Private Plan Change Request – Hughes Developments Limited
Appendix D – Traffic Assessment

novo group

Planning. Traffic. Development.

Integrated Transport Assessment

Prepared for

HUGHES DEVELOPMENTS LIMITED

163 Halkett Road Plan Change
West Melton

November 2020

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Prepared for

Hughes Developments Limited

163 Halkett Road Plan Change
West Melton

Novo Group Ltd
Level 1, 279 Montreal Street
PO Box 365, Christchurch 8140
P: (03) 365 5570
E: info@novogroup.co.nz
W: www.novogroup.co.nz

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Project Manager:	Rhys Chesterman, Director and Traffic Engineer/Planner
Prepared by:	Simon de Verteuil, Senior Transport Engineer
Reviewed by	Rhys Chesterman, Director and Traffic Engineer/Planner

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Introduction

1. Hughes Developments Limited has commissioned Novo Group to prepare an Integrated Transport Assessment (ITA) for a Plan Change at 163 Halkett Road in West Melton. This includes land bounded by State Highway 73 (to the south), Halkett Road (to the north) and the existing Gainsborough and Halkett Grove subdivisions (to the west).

2. This report provides an assessment of the transport aspects of the proposed development. It describes the transport environment in the vicinity of the site, the transport related components of the proposal and identifies any transportation issues associated with the proposed development. This includes any likely changes in travel patterns. The assessment also examines any potential adverse effects and whether these can be mitigated.

3. The report has been prepared broadly in accordance with the Integrated Transportation Assessment Guidelines specified in New Zealand Transport Agency Research report 422, November 2010 and other relevant best practice guides.

4. The site location is illustrated in Error! Reference source not found.. The proposed ODP for the site is contained in Error! Reference source not found..

Figure 1: Site Location (Source: Canterbury Maps)

Transport Environment

Road Network

5. The site is located immediately to the east of the existing West Melton urban area and bounded by West Coast Road (State Highway 73) to the south and Halkett Road to the north. These roads are shown below in **Figure 2**.

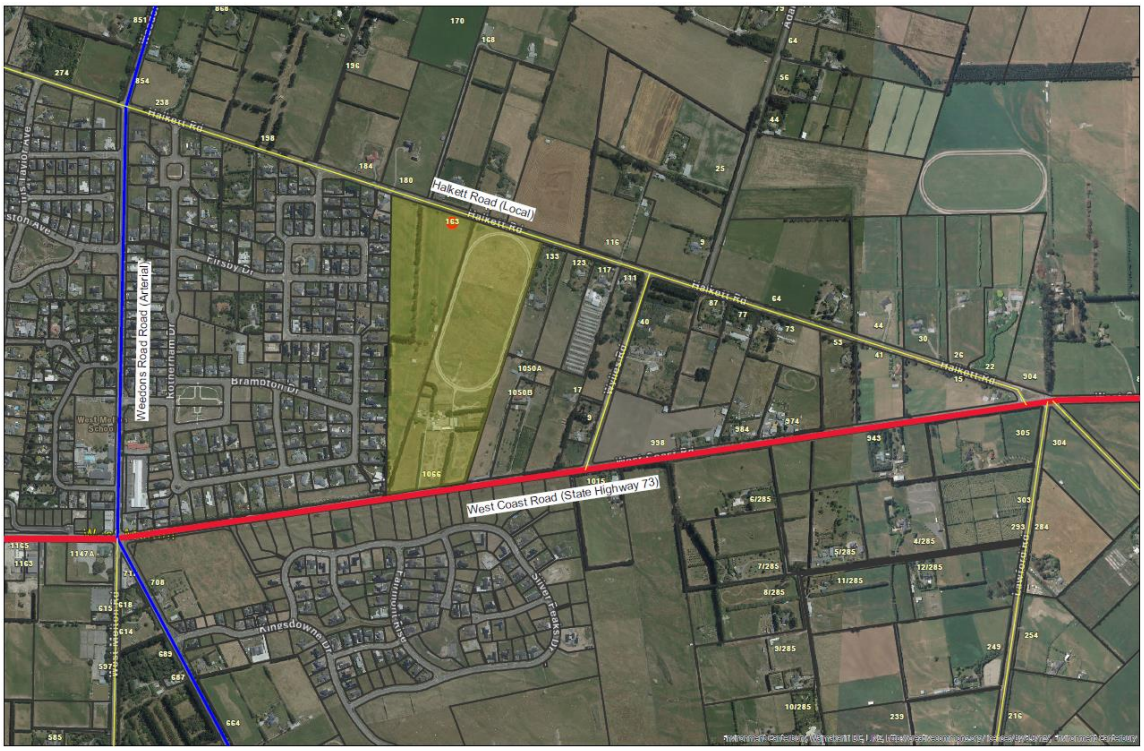

Figure 2: Road Network (Source: Canterbury Maps)

6. The key characteristics of adjacent roads are summarised below.

Table 1: Road characteristics – West Coast Road and Halkett Road

Key Feature or Characteristic	West Coast Road (SH73)	Halkett Road
Road Classification	State Highway	Local
Cross section Description	20 m road reserve Grass verge 8.0m (approx.) sealed carriageway, 3.5m lane in each direction separated by a painted centreline. Edge line markings with 0.5m shoulder approximately either side See **Photograph 1**.	20 m road reserve Grass verge 6.0m (approx.) sealed carriageway, 3.0m lane in each direction separated by a painted centreline. No edge line markings. See **Photograph 2**.
Road features	Straight alignment with grass verges either side (range from 4-5 m). A water race also runs along the south side of	Straight alignment with grass verges either side (approximately 6m wide). A speed threshold treatment (lane narrowing using markings) is located

	SH73 approximately 4.0m from the edge of the sealed road. On the southern/opposite side of the water race there is a fence and a sloped bund.	immediately west of where the access is proposed.
Traffic Volumes	Annual Average Daily Traffic = 13,250 including 5.2% heavy traffic (2019) [NZTA State Highway Traffic Monitoring site. West Melton – East of Dawsons Road (ID 07300013)].	1,097 vehicles per day (vpd) (June, 2020). [Data from RAMM – provided by SDC (Selwyn District Council)]
Posted Speed Limit	100km/h along the frontage. A new permanent speed limit of 60km/h is proposed approximately 200m west of the site[1].	There is a posted speed limit change along the site frontage. The existing speed limit is 80km/h outside the site; however, this reduces to 60km/h approximately 30m to the west of the proposed access.
Cycling Infrastructure	None	None
Pedestrian Infrastructure	There is no pedestrian infrastructure along SH73. There is a pedestrian refuge and pedestrian crossing point approximately 400m west of the site that links the northern and southern subdivisions.	There is no pedestrian infrastructure along Halkett Road
Public Transport	There are currently no public transport routes passing the site.	Bus service 86. Express service operating between Darfield, Kirwee and West Melton. Only one pick up and drop off time – 7.30am and 5.30pm.

7. All other roads in the local area are local roads. This includes West Melton Road, Wylies Road, Lawford Road, Curraghs Road, Adams Road and those located within the Gainsborough and Halkett Grove subdivisions.

Photographs 1 and 2 below illustrate the sight distance and cross section elements of SH73 and Halkett Road.

Photograph 1: SH73 Looking West (Left) & East (Right)

[1] https://www.nzta.govt.nz/projects/sh73-west-melton/

Photograph 2: Halkett Road Looking East (Left) & West (Right)

Crash History

8. The NZ Transport Agency Crash Analysis System (CAS) has been reviewed to identify crashes that have been reported within 50m of the site frontage in the five-year period ending 9 November 2020. This is illustrated in **Figure 3**. No crashes were reported.

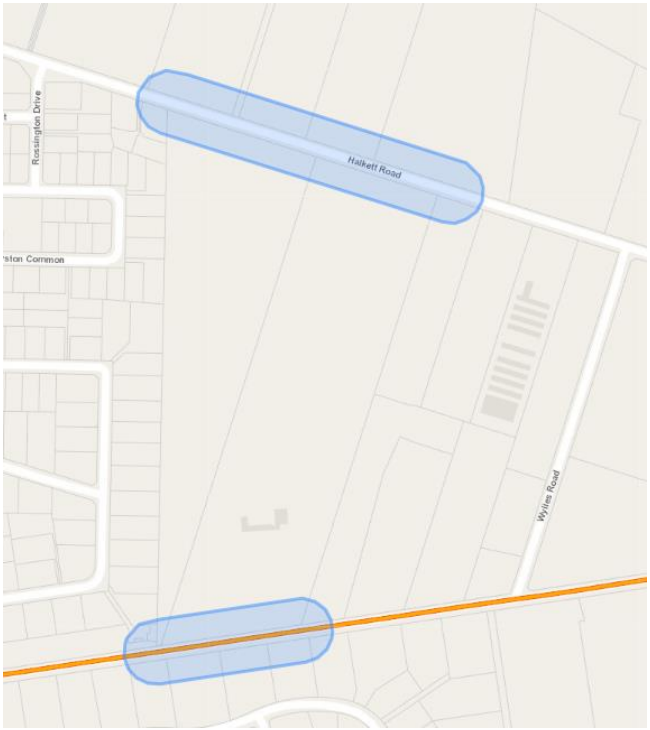

Figure 3: CAS Database Study Area and Crash History

Non-Car Modes of Transport

9. The site is currently located in a rural area on a greenfield site. There is minimal infrastructure in the area to support non-car modes. There are existing residential subdivisions to the west - Halkett Grove and Gainsborough. Both have internal footpaths but neither have footpaths along the frontages with Halkett Road or SH73. Cyclists are required to share the roads with motorised traffic.

10. There is a pedestrian refuge island and crossing point on SH73, approximately 300m east of Weedons Ross Road (see **Photograph 3)**. This was implemented to provide a direct route for pedestrians from the Wilfield residential subdivision to access services on the north side of SH73.

Photograph 3: Pedestrian Refuge Across SH73

11. A permanent speed limit change was implemented on 12 October 2020 along SH73 in vicinity of the site as shown in **Figure 4**. The safety of pedestrians crossing SH73 was identified as a key reason to implement this speed reduction.

Figure 4: Speed Limit Changes as of 12 October 20220

12. The No. 86 bus service is primarily for residents that commute to the city from Darfield, Kirwee and West Melton. It operates as an express service so only stops at selected locations as shown in **Figure 5**. This illustrates a bus-stop location on Halkett Road within 260m of the proposed site access.

Figure 5: Bus Service 86 (West Melton) (Source: Metro Christchurch)

Future Changes to Land Use and Infrastructure

13. The Weedons Ross Road/SH73 priority-controlled intersection is programmed to be upgraded to traffic signals. This is due for completion in 2022/2023. The key purpose for this improvement is *to allow safer access for pedestrians and cyclists, particularly vulnerable school children*[2].

Current and Future Transportation Patterns

14. NZTA have a traffic monitoring site (count station) along SH73, east of Dawsons Road. This is approximately 4 km east of the application site. The Average Annual Daily Traffic (AADT) recorded between 2014-2019[3] is illustrated in **Table 2**.

Table 2: Average Daily Traffic for SH73 (East of Dawsons Road)

Year	AADT
2014	9,910
2015	10,340
2016	11,027
2017	11,236
2018	9,424
2019	13,250

[2] https://www.nzta.govt.nz/planning-and-investment/nz-upgrade/canterbury-package/
[3] https://www.nzta.govt.nz/resources/state-highway-traffic-volumes/

15. **Table 2** reveals that the background traffic growth has increased by a rate of around 3.6% (compound) per year along SH73 (if using all values between 2014 & 2019).

16. Commuter traffic patterns from the latest Census data[4] (2013) has been analysed to determine likely traffic distributions for the site. Results for the West Melton zone (587904) are shown in **Table 3** and clearly indicate that a significant proportion of trips (74% and 90%) travel to and from Christchurch City (to and from the east). It also assumes that vehicles would predominantly use SH73 at some point to access their destinations.

Table 3: Predicted Traffic Distributions from the Site

Distribution	In	Out
Christchurch	711 (74%)	1926 (90%)
Other/West	255 (26%)	219 (10%)

The Proposal

17. The proposed Plan Change would enable up to 130 residential lots to be established at the application site. A proposed ODP is illustrated in **Appendix 1**.

18. Unless otherwise stated, it is proposed to adopt the transport provisions of the Operative District Plan or Proposed District Plan, whichever is relevant at the time.

19. The following sets out the transport details of the proposed Plan Change.

Site Layout

Access Intersections

20. The proposed ODP provides a north-south primary road through the site forming T-intersections at Halkett Road (to the north) and SH73 (to the south).

21. The intersection design at Halkett Road is envisaged to mirror the design associated with Rossington Drive (Halkett Grove). This includes lighting and kerb and channel at the point of access with the potential to include future footpaths.

22. The intersection design at SH73 is envisaged to include a right turn lane as conceptually illustrated in **Figure 6**. This can be accommodated for a posted speed limit of 100km/h with the widening shared across the centreline. It is anticipated that the stock-water race on the south side of the road may need to be filled in to accommodate such an access. A less onerous design could be provided if the existing 60km/h speed limit was extended further to the east to incorporate the proposed site access. Either way, an access intersection can be designed to fit within the existing road reserve.

[4] http://infoshare.stats.govt.nz/datavisualisation/commuterview/index.html#

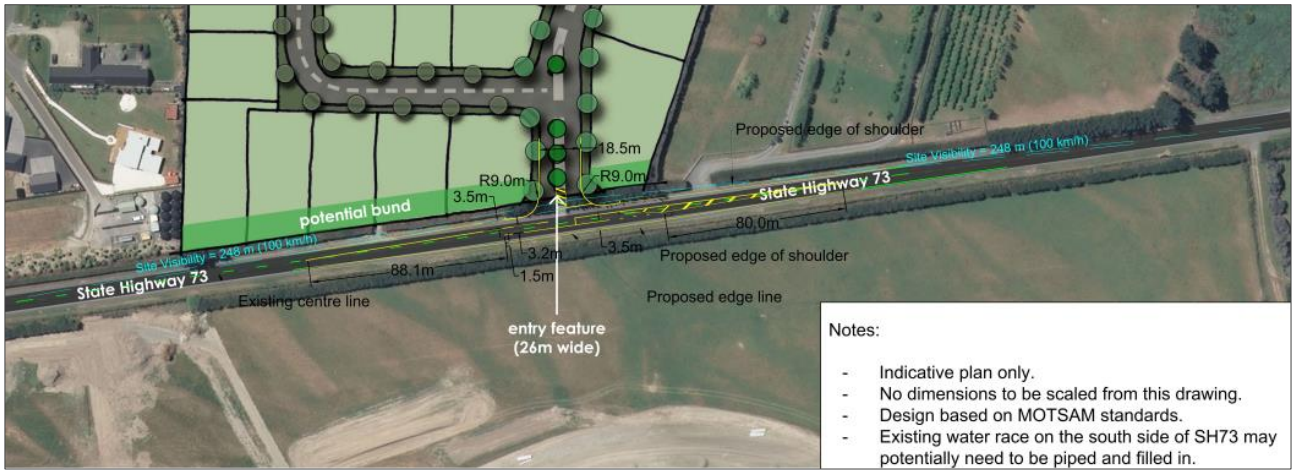

Figure 6: Indicative Intersection Plan With a Right-Turn Lane – SH73

Internal Roads

23. Internal roads within the site include:

- A primary north-south road;
- A secondary loop road connected to the primary road; and

Two secondary roads connecting with land further to the east.

24. The road cross-sections and intersection spacings within the Plan Change area are proposed to comply with the requirements of the District Plan. It is proposed that the roads identified on the ODP would most likely be constructed as either Local Major or Local Intermediate roads.

Potential Access Links

25. Vehicular access to the adjacent subdivision to the west (Halkett Grove) is not able to be provided, however provision has been made for future links to east with two connecting roads.

Pedestrian & Cycle Links

26. A link through Lot 105 within the Halkett Grove subdivision is proposed that can accommodate a shared footpath/cycleway. This is illustrated in **Figure 7**. This also identifies the existing pedestrian refuge across SH73 that links through to Rossington Drive from the residential subdivision to the south. Pedestrians/cyclists from the application site can use the shared footpath/cycleway to access the subdivision to the west, then either walk west along Brampton Drive (to access the various facilities within the activity centre of West Melton) via Brinsworth Avenue and Weedons Ross Road or they can walk south along Rossington Drive to use the pedestrian/cycle path to cross SH73 at the refuge.

27. The ‘activity centre’ is generally at the centre of West Melton and includes a Primary School, various shops including a supermarket, a kindergarten and nursery, ATM facilities, a church and a post office. All these facilities will be within approximately 1km walking distance of the application site.

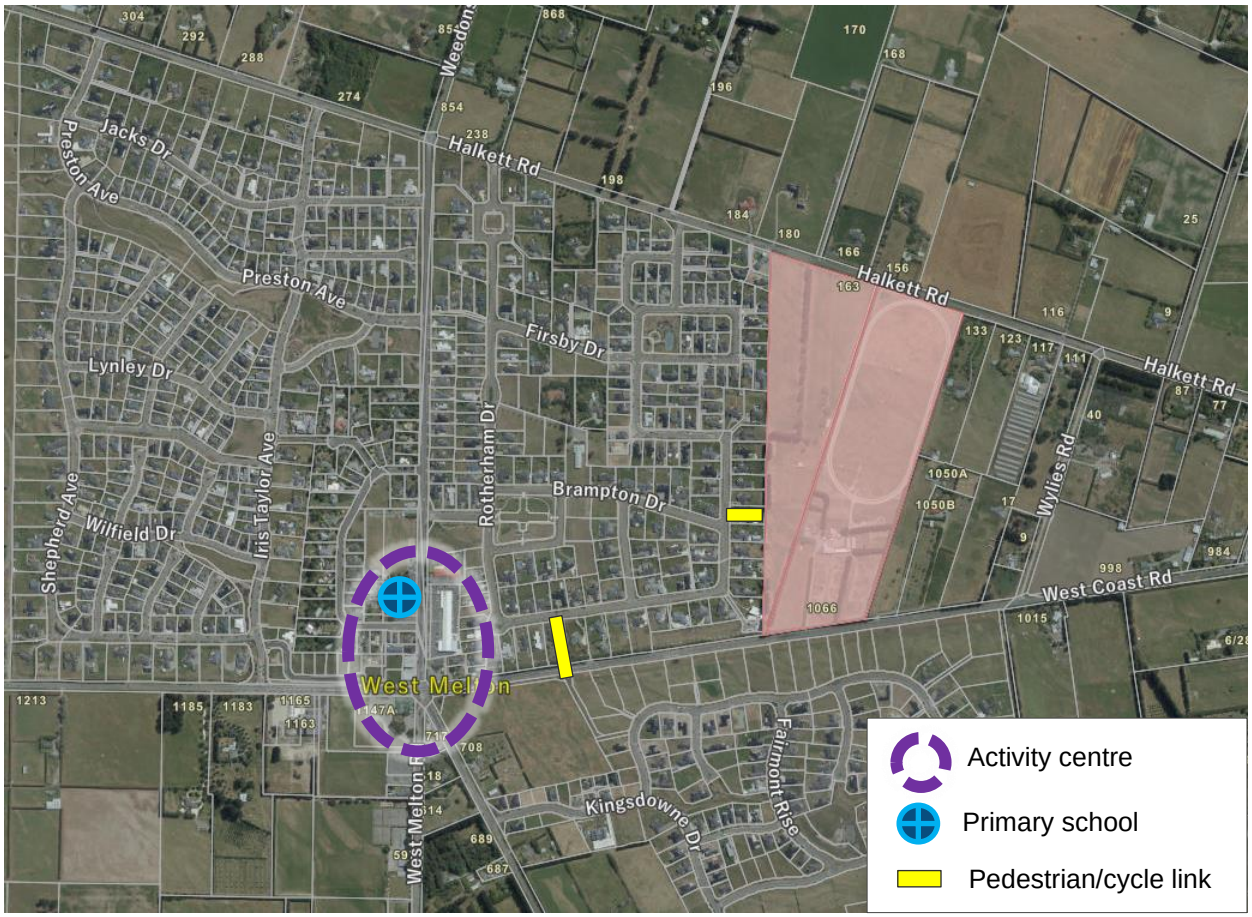

Figure 7: Pedestrian and Cycle Links near to the Site (source: Canterbury Maps)

28. The future provision for a footpath along SH73 could be considered that extends along the frontage of the site towards the existing pedestrian crossing (and beyond). This could improve connectivity to and from any further development to the east of the site, although for safety purposes the preference is to retain and promote internal pedestrian linkages.

Traffic Generation & Distribution

Traffic Generation

29. The traffic generation of residential activities is typically based on an 85th percentile rate of 0.9 vehicles per 'outer suburban' dwelling in the peak hours and 8.2 vehicles per dwelling per day[5]. However, it is considered that the location of the Plan Change site may lead to spreading of traffic generation, with some vehicles leaving early to commute to Rolleston and Christchurch, whilst others leaving later having dropped children at school in West Melton.

30. Applying those rates to the proposed 130 lots planned on the ODP will lead to a traffic generation of 117 vehicle movements per hour at peak times and 1,066 vehicle movements per day.

[5] Based on Outer Suburban dwellings in the NZTA Research Report 453 – *Trips and Parking Related to Land Use*.

31. In the morning peak, 80% of trips will be departing the development, with 65% arriving in the evening peak hour. These are typical splits for residential housing in the peak hours. The anticipated traffic generation associated with the Plan Change site is shown in **Table 4**.

Table 4: Traffic Generation (130 Lots)

Scenario	In	Out	Total
Morning Peak Hour	23	94	117
Evening Peak Hour	76	41	117
Daily	533	533	1,066

Distribution

32. Using the distribution of traffic derived from the 2013 Census data for Journey to Work (for people living in West Melton) and assuming that the split is 30:70% for residents using Halkett Road and SH73, respectively, the distribution of development is shown in **Table 5**.

Table 5: Distribution of Site Development Traffic

Distribution	Arrival		Departures	
	AM	PM	AM	PM
SH73				
East	12	39	59	26
West	4	14	7	3
Halkett Road				
East	5	17	25	11
West	2	6	3	1

33. These volumes have been used to inform and determine the intersection operation with the proposed Plan Change. The forecasted development and total traffic volumes at the two intersections are illustrated in **Figure 8** and **Figure 9** below. These are based on the following assumptions:

- An opening year of 2023 for the site;
- A compound growth of 3.64% along SH73 (and Halkett Road); and
- The peak hour is 10% of AADT and that this volume is shared evenly in both directions.

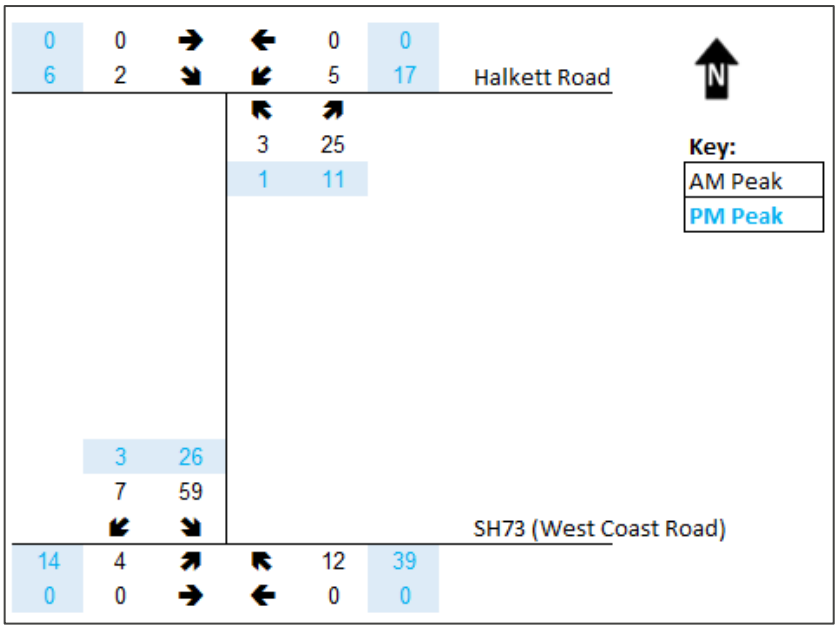

Figure 8: Development Volumes Modelled for the Site

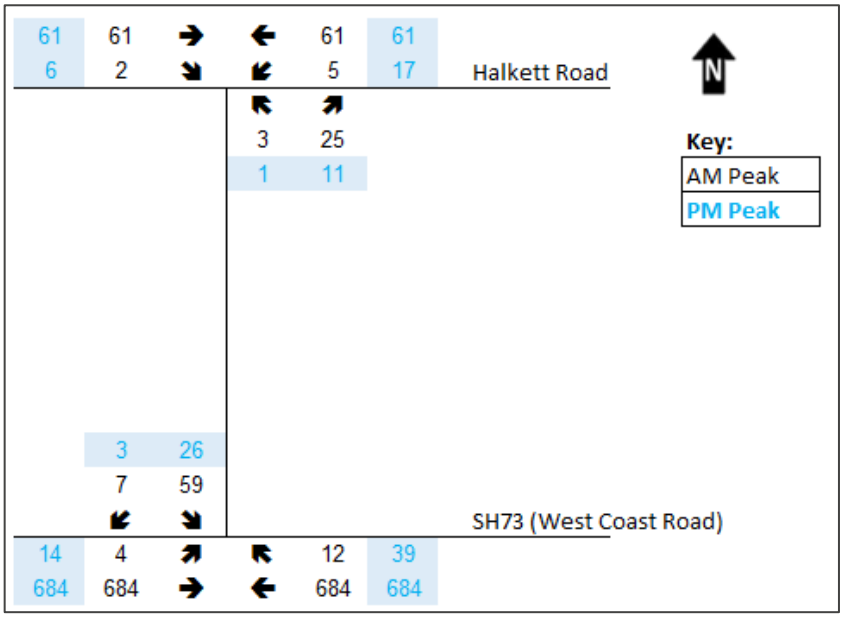

Figure 9: 2023 Total Traffic Volumes Modelled for the Site (Base + Development)

Assessment of Effects

34. Key matters for the assessment of transport effects associated with the proposed Plan Change are considered to be:

- **Roading Network Capacity**: Whether the main site access along SH73 can support development from the application site;

- **Parking & Loading**: Whether the District Plan rules adequately provide for the layout and provision of car parking and loading at the application site;

- **Access Arrangements**: Where the accesses are anticipated to operate safely and efficiently and whether the District Plan rules adequately provide for access. Also, the internal roading pattern proposed in the ODP and the associated rules and formation standards; and

- **Wider Network Effects**: Whether the effects of the proposed activity can be satisfactorily accommodated by the surrounding road network. Whether the proposed Plan Change will be accessible by a range of transport modes.

The above matters are assessed in turn in the following sections.

Roading Network Capacity

35. The traffic effects of the proposed ODP have been modelled using SIDRA 9.0 – an industry standard computer-based analysis tool for assessing the performance characteristics of an intersection.

36. The results presented in this report include the Level of Service ('LOS') provided by the intersection. LOS is a generalised function of delay where LOS A and B are very good and indicative of free-flow conditions; C is good; D is acceptable; and E and F are typically indicative of congestion and unstable conditions, although the former is sometimes accepted in the peak hour.

37. Only the site access onto SH73 has been modelled as the low volumes along Halkett Road do not merit analysis.

38. The SIDRA results are summarised below in **Table 6**.

Table 6: SIDRA Results at SH73/Site Access T-intersection – Opening 2023 (Base + Development)

Road and Movement	Turn	AM			PM		
		Average Delay (s)	95 %tile Queue (vehicle)	Level of Service	Average Delay (s)	95 %tile Queue (vehicle)	Level of Service
SH73 East	R	11.2	1	B	11.4	1	B
Site Access	L	12.6	1	B	12.3	1	B
	R	47.6	1	E	49.3	1	E
SH73 West	L	7.9	0	A	7.9	0	A

39. Results indicate that the intersection of SH73 (with a right turn lane) can support the level of development traffic proposed. Although a LOS E is indicated in the AM and PM peaks, this is for a very small number of drivers. In addition, when the traffic signals are implemented at the intersection of SH73/Weedons Ross Road (2022/2023), drivers wanting to head west from the site, will be able to exit onto Halkett Road instead, and drive south down Weedons Ross Road to use the traffic signals. It follows that the effect on drivers wanting to turn right will be mitigated.

40. Note that the layout does require two lanes for the egress onto SH73. The length of the right turn needs to accommodate the length of the largest vehicle expected to use the site. The layout is shown below in **Figure 10**.

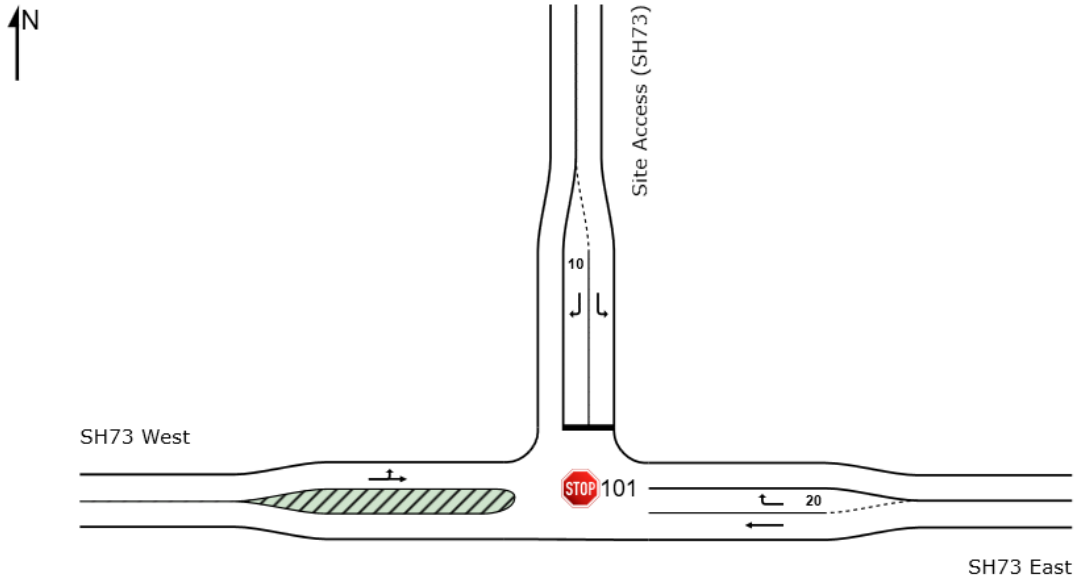

Figure 10: Site Access (SH73) Layout Modelled

41. All SIDRA modelling is included in **Appendix 2**.

Parking & Loading

42. The District Plan rules regarding parking and loading will be adopted for this Plan Change. This is considered to be sufficient to confirm that parking and loading will be satisfactorily provided for in a functional and practical manner.

Access Arrangements

Site Accesses

43. The engineering details of the proposed access arrangements are yet to be determined, although it is considered there will be sufficient space to accommodate satisfactory intersections at both the SH73 and at Halkett Road.

44. The intersections will be designed to comply with relevant design standards, including sight line requirements. These will also be subject to road safety audit requirements to confirm they can operate safely.

45. The proposed access intersection on SH73 will accommodate the predicted traffic volumes. An indicative intersection design has been provided in **Figure 6** that identifies spatial requirements for an intersection with a 100km/h speed limit and a right-turn bay.

46. The traffic volumes on Halkett Road are sufficiently low that detailed intersection design consideration is not required. There is sufficient space to accommodate an intersection in this location that is fit for purpose. This is envisaged to mirror the existing design at the neighbouring Halkett Grove subdivision.

47. Overall, it is considered that satisfactory intersections to accommodate access can be designed and constructed.

Internal Access Roads

48. The internal access roads and intersections are proposed to comply with the District Plan requirements and will again be subject to road safety audits. This is considered to be sufficient to confirm the internal network will operate safely and efficiently.

49. Access to individual properties is also proposed to comply with the District Plan requirements. Any non-compliances will either be sought at subdivision stage or addressed on an individual basis and the effects of this on safety and efficiency considered at that stage.

50. The above is considered to be sufficient to confirm that the internal transport network will be safe and efficient.

Wider Effects

Accessibility

51. The proposed site will include pedestrian and cycle links within the Plan Change area and potential linkages to adjoining land to the west and east. Most importantly this includes a key link via Lot 105 to and from The Halkett Grove subdivision. This in turn provides links and connections with the 'activity centre' and various facilities including the West Melton Primary School, and the subdivision on the south side of SH73 (via the pedestrian crossing). The approximate distance of 1km between the application site and the activity centre is considered to be an acceptable distance to walk/cycle – noting that a 1km walk would take approximately 11 minutes.

52. Two road links with associated footpaths are proposed to the east. These could include on-road cycleways if required.

53. There are no footpaths proposed along Halkett Road. The bus stop location is along Halkett Road to the west of the site's access. The road reserve is wide enough to provide one if ever required.

54. There are no footpaths on SH73. The future provision for a footpath along SH73 could be considered that extends along the frontage of the site towards the existing pedestrian crossing (and beyond). This could improve connectivity to and from any further development to the east of the site, although for safety purposes the preference is to retain and promote internal pedestrian linkages.

55. The above is considered to be sufficient to confirm that the site has access to adjoining communities and nearby amenities and facilities without the need to drive.

Summary & Conclusion

Summary

56. The Plan Change proposed would enable the development of up to 130 residential Lots to be established at the application site. These activities are predicted to generate in the order of 117 vehicle movements per hour in the peak hours and 1,066 vehicle movements per day.

57. An ODP has been prepared which provides a primary north-south road through the site connecting with SH73 and Halkett Road. A series of other local roads will provide connections to adjoining land to the east. A cycle and pedestrian link will be provided through Lot 105 which will provide a key link and

connection with communities and facilities to the west and on the opposite side of SH73. To the extent practicable, a high degree of accessibility is provided.

58. An intersection design incorporating a right-turn bay is envisaged on SH73. The traffic capacity of this intersection has been assessed. This intersection can operate satisfactorily with the proposed Plan Change traffic added to the network, operating at a LOS B on the main road (SH73) and LOS E for right turns during the peak hour period.

59. The transport provisions of the Operative District Plan (or Proposed District Plan) can be adopted at the subdivision and/or resource consent stages. No specific rules are required for any other transport purpose.

Conclusion

60. For the reasons discussed above, the proposed rezoning of this site for residential purposes can be supported from a transport perspective.

Appendix 1

Proposed ODP

Halkett Road

West Coast Road/State Highway 73

LEGEND

- Medium Density
- Reserves
- No Direct Vehicle Access
- Primary Road
- Secondary Road
- Possible Future Road Connection
- Shared Pedestrian / Cycle Lane (off road)
- Shared Pedestrian / Cycle Lane (on road)

NORTH

ODP - West Melton East

Not to Scale

Appendix 2

SIDRA Reports

MOVEMENT SUMMARY

Site: 101 [2023 AM - SH73 & Site Access (Site Folder: General)]

New Site
Site Category: (None)
Stop (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
East: SH73 East														
5	T1	684	5.2	720	5.2	0.380	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.8
6	R2	12	0.0	13	0.0	0.016	11.2	LOS B	0.1	0.4	0.59	0.74	0.59	55.0
Approach		696	5.1	733	5.1	0.380	0.2	NA	0.1	0.4	0.01	0.01	0.01	98.4
North: Site Access (SH73)														
7	L2	59	0.0	62	0.0	0.110	12.6	LOS B	0.4	2.7	0.64	1.00	0.64	52.0
9	R2	7	0.0	7	0.0	0.086	47.6	LOS E	0.2	1.7	0.93	1.00	0.93	34.1
Approach		66	0.0	69	0.0	0.110	16.3	LOS C	0.4	2.7	0.67	1.00	0.67	49.2
West: SH73 West														
10	L2	4	0.0	4	0.0	0.380	7.9	LOS A	0.0	0.0	0.00	0.00	0.00	87.9
11	T1	684	5.2	720	5.2	0.380	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.6
Approach		688	5.2	724	5.2	0.380	0.1	NA	0.0	0.0	0.00	0.00	0.00	99.6
All Vehicles		1450	4.9	1526	4.9	0.380	0.9	NA	0.4	2.7	0.04	0.05	0.04	94.8

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.

MOVEMENT SUMMARY

Site: 101 [2023 PM - SH73 & Site Access (Site Folder: General)]

New Site
Site Category: (None)
Stop (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
East: SH73 East														
5	T1	684	5.2	720	5.2	0.381	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	99.8
6	R2	39	0.0	41	0.0	0.054	11.4	LOS B	0.2	1.5	0.61	0.81	0.61	54.8
Approach		723	4.9	761	4.9	0.381	0.7	NA	0.2	1.5	0.03	0.04	0.03	95.7
North: Site Access (SH73)														
7	L2	26	0.0	27	0.0	0.049	12.3	LOS B	0.2	1.2	0.62	0.97	0.62	52.1
9	R2	3	0.0	3	0.0	0.039	49.3	LOS E	0.1	0.8	0.93	1.00	0.93	33.5
Approach		29	0.0	31	0.0	0.049	16.1	LOS C	0.2	1.2	0.65	0.97	0.65	49.3
West: SH73 West														
10	L2	14	0.0	15	0.0	0.386	7.9	LOS A	0.0	0.0	0.00	0.01	0.00	87.7
11	T1	684	5.2	720	5.2	0.386	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	99.3
Approach		698	5.1	735	5.1	0.386	0.2	NA	0.0	0.0	0.00	0.01	0.00	99.1
All Vehicles		1450	4.9	1526	4.9	0.386	0.7	NA	0.2	1.5	0.03	0.05	0.03	95.5

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.