.01	0.01	0.01	59.9
9	R2	5	0.0	5	0.0	0.259	7.3	LOS A	0.1	0.4	0.01	0.01	0.01	57.9
Approach		476	0.0	501	0.0	0.259	0.1	NA	0.1	0.4	0.01	0.01	0.01	59.9
West: East Maddisons Road														
10	L2	14	0.0	15	0.0	0.416	7.7	LOS A	1.9	13.0	0.66	0.92	0.91	48.9
12	R2	209	0.0	220	0.0	0.416	12.4	LOS B	1.9	13.0	0.66	0.92	0.91	48.8
Approach		223	0.0	235	0.0	0.416	12.1	LOS B	1.9	13.0	0.66	0.92	0.91	48.8
All Vehicles		1055	0.0	1111	0.0	0.416	3.1	NA	1.9	13.0	0.15	0.25	0.20	56.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix 6

District Plan Objectives and Policies

Operative District Plan Provision	Comment / Assessment
Objective B2.1.1 *An integrated approach to land use and transport planning to ensure the safe and efficient operation of the District's roads, pathways, railway lines and airfields is not compromised by adverse effects from activities on surrounding land or by residential growth.*	The assessment concludes the proposed road and two off-road connections for pedestrians and cyclists, will provide for safe and convenient connections and the proposed development can be appropriately integrated into the existing transport network
Objective B2.1.2 *An integrated approach to land use and transport planning to manage and minimise adverse effects of transport networks on adjoining land uses, and to avoid "reverse sensitivity" effects on the operation of transport networks.*	The site can be well integrated into the existing and planned transport network and the nearby transport network can continue to operate within efficiently.
Objective B2.1.3 *Future road networks and transport corridors are designed, located and protected, to promote transport choice and provide for: a range of sustainable transport modes; and alternatives to road movement of freight such as rail.*	The proposed road corridors, future road connections and off-road connections are consistent with the Rolleston Structure Plan and provide for good pedestrian and cycle connections as well as reasonably direct access to future public transport routes.
Policy B2.1.2 *Manage effects of activities on the safe and efficient operation of the District's existing and planned road network, considering the classification and function of each road in the hierarchy.*	The proposed development and occupation of dwellings / generation of traffic, will be co-ordinated with the proposed upgrades through subdivision and can operate within good levels of service prior to the Shillingford Drive extension and associated roundabout upgrade.
Policy B2.1.4(a) *Ensure all sites, allotments or properties have legal access to a legal road which is formed to the standard necessary to meet the needs of the activity considering:* *the number and type of vehicle movements generated by the activity;* *the road classification and function; and* *any pedestrian, cycle, public transport or other access required by the activity.*	The assessment above does not identify any constraints in achieving this.
Policy B2.1.5 *Ensure the development of new roads is:* *integrated with existing and future transport networks and landuses; and* *is designed and located to maximise permeability and accessibility;* *through achieving a high level of connectivity within and through new developments to encourage use of public and active transport; whilst having regard to the road hierarchy.*	As outlined above the proposal can be well integrated with the existing and future transport networks. The proposal includes direct links for active modes towards East Maddisons Road and generally toward the town centre. The site is within reasonable proximity to an existing public transport routes and is well located relative to the future orbital route.
Policy B2.1.12 *Address the impact of new residential or business activities on both the local roads around the site and the District's road network, particularly Arterial Road links with Christchurch City.*	The assessment above concludes that the proposal can be readily accommodated in this respect.

Policy B2.1.13 *Minimise the effects of increasing transport demand associated with areas identified for urban growth by promoting efficient and consolidated land use patterns that will reduce the demand for transport.*	The assessment of effects above outlines that the site has appropriately catered for this.
Policy B2.1.14 *Encourage people to walk or cycle within and between townships by providing a choice of routes for active transport modes and ensuring there is supporting infrastructure such as parking for cycles, at destinations.*	As outlined above the site has several direct connections to East Maddisons Road and is located in close proximity to future cycle routes around Rolleston.
Policy B2.1.15 *Require pedestrian and cycle links in new and redeveloped residential or business areas, where such links are likely to provide a safe, attractive and accessible alternative route for pedestrians and cyclists, to surrounding residential areas, business or community facilities*	In addition to the usual facilities within the road reserve, two off-road connections to East Maddisons Road are proposed.
Policy B4.2.10 *Ensure that new residential blocks are small in scale, easily navigable and convenient to public transport services and community infrastructure such as schools, shops, sports fields and medical facilities, particularly for pedestrians and cyclists.*	The proposed ODP shows a layout consistent with this.
Objective B4.3.4 *New areas for residential or business development support the timely, efficient and integrated provision of infrastructure, including appropriate transport and movement networks through a coordinated and phased development approach*	The assessment of effects has shown that the proposal can be accommodated prior to scheduled road upgrades nearby.
Policy B4.3.8 *Each Outline Development Plan shall include:* *Principal through roads, connection and integration with the surrounding road networks, relevant infrastructure services and areas for possible future development;* *…..* *Indicate how required infrastructure will be provided and how it will be funded;* *……* *Demonstrate how effective provision is made for a range of transport options, including public transport systems, pedestrian walkways and cycleways, both within and adjoining the ODP area;* *Show how other potential adverse effects on and/or from nearby existing or designated strategic infrastructure (including requirements for designations, or planned infrastructure) will be avoided, remedied or appropriately mitigated;* *…..*	These matters are achieved and addressed in the assessment of effects above.

Proposed District Plan Provision	Comment / Assessment
TRAN-O1 People and places are connected through safe, efficient, and convenient land transport corridors and land transport infrastructure which is well integrated with land use activities and subdivision development.	The proposed road and off-road connections will provide for safe and convenient access to and the proposed development can be appropriately integrated into the existing transport network.
TRAN-O2 Land transport corridors and land transport infrastructure are protected from incompatible land use activities and subdivision development.	The assessment of effects concluded the site is suitable for the proposed landuse and associated traffic generation
TRAN-O3 Land transport corridors and land transport infrastructure support the needs of people and freight, while ensuring adverse effects on the surrounding environment from their establishment and operation are managed.	Noting the conclusions of the assessment of effects, this can be readily achieved.
TRAN-P1 The safety and efficiency of the District's land transport network and systems are enabled through integrated land use and subdivision development that: *Manages the levels of service, formation standards and the types of land transport corridors and land transport infrastructure, including through the network road classifications and compliance with the design and operational standards;* *Provides land transport infrastructure that is consistent with the form, function, and character of each zone;* *Ensures there is enough space within land transport corridors to support the efficient and effective operation of network utilities;* *Provides for the safe and efficient movement and operation of emergency services; and* *Recognises cross-boundary connections with adjoining districts.*	The assessment above outlines that the proposed local roads are appropriate for this ODP. The proposed roads can be developed in accordance with the standard design. The proposed road structure is consistent with and specifically designed to cater for residential landuse. The proposed road layout will provide access for emergency services. The proposed site is appropriately located to utilise existing arterial connections including to Christchurch.
TRAN-P2 Manage any extensions to the District's land transport network to ensure it occurs in an integrated way by: *Co-coordinating the timing of land use activities and subdivision development with the availability of capacity in land transport corridors;* *Providing a range of travel modes and ensuring these are integrated, including between walking, cycling, public transport, freight and private vehicle modes; and* *Ensuring land use activities and subdivision development do not foreclose on the opportunity for land transport corridors to meet future land transport needs.*	As outlined above there are no timing constraints in respect of capacity. The assessment above includes considerations of travel by all modes. The proposed road layout includes connections to adjacent ODP areas.
TRAN-P5 Promote a range of transport options to reduce the number of trips and distances travelled in private motor vehicles by: *Encouraging land use activities and subdivision development to include connected walking and cycling networks and access to public transport and public transport facilities, including within and between townships; and* *Managing the design, layout and function of new land transport infrastructure to ensure they integrate with existing and future land transport corridors.*	The proposal includes direct links for active modes East Maddisons Road. As outlined above the proposal has been specifically designed to integrate with existing and future transport connections.
TRAN-P6 Enable safe, multi-modal connections that support walking, cycling, and access to public transport and public transport facilities through land use activities and subdivision development that: *Establish levels of service and multi-modal transport options based on the network road classifications, including the provision of*	The proposal provides for connections for all modes as appropriate for the size and scale of the future subdivision.

strategic level walking and cycling connections where they are identified in Development Plans or ODP; *Encourage residential blocks to be small, navigable and convenient to move around through legible, convenient and attractive walking and cycling routes to public transport facilities and between residential areas, business centres, community facilities, recreation space and local services;* *Manage the number and design of cul de sacs, rear lots and accessways;* *Provide for the interaction between vehicle access and manoeuvring, loading and parking areas when determining on-site pedestrian and cycling routes; and* *Align street layouts to maximise views and landscape features to promote attractive streets.*	
TRAN-P7 Recognise and protect the function of the District's land transport network and systems by managing land use activities and subdivision development to ensure the safe and efficient movement of people and goods by: *Managing adverse effects from activities on land transport corridors and land transport infrastructure, particularly where it may reduce safe and efficient traffic flows within the strategic transport network and links with Christchurch City;* *Ensuring land transport corridors and land transport infrastructure can support the volume and type of transport movements based on the network road classifications; and* *Requiring the design, positioning, and maintenance of accessways, corner splays, vehicle crossings, intersections, footpaths, plantings, and signs to ensure appropriate sightline visibility is provided to road users to support safe and efficient vehicle, pedestrian, and cycle movements.*	As outlined above, the proposal is considered to be readily able to be integrated into the existing transport network in a safely and efficiently.