Fulton Hogan Land Development Limited

Proposed Mixed Use Subdivision
922 Luggate-Cromwell Road

Transportation Assessment

CARRIAGEWAY
CONSULTING
traffic engineering | transport planning

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CCL file reference	parkburn_transport_assessmentreport_final_29.10.2026
Status	Final
Issued	29 October 2026

1. Introduction

1.1. This Transportation Assessment has been prepared to support a Substantive Application made by Fulton Hogan Land Development Limited under the Fast Track Approval Acts 2024 in accordance with the requirements of Section 42. The proposal is a Referred Project and this report has been prepared to support an application for the Parkburn Development Project (**the Project**) which is a mixed use development at 922 Luggate-Cromwell Road (State Highway 6) (**the site**), located approximately 8km to the north of Cromwell township and adjoining Lake Dunstan / Te Wairere.

1.2. The Project provides for the establishment of a mixed-use urban development, including quarry rehabilitation, residential development, supporting commercial and community activities, open space, and associated infrastructure. Works are also proposed within the State Highway 6 (SH6) road reserve.

1.3. Section 43 of the Fast Track Approval Act sets out the information to be included in a substantive application, which includes an assessment of adverse effects of the project on the environment. This report has been prepared to assess the transportation effects of the project and presents the findings, conclusions and recommendations with respect to traffic generation, road safety and access considerations.

1.4. This Transportation Assessment sets out an evaluation of the transportation aspects associated with the proposed masterplan, including changes in travel patterns that are likely to arise. Where potential adverse effects are identified, potential options for ways in which these can be addressed are set out.

1.5. This report is cognisant of the guidance specified in the New Zealand Transport Agency's '*Integrated Transport Assessment Guidelines'* and although travel by private motor vehicle is addressed within this report, in accordance with best practice the importance of other transport modes is also recognised. Consequently, travel by walking, cycling and public transport is also considered.

1.6. The site which is the subject of this report was previously considered and assessed through a private plan change to the Central Otago District Plan (known as Plan Change 21 (**PC21**)). The current proposal represents an intensification of the expected residential development and removal of the industrial development provided for under PC21. As far as practical, the same methodology has been adopted for this assessment as was used, and accepted as being appropriate, for PC21.

1.7. This report has been prepared by Andy Carr, in accordance with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note (2023). Mr Carr's qualifications and experience are summarised in Annexure A.

1.8. For clarity, this assessment is an updated version to that which was lodged on 4 August 2026 as part of the original Parkburn Substantive Application. This updated report takes into account the revised scheme plan and addresses comments received from Local Authority peer reviewers to date.

2. Site Overview

2.1. Location

2.1.1. The site is located around 8km to the north of Cromwell, and adjacent to Lake Dunstan and the completed Pisa Mooring development to the south. The site has frontage onto State Highway 6 to the west, and there are two legal roads that connect the site onto the highway. One of these is presently formed as the access to the current quarrying operations on the site and the adjacent property to the north (discussed further below) and will be upgraded to a roundabout as part of the development, and the other will be closed (but for completeness, a second roundabout will also be formed to serve the site).

2.1.2. The majority of the site is zoned as Low Density Residential but with the northern section zoned as Industrial Area as well as a smaller commercial zoned area.

2.1.3. The location of the site in the context of the local area is shown in Figure 1 and in more detail in Figure 2.

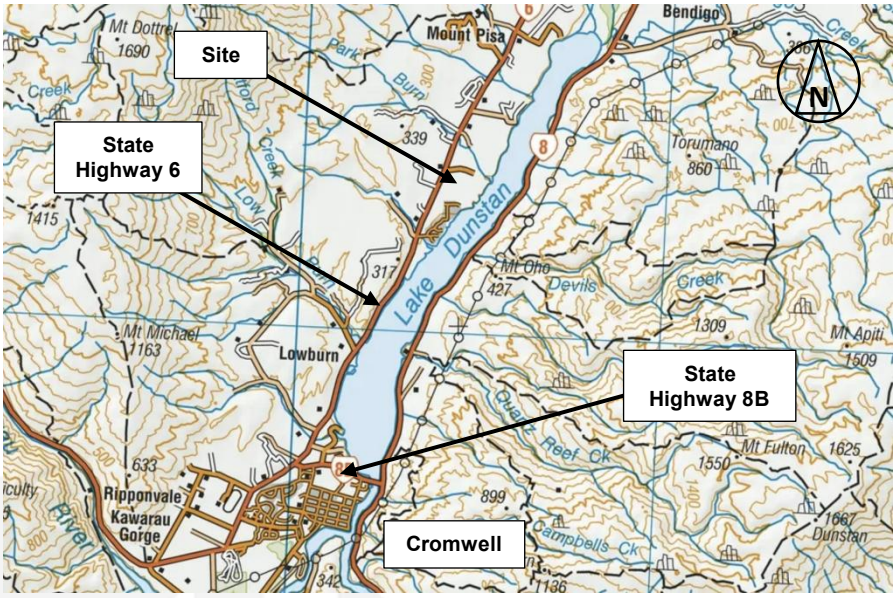


Figure 1: General Location of Site (Source: NZ Topo Map)

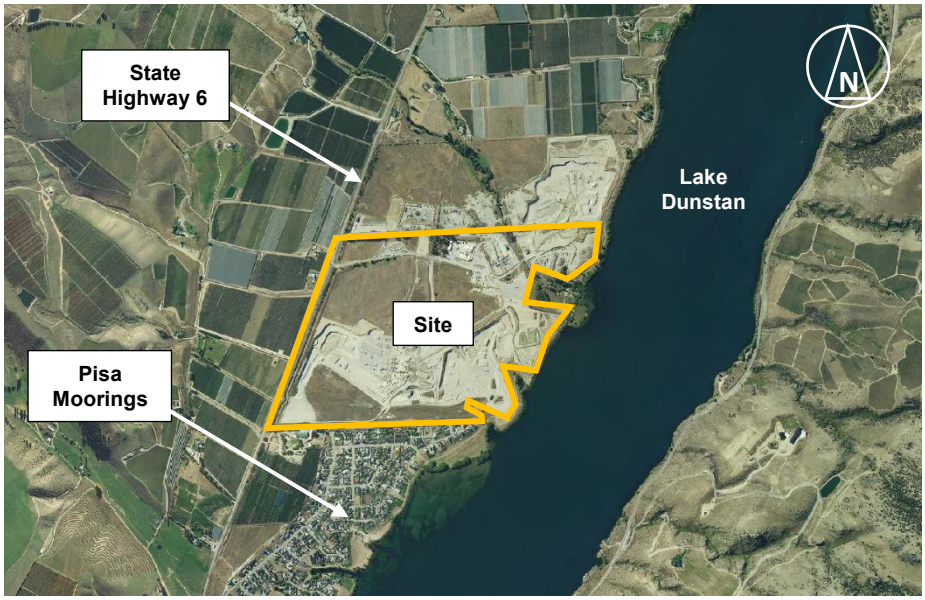


Figure 2: Aerial Photograph of Site and Environs

2.2. Roading Classification

2.2.1. The District Plan classifies State Highway 6 as a state highway, and therefore has the purpose of carrying through traffic, with direct property access being limited.

2.2.2. All other roads in the area are Local Roads, meaning they provide for local journeys and direct property access.

3. Current Transportation Networks

3.1. Roading Network

3.1.1. In the vicinity of the site (and in fact for 8km to the north and south of the site), State Highway 6 is characterised by a generally flat alignment and large-radii curves. The formation has one traffic lane in each direction of 3.6m width plus a sealed shoulder of around 0.5m width. The speed limit is 100km/h, with data indicating that the operating speed is around 5km/h greater than this (as would be expected in view of the highway geometry).



Photograph 1: Typical Cross-Section of State Highway 6

3.1.2. The existing legal road which presently connects the site to State Highway 6 is formed as the access to Parkburn Quarry and the adjacent property to the north. This has auxiliary right-turn land left-turn lanes for vehicles turning off the highway and widened shoulders. Sightlines at the intersection are excellent.



Photograph 2: State Highway 6 / Parkburn Quarry Access (Looking South)

3.1.3. Due to the presence of Lake Dunstan to the east and mountains (Pisa Range) to the west, the roading network in this general area is linear and broadly runs north-south. Consequently, to the north of the Parkburn Quarry access, the highway extends to Luggate some 25km away without any major roads connecting to it. Northwest of Luggate, State Highway 6 then runs to the outskirts of Wānaka before turning north to serve settlements on the West Coast.

3.1.4. Approximately 2km south of the Parkburn Quarry access and 1km south of the site's southern boundary, State Highway 6 passes through a priority ('give-way') crossroads, with Pisa Moorings Road forming the eastern approach and Clarke Road forming the western approach (although vehicles on the highway retain priority). Pisa Moorings Road serves the small settlement of Pisa Moorings (around 450 residences). The intersection has a right turn bay and a left turn deceleration lane for traffic turning into Pisa Moorings Road, and a widened shoulder for traffic turning left into Clark Road. Sightlines at the intersection are excellent.



Photograph 3: State Highway 6 / Pisa Moorings Road / Clarke Road Intersection (Looking North)

3.1.5. There are no further intersections for 3.7km south of Pisa Moorings, until Lowburn Valley Road connects to State Highway 6 from the west. This road serves the small settlement of Lowburn, with Lowburn Valley Road joining the highway at a priority ('give-way') intersection. The intersection does not have any auxiliary turning lanes but there are wide sealed shoulders on each side to enable vehicles to move clear of the through-traffic lanes before turning.



Photograph 4: State Highway 6 / Lowburn Valley Road Intersection (Looking South)

3.1.6. There are a freedom camping area and a seasonal water park on the eastern (lake) side of the highway, just south of Lowburn Valley Road which are served by an access that is formed as an intersection with an auxiliary right-turn bay. There are no further intersections for another 2.4km south of Lowburn Valley Road, until Burn Cottage Road connects to the highway at a priority ('give-way') intersection. The intersection does not have any auxiliary turning lanes but there are wide sealed shoulders on each side to enable vehicles to move clear of the through-traffic lanes before turning.



Photograph 5: State Highway 6 / Burn Cottage Road Intersection (Looking South)

3.1.7. The speed limit on the highway reduces to 80km/h approximately 150m to the south of Burn Cottage Road, with Shortcut Road connecting to the highway from the east some 250m south of the speed limit change. The State Highway 6 / Shortcut Road intersection is priority ('give-way') controlled and has a short left-turn lane and also has right-turn bays (one of which is for vehicles turning into a roadside stall located on the western side of the highway). Once again, the alignment of the highway means that sightlines for turning traffic are excellent.



Photograph 6: State Highway 6 / Shortcut Road Intersection (Looking North)

3.1.8. Shortcut Road provides a route for traffic that bypasses the majority of Cromwell township on its northern side, and connects to State Highway 8B to the east of the town centre.

3.1.9. Some 0.7km south of Shortcut Road, State Highway 6 meets State Highway 8B at a large (50m diameter) roundabout. This presently has one circulating lane, although it is understood that the design allows for a second lane to be added at some future time. There is presently one approach lane and one departure lane on each leg (but again, the layout allows for additional lanes to be added in future).



Photograph 7: State Highway 6 / State Highway 8B Roundabout (Looking South)

3.1.10. The roundabout replaced a priority intersection, and opened in mid-2022.

3.1.11. State Highway 8B runs eastwards from the roundabout providing access to Cromwell and connecting to State Highway 8 on the eastern side of Lake Dunstan. In turn this provides access to Alexandra and Dunedin to the southeast and to the northeast it connects to settlements on the east coast of the South Island. To the south of the roundabout, State

Highway 6 connects to the Wakatipu Basin before running southwards and terminating in Invercargill.

3.2. Non-Car Infrastructure

3.2.1. There is generally little specific provision for walking and cycling along State Highway 6. However, on the eastern side of the site is the Lake Dunstan Trail, which is a dedicated off-road route for walkers and cyclists. It runs along the shoreline of the lake at the site and southwards for approximately 2.7km before turning slightly westwards and running along the eastern side of the highway for around 4.3km.

3.2.2. Just north of Cromwell township the trail moves away from the highway and back to following the lake shoreline, and into the old town centre of Cromwell. Further south it connects to Clyde (around 19 southeast of Cromwell), and north of the site it runs to Smiths Way, a Local Road that is approximately 1.3km north of the site.

3.2.3. The Trail is described as Grade One (easy/flat) and is formed with a gravel surface of approximately 3.0m to 3.5m width.



Photograph 8: Example of Dunstan Trail Cross-Section (Looking South)

3.2.4. There is also provision for walking and cycling around the State Highway 6 / State Highway 8B roundabout, with a shared 1.8m wide route running around the circulating lane and through the deflection islands.



Photograph 9: Cycle Lane at the State Highway 6 / State Highway 8B Roundabout (Looking South)

3.2.5. There is no public transport in the area.

3.3. Future Changes

3.3.1. There are no known changes to the roading environment in the immediate area that are set out in any overarching strategies or guides at the time of writing.

4. Current Transportation Patterns

4.1. Traffic Flows

4.1.1. The New Zealand Transport Agency Waka Kotahi (**NZTA**) carries out a regular programme of monitoring the traffic volumes on the state highway network. There are no NZTA traffic counters in the immediate vicinity of the site, with the closest ones being 16km to the north and 6km to the south (counters 00600917 and 00600939 respectively).

4.1.2. Although the counter to the south is closest to the site, it lies to the south of Lowburn, the water park and the freedom camping site. As such, it will record traffic movements associated with these activities and which do not necessarily pass the site. Conversely, the counter towards the north will not count those vehicles that travel past the site but which turn off into private property between the site and the counter location.

4.1.3. For completeness, the Annual Average Daily Traffic Flows at the counters is shown below:

- Counter 00600917 (north of the site): 3,327 vehicles per day (two-way); and
- Counter 00600939 (south of the site): 6,627 vehicles per day (two-way).

4.1.4. In order to confirm the traffic flow past the site, a weekday morning and evening peak hour traffic count were undertaken at the State Highway 6 / Pisa Moorings Road / Clarke Road intersection in March 2025. The volumes recorded are set out below.

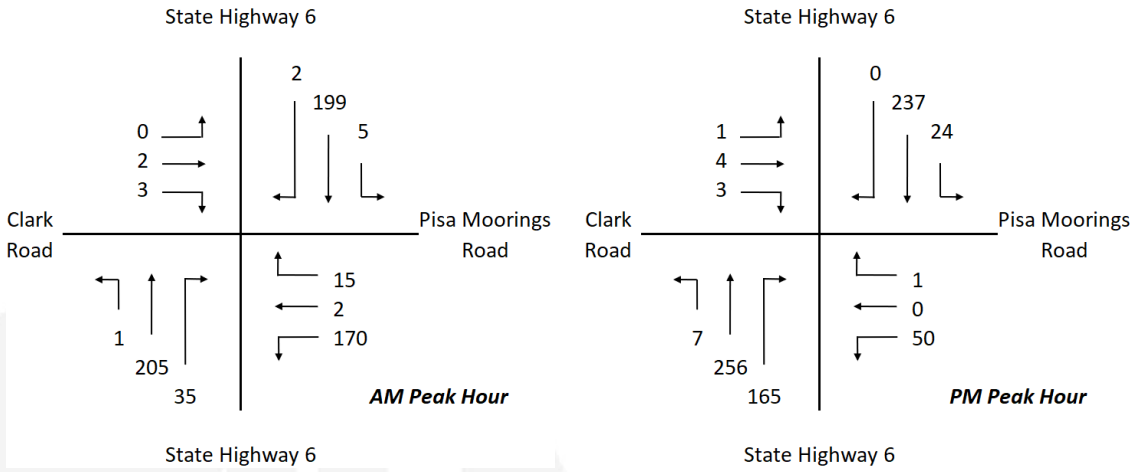


Figure 3: Turning Volumes at Access to Pisa Moorings, March 2025

4.1.5. This data has also been used to confirm the traffic generation rates for the site, as discussed below. As part of confirming the validity of the count, a comparison was carried out against the traffic flows observed at the two traffic counters and it was confirmed that the observed volumes at the intersection are typical. Details of this comparative exercise are shown in Annexure B.

4.1.6. As set out earlier in this report, a private plan change request for the site was previously advanced and subsequently approved by Central Otago District Council in 2024 (PC21). The approach which was utilised to assess the effects of the traffic generated by development of the site was to use a microsimulation transportation model, previously developed by the Council in order to assess and test large-scale proposals.

4.1.7. One advantage of using the model is that it makes allowance for the expected traffic volumes on the roading network in future Design Years, by taking into account the expected uptake of land around Cromwell (as anticipated by the Council). This therefore yields robust Design Year scenarios which can be used for assessment.

4.1.8. The model only includes the weekday evening peak period. It is understood that this was agreed by all parties assessing PC21 that this represented the 'worst case' traffic flows and that a weekday morning peak period assessment was not required. PC21 was approved on that basis.

4.1.9. The Council has made it's microsimulation model available for assessment of the current proposed development for the site. The Figure below shows the expected traffic volumes on the adjacent roading network for a Design Year of 2034[1], without any development of the site, as shown below:

[1] The model is only developed for particular future years, and 2034 is the closest year to the typical ten-year Design Year used for such analysis.

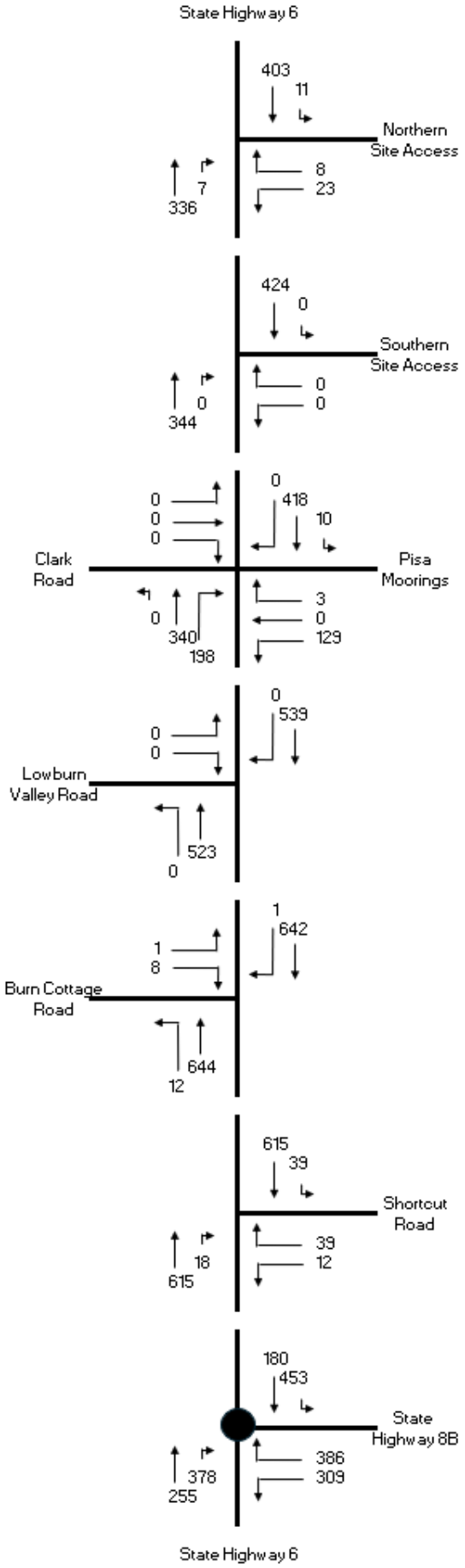


Figure 4: Design Year (2034) Traffic Volumes on State Highway 6, Evening Peak Hour

4.1.10. The model also calculates expected delays and the levels of service at each intersection. These are summarised below.

Intersection	Model Results		
	Total Veh/hr	Average Delay (s)	Level of Service
SH6 / Site Access South	768	3	A
SH6 / Site Access North	768	7	A
SH6 / Pisa Moorings Rd / Clark Rd	1,097	7	A
SH6 / Lowburn Valley Road	1,295	33	D
SH6 / Burn Cottage Road	1,308	20	C
SH6 / Shortcut Road	1,337	9	A
SH6 / SH8B Roundabout	1,960	9	A

Table 1: Intersection Performance, with no Site Development

4.1.11. It can be seen that most intersections operate with an excellent level of service. There are slightly lower levels of service expected at the Lowburn Valley Road and Burn Cottage Road intersections. These arise due to the volume of traffic on the highway which reduces the number of gaps into which traffic from the minor approaches can emerge.

4.1.12. As mentioned above, the site has already been subject to a plan change, and site development was also modelled using the microsimulation model. The results of this, as presented to the Hearing Panel for PC21, are shown below for 50% of the site development.

Intersection	N			E			S			W			Total		
	Veh/ hr	Delay (sec)	LOS	Veh/ hr	Delay (sec)	LOS	Veh/ hr	Delay (sec)	LOS	Veh/ hr	Delay (sec)	LOS	Veh/ hr	Delay (sec)	LOS
SH6 / PC 21 South	406	2	A	121	8	A	457	4	A	-	-	-	984	8	A
SH6 / PC 21 North	355	2	A	75	7	A	302	3	A	-	-	-	732	7	A
SH6 / Pisa Moorings Rd / Clark Rd	512	5	A	274	16	C	870	12	B	0	0	0	1656	16	C
SH6 / Lowburn Valley Rd	762	6	A	-	-	-	960	8	A	82	>150	F	1804	>150	F
SH6 / Burn Cottage Rd	801	2	A	-	-	-	964	1	A	36	40	E	1801	40	E
SH6 / Shortcut Rd	835	1	A	49	22	C	941	2	A	-	-	-	1825	22	C
SH6 / SH8b	789	9	A	844	5	A	666	106	F	-	-	-	2299	35	D

Table 2: Intersection Performance, 50% Site Development According to PC21 Assessment (Source: Abley ITA for PC21)

4.1.13. With 50% development, it was concluded that improvements should be made to convert the State Highway 6 / Pisa Moorings / Clarke Road intersection to a roundabout and to add a second circulating lane onto the State Highway 6 / State Highway 8B roundabout. With these improvement measures in place, the model was run again and the results as presented to the Hearing Panel for PC21 are shown below:

Intersection	N			E			S			W			Total		
	Veh/ hr	Delay (sec)	LOS	Veh/ hr	Delay (sec)	LOS	Veh/ hr	Delay (sec)	LOS	Veh/ hr	Delay (sec)	LOS	Veh/ hr	Delay (sec)	LOS
SH6 / PC 21 South	461	2	A	211	11	B	656	6	A	-	-	-	1328	11	B
SH6 / PC 21 North	385	2	A	113	7	A	371	4	A	-	-	-	869	7	A
SH6 / Pisa Moorings Rd / Clark Rd	649	9	A	276	8	A	1057	4	A	0	0	0	1982	6	A
SH6 / Lowburn Valley Rd	905	4	A	-	-	-	1126	10	A	97	>150	F	2127	>150	F
SH6 / Burn Cottage Rd	950	2	A	-	-	-	1117	1	A	28	>150	F	2095	>150	F
SH6 / Shortcut Rd	974	1	A	77	4	A	1067	3	A	-	-	-	2118	4	A
SH6 / SH8b	931	5	A	813	3	A	820	6	A	-	-	-	2564	5	A

Table 3: Intersection Performance, 100% Site Development According to PC21 Assessment (Source: Abley ITA for PC21)[2]

4.1.14. With these two improvement measures in place, the PC21 modelling showed that the transport network would operate satisfactorily, other than at the Lowburn Valley Road and Burn Cottage Road intersections. These were noted to arise due to a combination of zoned land which would increase traffic flows turning to and from those roads, plus volumes on the highway which limited the number of gaps which could be used by turning traffic. As such, the evidence for PC21 set out that these intersections were under pressure irrespective of PC21 and that the issue should be resolved by the Council and NZTA independently of the plan change. This position appears to have been accepted by the Hearing Panel for PC21 since no provision was made through PC21 to address or improve capacity.

4.2. Non-Car Modes of Travel

4.2.1. Given that the area is predominantly rural, it can reasonably be expected that it will be relatively lightly used by pedestrians and cyclists. It is considered that the absence of infrastructure for these road users is therefore not unreasonable. However, there are wide grassed berms available on the highway which can be used for walking.

4.2.2. The exception to this is the Lake Dunstan Trail, which can be expected to be well-used. Over the course of a year, up to 56,000 cyclists and pedestrians use at least part of the trail, although there are no specific numbers for the section of the trail to the north of Cromwell[3]. The width of the route generally aligns with the Austroads Guide to Road Design Part 6A ('Paths for Walking and Cycling') and there is no evidence that the current path is presenting operational or safety issues.

4.2.3. There are no regular bus services that pass the site. Although several longer-distance services pass nearby on State Highway 6, there are no bus stops provided within walking distance (as would be expected given the current activities on the site).

4.2.4. Cromwell itself is not served by scheduled public transport services due to its relatively small size (3,225 residences as per the most recent census) although there are inter-city services that stop in the township, and a shuttle bus that travels between Wānaka and Queenstown.

[2] For completeness, in preparing the assessment for the present Fast-Track proposal, a minor discrepancy was discovered in the previous modelling work. The Table above corrects this issue.
[3] https://www.centralotagonz.com/assets/PDFs/Central-Otago-Cycle-Trails-Demand-Projection-2024-to-2029.pdf

4.3. Road Safety

4.3.1. The NZTA Crash Analysis System has been used to establish the location and nature of the recorded traffic crashes in the vicinity of the site. All reported crashes between 2021 and 2025 were identified, plus the partial record for 2026, for State Highway 1 from 250m north of the site, to (and including) the State Highway 6 / State Highway 8B roundabout.

4.3.2. This shows that there has been a total of 22 crashes reported:

- Two crashes have been recorded on State Highway 6 between the site and Pisa Moorings Road:
  - One crash occurred adjacent to the site when a southbound driver failed to slow for roadworks, struck a patch of gravel and lost control, leaving the carriageway. The crash did not result in any injuries;
  - One crash occurred towards the north of Pisa Moorings when a southbound driver fell asleep and left the carriageway. The crash did not result in any injuries;
- Two crashes have been recorded at the State Highway 6 / Pisa Moorings Road / Clarke Road intersection:
  - One crash occurred when a southbound driver failed to notice that the car in front had slowed to turn right into Clark Road and ran into the rear. The crash did not result in any injuries, and the police report notes that the at-fault driver was disqualified and should not have been driving;
  - One crash occurred when a car did not turn left out of Pisa Moorings Road when the following driver assumed that they would, and the second driver ran into the rear of the first vehicle. The crash did not result in any injuries;
- Four crashes have been recorded on State Highway 6 between Pisa Moorings Road and Lowburn Valley Road:
  - One crash occurred when a northbound driver overtook a slower vehicle but failed to notice an oncoming southbound vehicle. In swerving to avoid a collision, the driver lost control and left the carriageway. The crash did not result in any injuries;
  - One crash occurred when a southbound driver fell asleep and collided with a northbound vehicle. The crash did not result in any injuries;
  - One crash occurred when a southbound driver fell asleep and crossed the centreline, causing a northbound vehicle to swerve and side-swipe the first vehicle. The crash resulted in minor injuries;
  - One crash occurred when a southbound driver slowed to pass a stationary (broken-down) school bus in the northbound lane. Another southbound driver also braked, but a third driver ran into the second vehicle and pushed it into the first vehicle. The crash resulted in minor injuries;
- Two crashes have been recorded at the State Highway 6 / Lowburn Valley Road intersection:
  - One crash occurred when a southbound driver failed to notice that the car in front had suddenly slowed to turn right into Lowburn Valley Road and ran into the rear. The crash did not result in any injuries;
  - One crash occurred when a driver turning right into Lowburn Valley Road initially moved to the centre of the highway prior to making the turn but then changed their mind and suddenly moved onto the shoulder, where they struck another southbound vehicle that had started to pass them. The crash did not result in any injuries;

- Four crashes have been recorded on State Highway 6 between Lowburn Valley Road and Burn Cottage Road:
    - One crash occurred when a driver turned right out of the freedom camping / water park site and failed to notice a southbound vehicle on the highway, and the two collided. The crash resulted in minor injuries;
    - One crash occurred when a northbound driver stopped prior to turning right into the freedom camping / water park site and was struck from behind by a driver that had been distracted by looking at the water park. The crash resulted in serious injuries. It should be noted that since this crash, a right-turn bay has been constructed in this location to separate turning and through traffic;
    - One crash occurred when a northbound driver intending to enter the water park moved into the southbound traffic lane prior to making the turn, and was then struck by a southbound vehicle. The crash did not result in any injuries;
    - One crash occurred when a northbound driver left the road. The police record sets out that the circumstances of the crash are unknown although it did not appear that any injuries had been caused;
- No crashes have been recorded at the State Highway 6 / Burn Cottage Road intersection:
- No crashes have been recorded on State Highway 6 between Burn Cottage Road and State Highway 8B:
- Four crashes have been recorded at the State Highway 6 / State Highway 8B roundabout:
    - One crash occurred on the westbound approach when a driver ran into the rear of another vehicle at the limit line. The crash did not result in any injuries;
    - One crash occurred when a southbound driver failed to notice the roundabout in thick fog and drove across the central island before turning eastwards. The crash did not result in any injuries;
    - One crash occurred when the load of a northbound truck shifted as the driver negotiated the roundabout, and the driver lost control with the vehicle toppling over. The crash resulted in minor injuries;
    - One crash occurred when a slow moving vehicle travelling northbound moved to the side to let other vehicles pass, but struck a lamp post. The crash did not result in any injuries;
- Four crashes were recorded at the State Highway 6 / State Highway 8B intersection prior to it being converted to a roundabout. Because the intersection geometry is now different, these types of crashes cannot now occur but are recorded here for completeness:
    - Two crashes occurred when a northbound driver turned right into State Highway 8B and struck a southbound vehicle on State Highway 6;
    - One crash occurred when a driver turned right from State Highway 8B onto State Highway 6 and struck a southbound vehicle on State Highway 6;
    - One crash occurred when two northbound drivers both attempted to turn right onto State Highway 8B at the same time and collided with one another.

4.3.3. Of the 22 crashes set out above, five have been addressed through changes to the road geometry, with four at the State Highway 6 / State Highway 8B intersection occurring prior to its conversion to a roundabout and one occurring at the access to the freedom camping / water park site prior to the installation of a right-turn bay. Of the remaining 17 crashes, only four resulted in injuries and all of these were minor.

4.3.4. The historic pattern of crashes does not indicate any particular safety-related deficiencies on this part of the roading network, with the crashes occurring in different locations and with different contributing factors.

5. Proposal

5.1. The Project) involves the staged subdivision and development of land at 922 Luggate-Cromwell Road (State Highway 6), approximately 8km north of Cromwell township and adjoining Lake Dunstan / Te Wairere. The site includes part of the existing Parkburn Quarry.

5.2. From a transportation perspective, the Project comprises the following components:

- Subdivision and development to enable approximately 1,000 residential allotments, supporting the construction of approximately 1,000 residential units;
- Subdivision and development to establish a neighbourhood centre, including retail, commercial, medical, and early childhood education activities, together with land for a primary school; and
- Construction of associated infrastructure, including internal transport networks and external access works connecting the site to State Highway 6 in two locations.

5.3. The proposed Outline Development Plan is shown below:

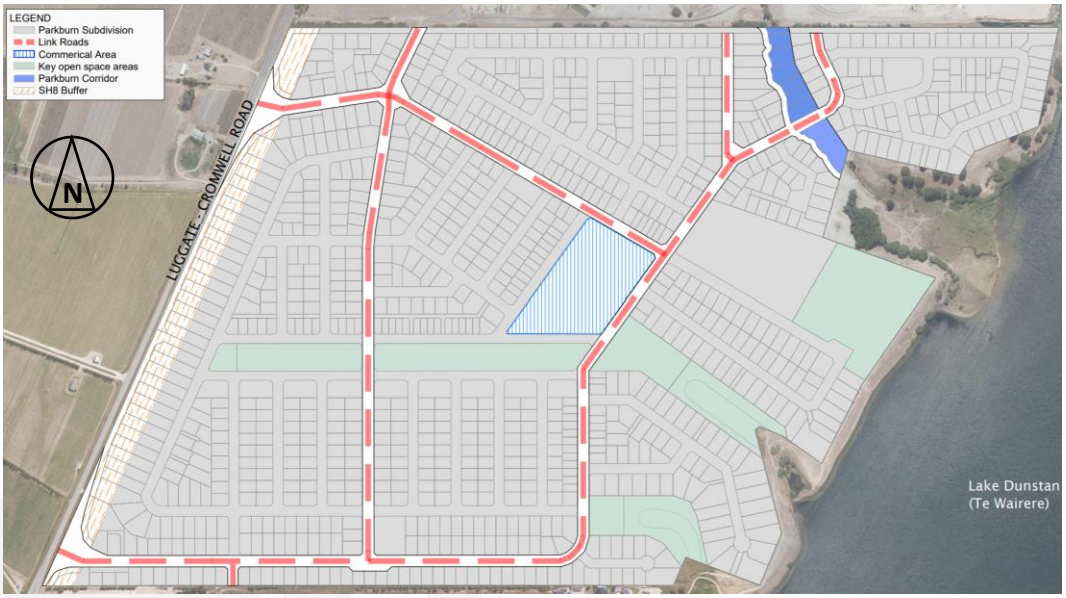


Figure 5: Proposed Outline Development Plan (Extract from Landpro Drawing)

5.4. Discussions with NZTA have identified that the southernmost intersection on the highway is expected to be formed as a roundabout. NZTA has also requested that the northernmost intersection is also formed as a roundabout. Accordingly, the masterplan makes provision for this. The detailed design of the roundabouts is a matter for subsequently agreement with NZTA but at the present time, the masterplan allows for the same design of roundabout as constructed by NZTA at the State Highway 6 / State Highway 8B intersection in 2022. These can be accommodated within the existing road designation and the subject site.

5.5. The roundabouts form the only points of access between the site and the highway, and no direct property access is contemplated.

5.6. The masterplan allows for roading connections to the immediate north to serve an adjacent site which it is understood will be brought forward for a private plan change in the future (for clarity, this does not form part of the current application). There is also a link to the south, to a road within Pisa Moorings known as Pony Court. The significance of this is discussed below.

6. Traffic Generation and Distribution

6.1. Traffic Generation

6.1.1. PC21 adopted a standard urban trip generation rate for the site, of 1.33 vehicle movements per residence in the peak hours and with all residences being occupied. However, traffic generated by residential developments is known to vary for a variety of reasons, with one such reason being the proximity (or otherwise) and need to travel to employment and community facilities. Where a dwelling is some distance from these types of facilities, the traffic generation rates tend to be lower than for residences that are closer due to 'trip chaining', that is, the tendency of a resident to carry out multiple visits to different destinations during the same trip away from the dwelling.

6.1.2. This being the case, it would be reasonable to anticipate that the trip generation rate per household will be lower than this. Accordingly, a detailed evaluation of the appropriate trip rate was carried out, based upon applying the surveyed volumes of the adjacent Pisa Moorings. Care was taken to ensure that Pisa Moorings did not have any unusual characteristics that might mean the trip rate could not be applied to the site and that the day of the survey did not exhibit any unusual characteristics.

6.1.3. The detail of this is included in Annexure B to this report. In short though, it is considered that the rate of 1.33 trips per household in the peak hours that was applied through PC21 is too large based on the available information. Rather, a rate of 0 0.56 trips per household is considered to be the most robust.

6.1.4. For the purposes of the assessment exercise, a yield for the site of 1,047 residences has been allowed for. The application set out that "*approximately 1,000 residential units*" was proposed, but an additional 5% has been allowed for to ensure the final yield lies within the scope of the modelling exercise. It is understood that the revised masterplan reduces the yield very slightly from the previous assessment but the difference (less than 0.5%) is not material to any outcomes of the assessment.

6.1.5. The trip rate calculated for Pisa Moorings takes into account that residents have the need to travel to Cromwell for education and most commercial activities. The proposal also makes allowance for a school and neighbourhood centre. If these do not progress for any reason, then residents of the site will also have the need to travel for these purposes, and accordingly, the trip rate will be unchanged. However, if the school and/or the neighbourhood centre progress, trips made by residents that would otherwise be made to Cromwell will instead be made wholly within the site. In other words, the number of trips that occur on the external highway will decrease. Consequently, the application of the calculated trip rate yields a 'worst case traffic generation figure which may be lower in practice.

6.1.6. As might be evident, the lower trip rate and greater yield tend to offset one another. By way of comparison, the 543 residential lots assessed for PC21 at a rate of 1.33 vehicle movements per unit, generate a total of 722 vehicles (two-way). The potential 1,047 residential lots tested at a rate of 0.56 trips per unit generate 586 vehicles (two-way), around 20% lower than was evaluated for PC21.

6.2. Trip Distribution

6.2.1. PC21 adopted a distribution of trips which allowed for 90% of traffic to be associated with origins and destinations to the south of the site. The March 2025 survey of Pisa Moorings confirmed this distribution and therefore the current analysis is based on the same distribution.

7. Effects on the Transportation Networks

7.1. Roading Capacity

7.1.1. The traffic generated by the development has been added into the microsimulation model and the model has then been re-run. The results of this exercise are included and discussed in detail within Annexure C to this report, and in short, this includes for several scenarios.

7.1.2. The full development of the site to the density expected under PC21 has been remodelled. For this analysis, the calculated trip rate of 0.56 vehicles per residential units has been adopted, rather than the higher rate used for PC21.The analysis shows that this level of traffic (generated from 543 residences) can be accommodated on the highway without the need for any improvement measures.

7.1.3. As development increases within the site, it becomes progressively harder for drivers to turn right and exit Pisa Moorings. This is because there are fewer gaps in the traffic stream into which they can emerge, and as a result, queues and delays increase. The option that has been considered to address this is to form a link between Pony Court within Pisa Moorings and the site.

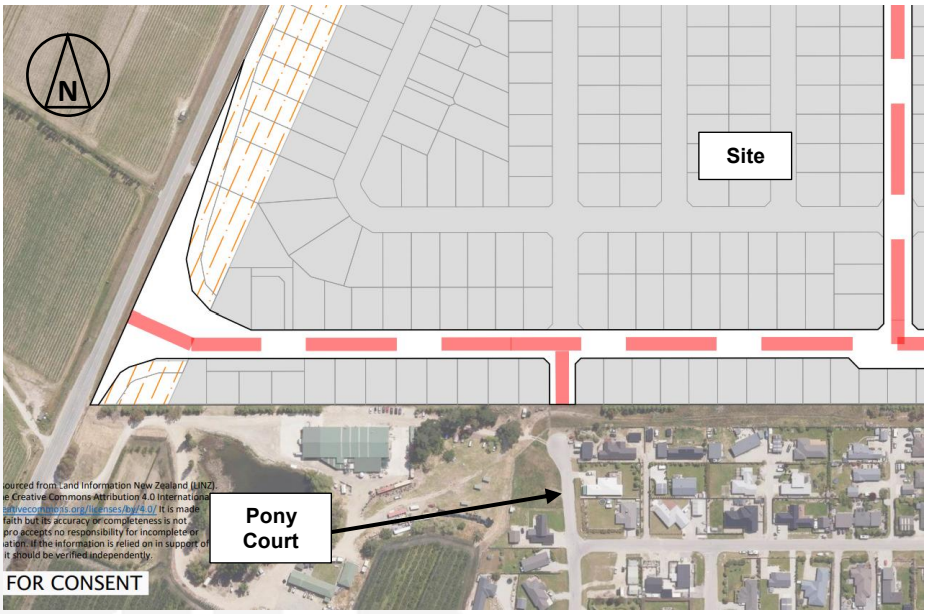


Figure 6: Link to Pony Court (Extract from Landpro Drawing, Annotated)

7.1.4. The formation of this link means that drivers wishing to turn north will no longer be required to turn right from the priority intersection at State Highway 6 / Pisa Moorings Road / Clarke Road intersection. Rather, they will be able to travel north into the site and exit onto the highway using the new roundabout. The link also provides a secondary purpose because it means that residents of Pisa Moorings do not need to exit that subdivision in order to gain access to the neighbourhood centre or primary school within the site, but can instead use solely the internal roading network. This therefore takes more pressure off the highway and associated intersections. In addition this link provides an alternative access point for Pisa Moorings which currently has only one road in and out of the development.

7.1.5. It is stressed that the benefits of this direct link arise irrespective of its specific location. Pony Court appears to the most obvious and direct manner in which the link could be provided. It is presently formed as a cul-de-sac with an 8m carriageway but no footpaths. However, it has a

legal width of a 18m, meaning that it is easily capable of being upgraded to carry additional traffic within the available legal width. Nevertheless, from a transportation perspective, providing a direct link from other locations towards the northwest of Pisa Moorings would create the same outcomes.

7.1.6. In order to identify the point at which this direct link should be formed and drivers may have difficulties existing Pisa Moorings Road, the point at which Level of Service D changes to E has been found. This is the point at which average delays per vehicle increase to more than 35 seconds. The way this has been identified is to run the model at different yields and then interpolate between the results. This shows that Level of Service D transitions to Level of Service E when there are 710 residences occupied within the site.

7.1.7. Accordingly, as set out in Annexure C, it is recommended that development within the site should be limited to 710 residences until a direct link between the site and Pisa Moorings is created.

7.1.8. It is possible that the non-residential aspects of the development could be progressed which would generate traffic, and in turn this would mean that the maximum number of residences that could be accommodated prior to the direct link being formed would be lower than the 710 residences calculated above. However this is considered to be an unlikely outcome because:

- The extent of commercial development and the school depend on having a suitable catchment of customers/students. If there was only a small number of residences, then it is far less likely that all of the commercial development would be constructed, occupied and generating the full amount of traffic, or that the school was operating with its full roll; and
- The trip rates used for assessing the residential component of the development have not been reduced to allow for trips to be made internal to the site. Consequently, if it was to be assumed that the commercial development or the school were operational, then there would be less need for residents to travel outside of the site for educational proposes, employment or shopping. In turn this would reduce the external trip-making of the residential activities, and the lower traffic generation of the residences then offsets the traffic generation of the non-residential activities.

7.1.9. Finally, full development of the site (tested as 1,047 residences, as noted above) has been modelled (including for a direct link between the site and Pisa Moorings). This shows that levels of service and the extent of delay remain good, although further investigation of the results shows that although the overall level of service at the State Highway 6 / State Highway 8B roundabout is acceptable, this masks that Level of Service E arises on the southern approach to the roundabout.

7.1.10. Accordingly, an evaluation has been carried out of the point at which Level of Service D transitions to Level of Service E, using the same approach described above of testing various scenario and extrapolating between them. This shows that the transition occurs when there are 875 residences occupied within the site.

7.1.11. Accordingly, as set out in Annexure C, it is recommended that development within the site should be limited to 875 residences until the roundabout is improved. The nature of the improvements is a matter than can be addressed at that time in conjunction with NZTA. However as discussed above, the roundabout was designed to be 'future-proofed' an allow for additional approach lanes and a second circulating lane, meaning that there can be confidence that there is sufficient area within the legal highway reserve for any necessary improvement scheme to be constructed.

7.1.12. Overall, it is considered that the traffic generated by the site can be accommodated on the roading network subject to the following two provisions:

- Development within the site should be limited to 710 residences until a direct link between the site and Pisa Moorings is created; and
- Development within the site should be limited to 875 residences until the southern approach to the State Highway 6 / State Highway 8B roundabout is improved to create additional capacity.

7.1.13. As identified in PC21 and confirmed above, both the State Highway 6 / Lowburn Valley Road and State Highway 6 / Burn Cottage Road intersections experience poor levels of service with development of the site. This is due to the reduction in the number of gaps in the State Highway 6 traffic stream into which vehicles can turn from those two minor roads. However as set out above, because the larger number of lots is offset by the expected low trip rate, the extent of queues and delays at the two intersections is forecast to be little different to the analysis presented for PC21. The Hearing Panel for PC21 ultimately determined that no mitigation measures for these two intersections were required to form part of the plan change provisions. Given that the proposed scenario has comparable queues and delays, it is reasonable that the same conclusion applies and that no interventions are required at these two locations.

7.1.14. The modelling discussed above and in Annexure C was undertaken prior to NZTA identifying that roundabouts were its preferred intersection layout to serve the site. Accordingly, an assessment has been undertaken of the performance of the roundabouts using the expected traffic volumes output from the modelling (and allowing for the same layout as at the State Highway 6 / State Highway 8B roundabout).

7.1.15. For this exercise, to avoid the need to re-run the whole microsimulation model, different modelling software (Sidra Intersection) has been used. The results are summarised below:

Road and Movement	Southern Site Access			Northern Site Access		
	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
State Highway 6 (south)	7.9	3.5	A	7.0	1.9	A
Site Access	4.6	1.3	A	4.6	0.5	A
State Highway 6 (north)	7.0	2.7	A	6.0	1.9	A

Table 4: Peak Hour Levels of Service at the State Highway 6 / Site Access Roundabouts, with Site Fully Developed

7.1.16. It can be seen that the queues and delays are very low and the roundabouts have ample spare capacity.

7.1.17. The modelling set out above is based on the split of traffic generated by the site at full development, with each roundabout carrying some of the development traffic. However it is understood that development of the site will occur from south to north, and thus there may be a time when the southern roundabout carries more traffic than it would at full development (where a proportion of the traffic uses the northern roundabout). In order to evaluate such an interim scenario, the southern roundabout has been tested allowing for **all** development related traffic to pass through it, and the results are shown below.

Road and Movement	Southern Site Access

	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
State Highway 6 (south)	8.9	3.7	A
Site Access	4.6	1.9	A
State Highway 6 (north)	7.6	2.7	A

Table 5: Peak Hour Levels of Service at the Southern State Highway 6 / Site Access Roundabout, with Site Fully Developed and without Northern Roundabout

7.1.18. It can be seen that even under this extreme scenario, the roundabout has ample available capacity and provides excellent Levels of Service on each approach.

7.1.19. On that basis, it is not only considered that the traffic generated by the site can be accommodated on the roading network subject to the two provisions set out above (regarding a direct link between the site and Pisa Mooring, and improvements to the State Highway 6 / State Highway 8B roundabout) but also that the proposed roundabout serving the site are easily able to accommodate the expected traffic generation.

7.2. Non-Car Modes of Travel

7.2.1. The development of the site may result in increased levels of walking and cycling in the immediate area. It is typically accepted that people will walk a maximum of 1km to reach a particular destination, and will cycle a maximum distance of 3km, but the site lies 8km from the nearest settlement of Cromwell and it is therefore expected that the bulk of movements will be internal to the site or between the site and Pisa Moorings (the latter being especially relevant for movements to/from the school and neighbourhood centre).

7.2.2. The design of the roading network within the site makes provision for a shared walking and cycling route on the more heavily-trafficked roads, and there are footpaths provided on both sides of all other roads. This will ensure a high-quality route for cyclists, as well as supporting ease of walking trips. Moreover, there is a shared walking and cycling route that runs east-west through the centre of the site, and also along its northern boundary, which provide a high degree of permeability for those walking and cycling.

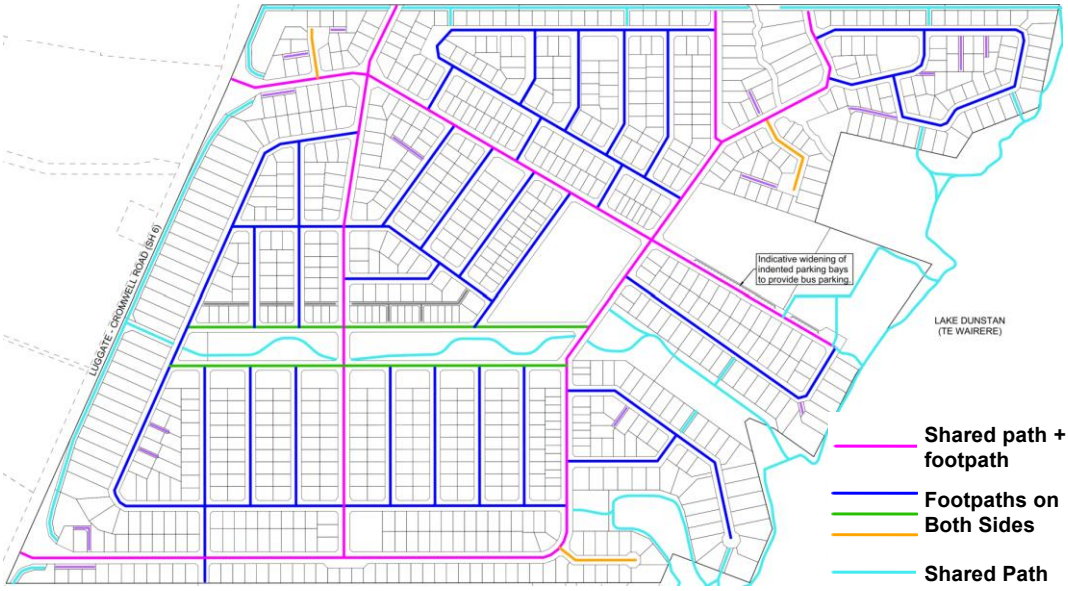


Figure 7: Footpath and Shared Walking/Cycling Path Provision (Extract from Landpro Drawing, Annotated)

7.2.3. Because the site has frontage onto the Lake Dunstan Trail, it is likely that this will be used for recreational cycling/walking but it is also possible that using e-bikes, commuting may take place. The trail is sufficiently wide for this and it is not considered that improvements are required to it. Although it is unsealed, it is well-maintained and flat, and it is not considered that formally sealing the Trail would create a material increase in its use. Cycling between the site and Cromwell would take in the order of half an hour, with a walking trip taking about two hours.

7.2.4. For clarity, the Trail already extends along the shores of Lake Dunstan to the east, but to present an overall view of the walking/cycling routes in the area, this is shown on Figure 7 above. It can be seen that the site provides linkages to connect into the Trail.

7.2.5. Although it is expected that the bulk of walking and cycling would be via the Lake Dunstan Trail, the layout also includes a shared path running along the eastern side of the highway. This is intended to accommodate any longer-distance walking trips or on-road cycling that may occur in the immediate area. For clarity, the connections towards the north and south of the site do not form part of the application and will fall to others to implement.

7.2.6. Cromwell itself is not served by scheduled public transport services. Typically the ability to provide economically-viable services increases as the size of a settlement increases, but it is relevant that even with Parkburn fully developed, the number of residences in Cromwell plus Parkburn would still be a third smaller than Wānaka, which despite being larger, does not have a scheduled public transport service. Accordingly, it is not considered that Parkburn will give rise to the need for public transport.

7.2.7. That said, the masterplan layout shows that a loop road is provided within the site that connects the two roundabouts via the neighbourhood centre and the school. This therefore provides a viable route option in the event that a public transport service was to operate in future. It is understood that this arrangement was sought by Otago Regional Council.

7.2.8. The nature of any future bus service cannot be confirmed at this stage but the proposed internal roading hierarchy shows that this route will comprise of Road Type J, which has a 20m legal width. This width is sufficient to accommodate a bus as the design vehicle, especially a in practice the limited patronage of the site means that larger buses are unlikely. The details

of any bus route and confirmation of vehicle tracking are a matter for consideration when bus services are being considered.

7.3. Road Safety

7.3.1. Based on a review of the road safety records, the proposal is unlikely to result in adverse road safety effects arising as a result of the increase in traffic flows on the existing road network.

7.3.2. The roundabouts serving the site and other infrastructure improvements can be developed to meet current guides and standards, and there are no reasons why departure from these should be necessary. It can also be expected that schemes that affect the state highway network will be subject to a road safety audit / safe system audit by NZTA which further protects the safety and operation of the state highway network. The flat and straight nature of the highway means that sight distances will be excellent.

7.3.3. The roundabouts create the opportunity for a reduction in the speed limit, and a reduced speed is likely to lead to improved road safety outcomes. However, a speed limit reduction is not a prerequisite for construction of the roundabouts, as there are already roundabouts on state highways that are subject to 100km/h speed limits elsewhere in the South Island.

7.3.4. Within the site itself, the topography is relatively flat and so it is not expected that there will be any difficulties in achieving appropriate road alignment or sight distances. The site provides an integrated network for walking and cycling, which included off-road shared routes for pedestrians and cyclists. There is no reason why appropriate intervisibilities between road users cannot be provided, including at locations where pedestrians must cross the roads.

7.3.5. Providing a suitable operating speed environment forms part of supporting road safety. Although the roads will be signposted with an appropriate speed limit for urban residential roads (typically 40km/h or 50km/h), the site layout includes roads that are relatively long and straight.

7.3.6. There is a relationship between the forward visibility available to drivers, the width of the carriageway, and the resultant vehicle speed. Broadly, as forward visibilities increase and as carriageway width increases, vehicle speed increases. This is reflected in Figure 3.2 of the Council's draft Code of Practice (which is also in the overarching national Standard NZS4404:2010).

7.3.7. However, a large proportion of the current roading network in the nearby Cromwell township comprises long and straight roads, with wide carriageways. Examples of this include Inniscort Street (1.05km long, 12m formed width), Molyneux Avenue (0.8km long, 10m width) and Neplusultra Street (1.3km long and 10m formed width). By way of comparison, the longest proposed straight road within the Parkburn site is 0.9km long with an 8.4m wide carriageway (that is, shorter and narrower than already exist in Cromwell).

7.3.8. Figure 3.2 of the draft Code of Practice suggests that in the absence of any further control, speeds on Inniscort Street, Molyneux Avenue and Neplusutra Street would be in excess of 80km/h. This is not the case however, with the TomTom database of vehicle speeds showing 85th percentile speeds of 52km/h, 49km/h and 56km/h respectively. This shows the influence of the posted speed limit (50km/h on all three roads) which serves to limit the travel speeds of drivers. The Austroads Guide sets out that generally for design purposes the operating speed of a road is taken to be the posted speed limit plus 10km/h and it can be seen in this case that the operating speeds fall below this. In short, this means that drivers' compliance with the speed limit is very good.

7.3.9. Accordingly, it is not considered that traffic calming measures will be required at Parkburn to address excessive speeds, because on existing long, straight roads in Cromwell, vehicles are travelling at the appropriate speed simply through drivers complying with the speed limit. There is no reason to expect that drivers within Parkburn will behave any differently.

7.3.10. However, in the event that the posted speed limit within Parkburn was to be 40km/h (and aligned with the urban speed limit in other nearby areas such as Wānaka and Queenstown) then traffic calming may be required. There are a variety of measures that could be implemented but all are within the legal road reserve and therefore will need to be vested and maintained by the Council. Thus any measures require Council support, and it can be expected that the Council will seek a design solution that could equally be rolled out in the existing Cromwell township so that residents of the District are presented with a consistent roading environment.

7.3.11. In view of this, it is not considered appropriate to set out a specific traffic calming solution for the Parkburn roads at this time. It may not be needed, and if it is needed, then the measures should be consistent with those put in place in other areas that drivers can be expected to encounter.

7.3.12. That said, the draft Code of Practice sets out that measures such as narrowed movement lanes, parking, slow points, build outs, chicanes, planting/landscaping and street furniture can all reduce vehicle speeds, plus there are also options for vertical deflection devices such as speed tables and road humps which could form part of any scheme.

7.3.13. Ultimately, the operating speeds of roads are typically assessed at the time of engineering approvals to ensure that they are suitable, largely because speed limits are not normally confirmed until this time, and so it is generally not possible to have certainty as to which measures to slow traffic speeds (if any) will be required at earlier stages in the consenting or design process. However if further certainty is required on this matter, a condition of consent could be put in place that the operating speed will be assessed, and the need for (and type of) traffic calming measures will be considered, at the time that engineering approvals for the roads are sought.

8. District Plan and Engineering Code of Practice

8.1. Introduction

8.1.1. The District Plan sets out a number of transportation-related rules with which any development is expected to comply. An assessment of the transportation rules has been undertaken and the results are summarised below.

8.2. District Plan Part 12.7.1: Access Standards from Roads

8.2.1. Part (ii): Sight Distances

8.2.1.1. Under the District Plan, assuming that roads within the site are subject to a speed limit of 50km/h (being typical for a residential subdivision) then each lot requires a sight distance of 40m at its access. The generally flat and straight nature of the roads means that this will be achieved, but it is possible that for those lots that are close to intersections or curves, sightlines may be shorter.

8.2.1.2. The length of a sightline is based on the time that is required for a driver to see the road ahead, assimilate what is happening, and bring their vehicle to a stop. As such, the sightline is proportional to the speed of the vehicle. Consequently at lower speeds, shorter sight distances can be supported.

8.2.1.3. At curves and intersections, drivers must slow considerably in order to negotiate the road geometry and thus because their speed is slower, shorter sight distances are appropriate for these locations. Accordingly, it is considered that *if* there are lots with sight distances of less than 40m, these can be supported.

8.2.2. Part (iii): Access to Rural Arterial Roads

8.2.2.1. Although State Highway 6 is notionally a Rural Arterial Road, the points of access onto it have been devised based on discussions with NZTA. As such, the parameters set out in this section of the District Plan are not applicable in this case.

8.2.3. Part (vii): Access to Urban Local Roads

8.2.3.1. The District Plan requires that accesses to Urban Local Roads must be sealed and any access must be at least 15m from a state highway. These are achieved under the proposed masterplan.

8.3. District Plan Part 12.7.2: Parking

8.3.1. Part (i): Number of Spaces

8.3.1.1. At this stage, no detailed layout has been produced for the individual lots. However their size means that each will be able to provide several car parking spaces, meeting Plan requirements.

8.3.2. Part (ii): Parking in Excess of Three Spaces

8.3.2.1. It is not expected that any residential lots will provide more than three parking spaces.

8.3.2.2. For the non-residential lots, the car parks can be sealed and drained (Parts (a) and (b)), and they will have a defined point of entry and exit to avoid drivers using informal accesses (Part (c)). Parking areas can have sufficient manoeuvring space (Part (d)) and queuing space (Part (e)).

8.4. District Plan Part 12.7.3: Loading and Manoeuvring

8.4.1. Part (i): Servicing Activities

8.4.1.1. Much of the proposal is for residential activities and therefore the loading and unloading of goods is not expected to occur frequently.

8.4.1.2. For the neighbourhood centre, loading facilities will be provided in a manner that means loading will not take place from the frontage road.

8.5. Council's Engineering Code of Practice

8.5.1. The Council has a Code of Practice for Land Development and Subdivision Engineering, based on national Standard NZS4404 published in 2004. This version of the national Standard was superseded and formally withdrawn in 2010, although the Council still uses the 2004 variant. However the Council is presently updating the Code of Practice to reflect the most recent guidance, and at the time of writing, the draft version is being consulted on.

8.5.2. It is understood that the road cross-sections and other matters relating to the Engineering Code of Practice is addressed by other consultants and so they are not included within this report.

8.6. Summary

8.6.1. It is considered that the site layout complies with all the transportation requirements of the District Plan, other than for the sightlines at a small number of lots which are close to intersections or curves. The effects of these shortfalls have been considered and the layout can be supported as the reduced sightlines arise due to roading features (curves and intersections) which also reduce the operating speed of the road.

9. Conclusions

9.1. This report has identified, evaluated and assessed the various transport and access elements of a proposed subdivision of 1,047 residential lots plus neighbourhood centre (which may include retail, commercial, medical and early childhood education activities) and a possible primary school.

9.2. The site has previously been assessed through a private plan change to the Central Otago District Plan (**PC21**). As far as practical, the same methodology has been adopted for this assessment as was used, and accepted as being appropriate, for PC21.

9.3. PC21 adopted a generic urban trip generation rate for the expected site development. However this did not take into account that sites that are outside the urban area typically have lower rates. An evaluation of the expected rate in this case has been carried out, which indicates that the rate per residential unit is lower than previously used, and this offsets the increase in the number of lots.

9.4. The transport modelling of the proposal indicates that the full development of the site can be accommodated by the roading network subject to two staging thresholds:

- Development within the site should be limited to 710 residences until a direct link between the site and Pisa Moorings is created; and
- Development within the site should be limited to 875 residences until the southern approach to the State Highway 6 / State Highway 8B roundabout is improved to create additional capacity.

9.5. Access to the site is proposed via two roundabouts at the northwest and southwest of the site (roundabouts have been required by NZTA). These have been modelled and have ample available capacity to accommodate the expected traffic flows. The masterplan makes allowance for suitable roundabouts to be implemented.

9.6. As identified in PC21 and confirmed through the modelling carried out for this proposal, both the State Highway 6 / Lowburn Valley Road and State Highway 6 / Burn Cottage Road intersections experience poor levels of service, due to the elevated traffic volumes on State Highway 6. However, the extent of queues and delays at the two intersections is forecast to have little difference to the analysis presented for PC21, where the Hearings Panel determined that no mitigation measures for these two intersections were required to form part of the plan change provisions.

9.7. The location of the site means that it is unlikely there will be a large walking and cycling movements to and from external destinations but any such movements to/from Cromwell can take place using the Lake Dunstan Trail. Internally the site provides for walking and cycling movements by way of footpaths on all roads, and a shared walking/cycling route on the main roads. There are also shared routes proposed along the western and northern perimeters of the site, and well as running east-west though it. These connect to the Lake Dunstan Trail on the eastern side of the site

9.8. The size of the proposal is not such that a public transport service is justified albeit the roading layout has been designed to cater for possible future services along a route past the neighbourhood centre and possible school, and which would therefore serve the key trip attractors in the site. It is understood that this arrangement was sought by Otago Regional Council.

9.9. The crash history in the vicinity of the site does not indicate that there would be any adverse safety effects from the proposal. The roading network within the site and the improvements required for intersections on State Highway 6 can be developed to meet current guides and standards

9.10. It is expected that there will be a high degree of compliance with the transportation requirements of the District Plan. Non-compliances are likely at a small number of lots with regard to sightlines, but the effects of these shortfalls have been considered and it is considered that the layout can be supported, noting that in such locations, the operating speed of the road can be expected to be lower than the posted limit due to the roading geometry.

9.11. Overall, and subject to the preceding comments, the proposal can be supported from a traffic and transportation perspective and it is considered that there are no traffic and transportation reasons why the consent could not be approved.

Carriageway Consulting Limited
October 2026

Appendix A

Qualifications and Experience of Report Author

CARRIAGEWAY
CONSULTING
traffic engineering | transport planning

Qualifications and Experience

Report Author: Andy Carr

Professional Qualifications

1988	Bachelor of Science with Honours (Computing Science), University of Newcastle upon Tyne
1989	Master of Science (Transport Engineering and Operations), University of Newcastle upon Tyne
1998	Master of Business Administration (Distinction): University of Newcastle upon Tyne
2006 - present	Chartered Professional Engineer (Practice field: Transportation engineering)
2006 - present	International Professional Engineer (NZ)
2006 - present	APEC Engineer
2006 - present	Chartered Member, Engineering New Zealand

Employment Profile

2014 - present	Director and Owner, Carriageway Consulting Limited – involved in numerous transportation engineering projects from transportation assessments for new developments and plan changes, to roading design, road safety audits, and independent peer reviews for local authorities and government departments. Preparation and presentation of expert evidence to Council Hearings and the Environment Court.
2012 - 2014	Associate Principal, Abley Limited - leading a range of transportation assessments for land-use projects throughout the country, and provision of expert evidence.
2005 - 2012	Senior Transport Planner and progressing to Senior Associate / Office Manager, Traffic Design Group - responsible for sourcing, managing and overall technical direction of the transportation assessments for land use development projects throughout the South Island.
2004 - 2005	Senior Transport Planner, Beca - assisting in a variety of roading projects with particular responsibility for writing the first New Zealand Pedestrian Planning Guide.
1990 - 2004	Traffic engineer in various private sector roles in the UK, ranging from Graduate (1990-1992) to Principal (2000-2004) with a range of roles, initially assisting with a variety of projects assessing land use changes, road safety and strategic transportation studies, and ultimately managing a local team with technical oversight of all work carried out, client liaison and sourcing commissions.

Additional Information

Member, Resource Management Law Association

Member, Engineering New Zealand Transportation Group

Associate Member, New Zealand Planning Institute

Annexure B

Assessment of Trip Generation Rate

CARRIAGEWAY
CONSULTING

CCL Ref: 15090-160326-dewe

16 March 2026

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Greg Dewe
Fulton Hogan Land Development Limited

By e-mail only: [redacted]

Dear Greg

Parkburn: Residential Trip Generation Rate

Further to our discussions and modelling work, as you know, NZTA has sought further information regarding the trip generation rate that we adopted for the assessment of the Parkburn subdivision. This letter sets out relevant background information to this.

In preparing this letter we have completely reassessed the traffic survey information, to ensure that no calculation errors inadvertently occurred in our previous assessment. For clarity, this has led to some very minor differences in the numbers below compared to earlier reporting, largely due to rounding discrepancies.

Background

The Parkburn site was considered for residential development through Plan Change 21 (**PC21**) to the Central Otago District Plan. When the present proposal for Parkburn was initially advanced, it emerged during initial discussions with the modelling team that the traffic generation rate used for residential activities at PC21 had been based on a typical residential subdivision within urban Cromwell. The rate used in the peak hours was 1.33 vehicle movements per household, with all households being occupied.

Intuitively this introduces a potential over-estimation in the trip rate, because residences that are some distance from settlements usually have different trip-making characteristics to those that are within towns. For example, drivers living more remotely will set off earlier on their journey due to longer travel distances, and trips into town will be organised to visit several different destinations as part of the same trip ('trip-chaining').

Consequently prior to undertaking any assessment of Parkburn, additional data was collected to assess the appropriate trip rate to be used.

Location for Traffic Survey

Parkburn is adjacent to Pisa Moorings, and so it is plausible that the trip generation of Pisa Moorings would be the same as for Parkburn. A number of assessments were carried out to ensure that this was the case.

Firstly we considered the need to travel, which is likely to be due to the need to travel to work and education. The 2023 census showed the following proportions of retirees:

- Median age:
  - Pisa Moorings: 40.5 years;
  - Cromwell East (Statistical Area 2): 40.4 years;
  - Cromwell West (Statistical Area 2): 41.3%;
  - New Zealand overall: 38.1 years;
- Proportion of people aged 65 and over:
  - Pisa Moorings: 15.6%;
  - Cromwell East (Statistical Area 2): 20.1%;
  - Cromwell West (Statistical Area 2): 21.8%;
  - New Zealand overall: 16.6%

The data does not support Pisa Moorings having a high proportion of retirees, as the percentage is lower than for Cromwell overall and similar to New Zealand overall.

We then assessed the matter of employment, as people that are not employed will not travel to work. The census showed the following:

- Unemployed or not in labour force:
  - Pisa Moorings: 23.5%;
  - Cromwell East (Statistical Area 2): 27.6%;
  - Cromwell West (Statistical Area 2): 30.7%;
  - New Zealand overall: 35.4%

The data showed that the proportion of employed residents in Pisa Moorings is greater than from Cromwell and for the whole of New Zealand. This does not indicate that a lower trip rate would arise from a diminished need to travel to work.

We then assessed how residents travel to work:

- Travel to work: Drove a car / passenger in a car, truck or van:
  - Pisa Moorings: 79.9%%
  - Cromwell East (Statistical Area 2): 78.0%
  - Cromwell West (Statistical Area 2): 75.3%;
  - New Zealand overall: 70.6%

The data shows that slightly more residents travel to work using a car, truck or van at Pisa Moorings than the remainder of Cromwell and New Zealand as a whole.

We then considered the need to travel for education (that is, to carry out the ‘school run’). The census showed the following:

- Family or sole parent with child:
  - Pisa Moorings: 46.3%
  - Cromwell East (Statistical Area 2): 45.6%;
  - Cromwell West (Statistical Area 2): 47.1%;
  - New Zealand overall: 58.5%
- Average number of residents per household:
  - Pisa Moorings: 2.8 residents
  - Cromwell East (Statistical Area 2): 2.5 residents
  - Cromwell West (Statistical Area 2): 2.5 residents

    - New Zealand overall: 2.7 residents
- Travel to education: Drove a car / passenger in a car, truck or van:
    - Pisa Moorings: 60.9%
    - Cromwell East (Statistical Area 2): 37.9%
    - Cromwell West (Statistical Area 2): 30.6%
    - New Zealand overall: 51.2%

The data shows that a similar number of families in Pisa Moorings had children as the rest of Cromwell (although this is lower than for New Zealand as a whole). Families in Pisa Moorings are larger, and more travel to education is made by car.

We also evaluated the extent to which homes might not be occupied as they were second or holiday homes.

- Unoccupied dwellings on census night:
    - Pisa Moorings: 18.8%
    - Cromwell East (Statistical Area 2): 18.1%
    - Cromwell West (Statistical Area 2): 16.9%
    - New Zealand overall: 10.9%

This data set suggests that slightly more dwellings were unoccupied in Pisa Moorings than in Cromwell. Overall though the rate of occupancy in Cromwell differs from New Zealand overall.

In summary then, we do not consider that the data shows that Pisa Moorings exhibits significantly different characteristics to the remainder of Cromwell. Accordingly, Pisa Moorings is an appropriate survey location to adopt to derive a trip rate for application to Parkburn.

Survey and Results

Helpfully, there is only one point of vehicular access to Pisa Moorings, and accordingly, we arranged for a traffic survey to be undertaken at the State Highway 6 / Pisa Moorings Road / Clark Road intersection during a typical weekday in March 2025, in the periods 7:30am to 9:30am and 3:45pm to 6:15pm.

Appendix A to this letter sets out the full results of the survey, which was collected through an observer using a mobile app. Use of this system meant that traffic flows could be collected on a minute-by-minute basis.

On this basis, the observed peak hours were as follows:

- Morning peak hour: 7:44am to 8:43am:
    - Entering Pisa Moorings: 42 vehicles;
    - Exiting Pisa Moorings:188 vehicles;
    - 82% of traffic exiting, 18% entering;
- Evening peak hour: 5:03pm to 6:02pm:
    - Entering Pisa Moorings: 197 vehicles;
    - Exiting Pisa Moorings: 54 vehicles;
    - 22% of traffic exiting, 78% entering.

Notwithstanding that these are the peak hour, when the whole of the data set is examined, there is very low 'peakiness' in the traffic flows:

- In the morning peak hour:
  - The peak traffic generation was 230 vehicles (two-way) occurring between 7:44am to 8:43am;
  - However in every consecutive 60-minute period between 7:31am and 9:09am (that is, for 39 60-minute periods), the traffic volume was within 10% of this (a 60-minute volume of 208 vehicles or more);
- In the evening peak hour:
  - The peak traffic generation was 251 vehicles (two-way) occurring between 5:03pm to 6:02pm;
  - However in every consecutive 60-minute period ending between 5:39pm and 6:15pm, (that is, for 37 60-minute periods), the traffic volume was within 10% of this (a 60-minute volume of 226 vehicles or more).

This can be seen when each 60-minute period is plotted, as below:

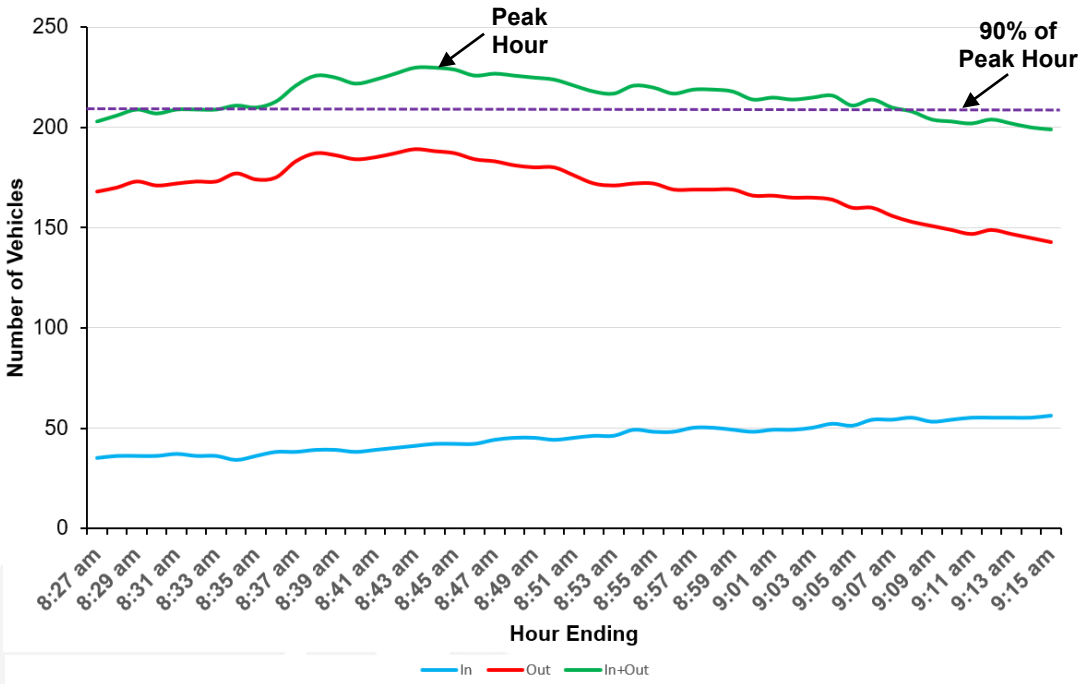


Figure 1: Cumulative Traffic Flows in Each 60-minute Period, Morning Survey Period

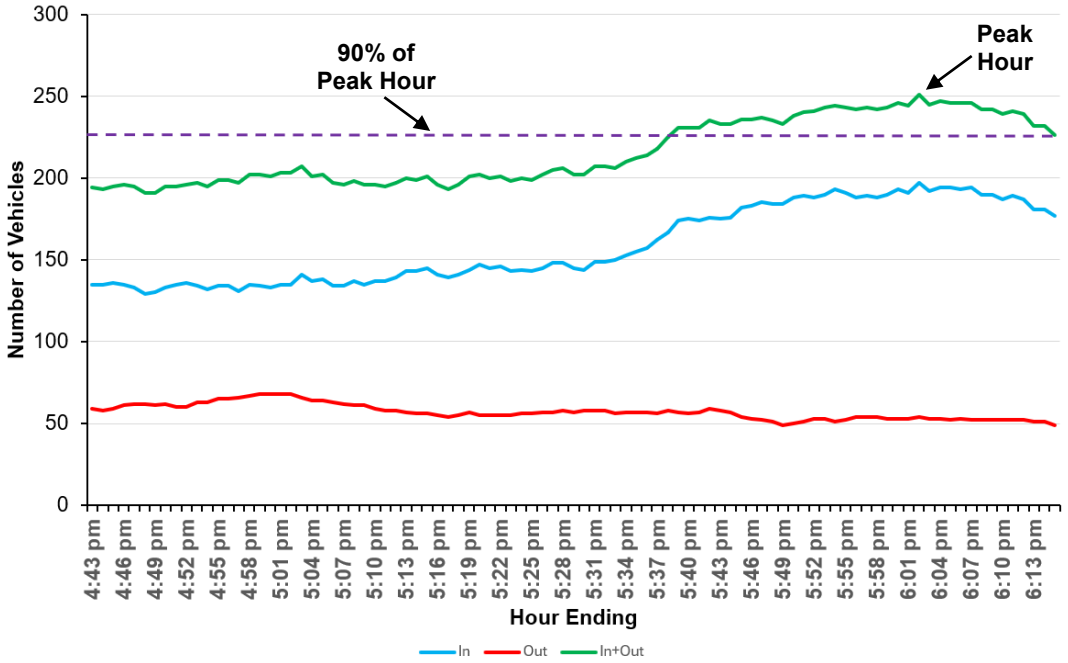


Figure 2: Cumulative Traffic Flows in Each 60-minute Period, Evening Survey Period

The graph of the morning peak period visually demonstrates that the trip generation of the Pisa Moorings remains very similar over much of the period surveyed. In the evening peak period, the traffic generation is lower for the first part of the survey (up to around 5:34pm) before then increasing and remaining high after around 5:30pm.

In our view this indicates that the period when higher traffic flows enter and exit Pisa Moorings occur is elongated. Peak spreading of this nature is common in congested conditions but the roading network in this area is generally not under stress. One possible explanation for this is the location of Pisa Moorings. At any given time it is likely that residents will be working in Wānaka, Luggate and the Wakatipu Basin, and due to the extended journey distances will therefore leave earlier to travel and arrive back later. Some residents will travel to work in Cromwell, and others will carry out the 'school run'. All of these journeys will be of a different duration and so it is reasonable that they will start and end at different times, thus giving rise to peak spreading.

There is some evidence for this when the traffic volumes are collated into ten-minute periods as shown below.

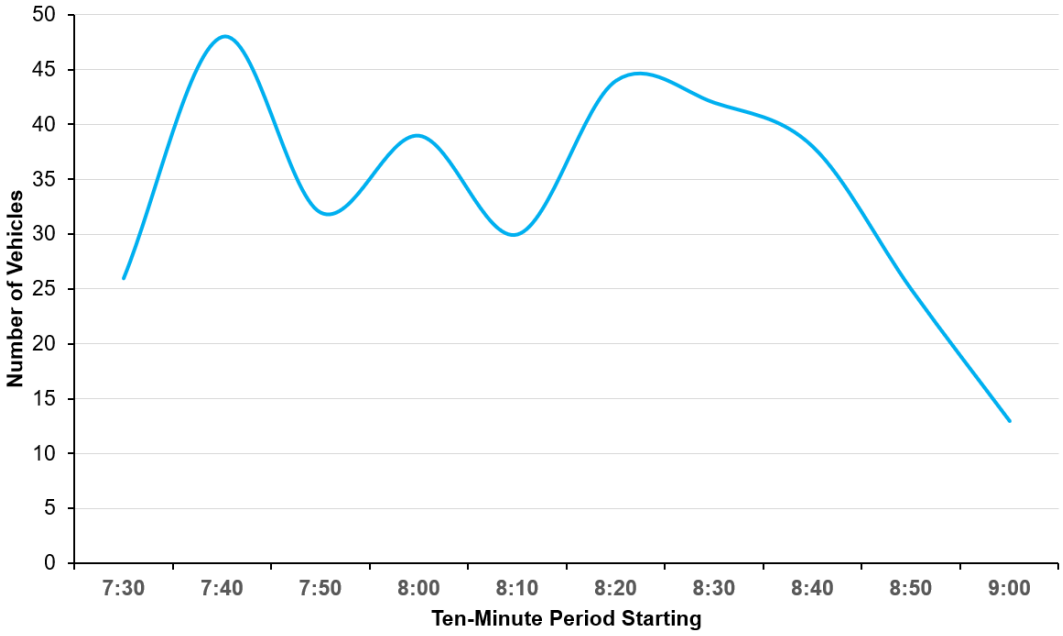


Figure 3: Traffic Flows in Each 10-minute Period, Morning Survey Period

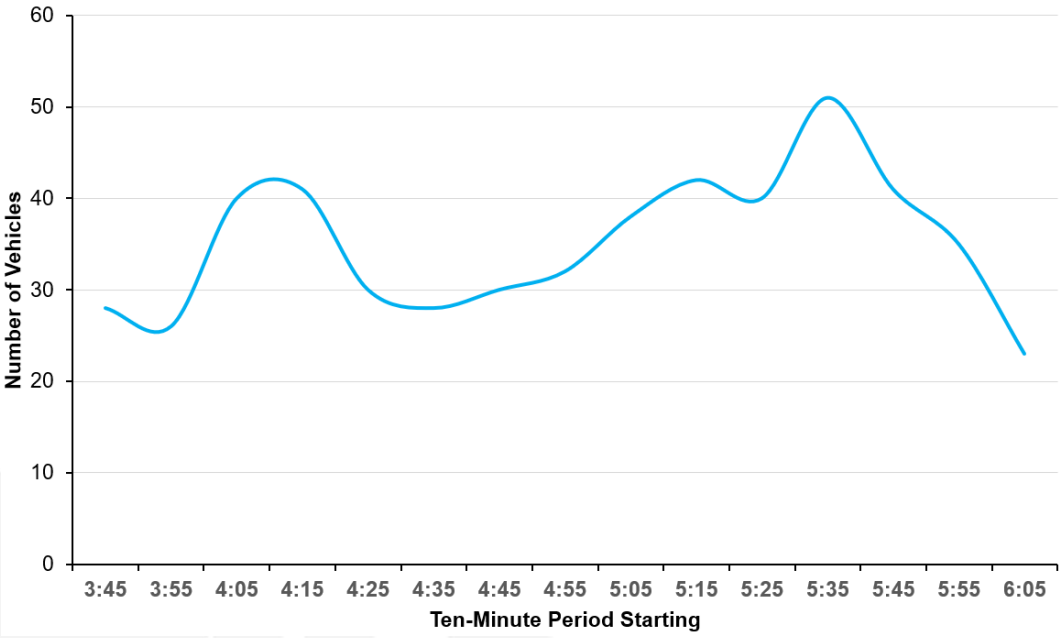


Figure 4: Traffic Flows in Each 10-minute Period, Evening Survey Period

In the morning survey period, a short-term peak is seen at both 7:40am and 8:00am, which would be commensurate with residents leaving to travel to destinations further afield. In that regard the busiest period occurs at 7:40am, which is earlier than needed to travel to Cromwell but potentially would be appropriate for Wānaka and Queenstown. Traffic volumes peak again around 8:20am which would align with travel into Cromwell and then remain high (commensurate with school travel) until declining after 8:40am.

The evening peak survey shows two clear peaks, with a peak at around 4:10pm before the volume falls and then rises again to the busiest period at 5:35pm.

In summary then, in our view, the surveys show that the peak traffic flows are spread over an extended timeframe, with one explanation for this being the location of Pisa Moorings in relation to the likely trip destinations.

Number of Residences in Pisa Moorings

The number of residences in Pisa Moorings is an important aspect of understanding the trip generation rate per unit and so was found in two ways.

In the first instance, aerial photographs of Pisa Moorings in 2025 were obtained and the number of lots was manually counted.

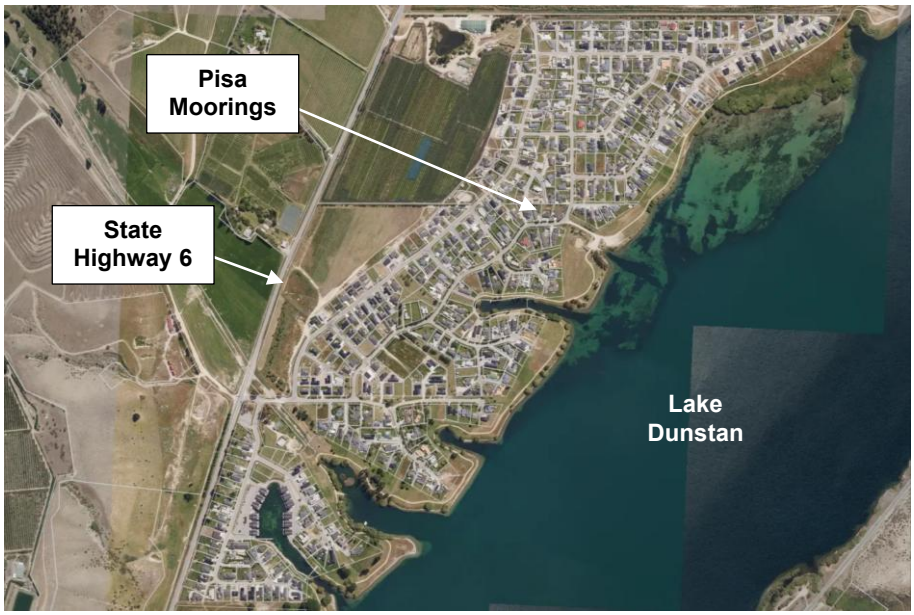


Figure 5: Pisa Moorings Showing Individual Lots

This manual approach yielded approximately 450 residences.

The 2023 census was also assessed, and this showed 420 residences. However aerial photographs from 2023 show vacant sections in Pisa Moorings that were occupied by houses in 2025, showing that there were more houses in Pisa Moorings in 2025 than in 2023. On this basis, the figure of 230 residences will be lower than is present, and so the figure of 450 residences has been adopted as it can be visually observed on photographs.

In common with other settlements in the area, there is the potential for houses to be holiday/second homes. The 2023 census showed 18.8% unoccupied properties in Pisa Moorings which is greater than nationally (10.9%).

By coincidence, census night in 2023 was Tuesday 7 March and our traffic survey was carried out on Tuesday 4 March. This means that it is highly likely that there was the same pattern of household occupancy at the time of the survey as the census, almost exactly two years prior. In other words, we can expect, with a reasonable degree of confidence, that during our survey 81.2% of the households were occupied.

Trip Rate

On this basis then, Pisa Moorings had 365 occupied properties generating 230 vehicles (two-way) in the morning peak hour and 251 vehicles (two-way) in the evening peak hour. This equates to peak hour rates of 0.63 and 0.69 trips per occupied residence in the peak hours, or peak hour rates of 0.51 and 0.56 trips per residence (occupied and unoccupied) in the peak hours. To reiterate, the trip generation rate used in the PC21 assessment was 1.33 trips per household in the peak hours.

Further Checks on the Data

Assessment of Whether Surveyed Flows were Typical

One reason for a low traffic count can be that there is some form of disruption on the roading network which means people travel less or travel at different times. To allow an assessment of this, the 2025 traffic count also observed 'through' traffic on the highway (also shown in Appendix B).

There are no NZTA traffic counters in the immediate vicinity of the site, with the closest ones being 16km to the north and 6km to the south (counters 00600917 and 00600939). Counter 00600917 is not continuous, but we have therefore compared the average for 2025 to the observed traffic counts:

- 8am to 9am:
  - NZTA counter: 272 vehicles (two-way);
  - Survey: 349 vehicles (two-way);
- 4pm to 5pm:
  - NZTA counter: 332 vehicles (two-way);
  - Survey: 418 vehicles (two-way);
- 5pm to 6pm:
  - NZTA counter: 339 vehicles (two-way);
  - Survey: 483 vehicles (two-way).

Because the NZTA data is an average there is inevitably some difference in the figures. However the surveyed data consistently shows higher volumes compared to the NZTA data.

The traffic counter towards the south (counter 00600939) is continuous and so it is therefore possible to compare the volumes recorded on the day of the survey with those recorded in the period before and after. This is shown below:

- 7am to 8am:
  - NZTA counter on 4 March: 625 vehicles (two-way);
  - NZTA counter average in February and March: 552 vehicles (two-way);
  - Survey day 13% higher than average;
- 8am to 9am:
  - NZTA counter on 4 March: 628 vehicles (two-way);
  - NZTA counter average in February and March: 594 vehicles (two-way);
  - Survey day 6% higher than average;
- 4pm to 5pm:
  - NZTA counter on 4 March: 678 vehicles (two-way);
  - NZTA counter average in February and March: 695 vehicles (two-way);
  - Survey day 3% lower than average;
- 5pm to 6pm:
  - NZTA counter on 4 March: 756 vehicles (two-way);
  - NZTA counter average in February and March: 706 vehicles (two-way);
  - Survey day 7% higher than average.

The data indicates that on the day of the survey, volume were generally higher compared to the average weekday in the weeks immediately prior or following. This does not indicate that traffic volumes were suppressed on the survey day.

The continuous counter also enables a comparison to be made between the volumes observed in the survey and those at the counter. The counter location is located to the south of Lowburn and

it therefore records traffic travelling to and from the Water Park and also the Lowburn Harbour Camping and Campervan Site, and Lowburn itself, none of which will be passing the site. Consequently it can be expected that the automatic traffic counter will record volumes greater than seen during the survey.

- 8am to 9am:
  - NZTA counter on 4 March: 628 vehicles (two-way);
  - Survey: 524 vehicles (two-way);
- 4pm to 5pm:
  - NZTA counter on 4 March: 678 vehicles (two-way);
  - Survey: 582 vehicles (two-way);
- 5pm to 6pm:
  - NZTA counter on 4 March: 756 vehicles (two-way);
  - Survey: 684 vehicles (two-way).

In each case, the automatic traffic count data is 70-100 vehicles (two-way) greater than seen during the manual survey. This difference would not be out-of-keeping with the extent of travel to/from Lowburn and the camp site.

On this basis, we conclude that conditions on the roading network on the day of the survey were typical.

Comparison with Other Locations

We have recently reviewed trip rates for residential households in the Queenstown area as part of another commission. Of note is that the recently-approved Fast-Track application for Homestead Bay was based on reported rates of 0.58 to 0.89 trips per household. Other surveys showed values of 0.44 to 0.87 trips per residence (occupied and unoccupied) in the peak hours, with a mean value of 0.7 trips per residence (occupied and unoccupied) in the peak hours.

This data cannot be directly applied to Pisa Moorings and to Cromwell, as the Wakatipu Basin has a public transport service (although the uptake of this is small). The purpose of presenting it is that no trip rates were as high as the previous rate applied to the PC21 area.

Effects of Variation in the Number of Residences

It might be considered that the number of residences in Pisa Moorings has been underestimated. However if the number of units was to be greater, then the trip rate per unit would be lower than calculated.

In that regard, a traffic survey was carried out at the State Highway 6 / Pisa Moorings Road intersection in 2017. This was undertaken for five weekdays and showed an average volume of 112 vehicles (two-way) in the morning peak hour and 117 vehicles (two-way) in the evening peak hour. The 2018 census (carried out a year later) indicates that there were 276 residences in Pisa Moorings. As the dates of the survey and census do not align, the data cannot be fully relied upon but we highlight that the data suggests a trip rate aligned with the 2025 observations rather than a higher rate used in PC21.

Travel to Commercial Development

Finally, we note that Parkburn includes commercial development. Thus while residents of Pisa Moorings presently have to travel into Cromwell for goods and services, residents of Parkburn will have some of those facilities available on site (once developed). Consequently a proportion of trips observed in 2025 at Pisa Moorings will instead be made wholly internally to the Parkburn site and

will therefore not occur on the state highway[1]. This will therefore result in a further reduction in the external trip rate per residence.

Summary and Conclusions

The census data shows that Pisa Moorings is a suitable location for a survey to determine the expected trip generation of Parkburn, as Pisa Moorings does not show any characteristics that would affect trip-making when compared to the rest of Cromwell.

The survey showed a rate in the peak hour that is lower than was previously used for PC21. One plausible explanation for this is that the distance of Pisa Moorings from other settlements means that the 'peak' traffic generation occurs over an extended period as some residents travel to destinations further afield and other travel to destinations that are closer. The survey data supports this (and in fact NZTA counter 00600917 also supports this, with 625 vehicles (two-way) recorded on the survey day between 7am and 8am, and 628 vehicles (two-way) recorded between 8am and 9am).

The survey for Pisa Moorings shows peak hour rates of 0.51 and 0.56 trips per residence (occupied and unoccupied) in the morning and evening peak hours respectively. Anticipating that the same proportion of occupied and unoccupied dwellings is present at Parkburn, the same trip rate has been applied, plus an additional 5% to conservatively allow for any day-to-day variation in the rate.

No allowance has been made for reductions to the trip rate associated with the ability to visit commercial activities within the site (and to not have to travel into Cromwell for this).

We trust that this provides a full assessment of the justification for the trip rate, but we would be pleased to discuss this letter with you at your convenience.

Kind regards
Carriageway Consulting Limited

Andy Carr
Traffic Engineer | Director
Mobile [redacted]
Email [redacted]

[1] With the proposed connection being made between Pisa Moorings and Parkburn, this will also mean that a proportion of trips associated with Pisa Moorings will also be made internally, contributing to a further reduction in the current external trip generation.

Appendix

Results of Traffic Survey

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Cars	State Highway 6 Northbound				State Highway 6 Southbound				Clark Road Eastbound				Pisa Moorings Road Westbound				
Start Time	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total All
7:28 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:29 am	0	2	0	2	0	2	0	2	0	0	0	0	0	0	0	0	4
7:30 am	0	4	0	4	0	2	0	2	0	0	0	0	2	0	0	2	8
7:31 am	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	2
7:32 am	0	1	1	2	0	3	0	3	0	0	0	0	2	0	0	2	7
7:33 am	0	2	1	3	0	4	0	4	0	0	0	0	2	0	0	2	9
7:34 am	0	6	2	8	0	4	0	4	0	0	0	0	2	0	0	2	14
7:35 am	0	0	0	0	0	5	0	5	0	0	0	0	2	0	1	3	8
7:36 am	0	4	0	4	0	1	0	1	0	0	0	0	3	0	1	4	9
7:37 am	0	4	0	4	0	6	0	6	0	0	0	0	1	0	0	1	11
7:38 am	0	1	0	1	0	2	0	2	0	0	0	0	1	0	0	1	4
7:39 am	0	3	0	3	0	3	0	3	0	0	0	0	3	0	0	3	9
7:40 am	0	7	1	8	0	2	0	2	0	0	0	0	3	0	2	5	15
7:41 am	0	4	0	4	0	2	0	2	0	0	0	0	2	0	0	2	8
7:42 am	0	4	0	4	0	1	0	1	0	0	0	0	1	0	0	1	6
7:43 am	0	2	0	2	0	0	0	0	0	0	0	0	2	0	0	2	4
7:44 am	0	2	0	2	0	2	0	2	0	0	0	0	2	0	1	3	7
7:45 am	0	4	0	4	0	1	0	1	0	0	0	0	2	0	0	2	7
7:46 am	0	1	0	1	0	4	0	4	0	0	0	0	6	0	2	8	13
7:47 am	0	2	0	2	0	6	0	6	0	0	0	0	3	0	0	3	11
7:48 am	0	0	0	0	0	7	0	7	0	0	0	0	5	0	0	5	12
7:49 am	0	8	0	8	1	2	0	3	0	0	0	0	5	0	0	5	16
7:50 am	0	12	0	12	0	3	0	3	0	0	0	0	2	0	1	3	18
7:51 am	0	4	1	5	0	2	0	2	0	0	0	0	4	0	0	4	11
7:52 am	0	5	0	5	0	4	0	4	0	0	0	0	4	0	1	5	14
7:53 am	0	3	0	3	0	4	0	4	0	0	0	0	3	0	0	3	10
7:54 am	0	0	0	0	0	2	0	2	0	0	0	0	3	0	0	3	5
7:55 am	0	1	1	2	0	3	0	3	0	0	0	0	1	0	0	1	6
7:56 am	0	1	0	1	0	1	0	1	0	0	1	1	4	0	0	4	7
7:57 am	0	1	2	3	0	1	0	1	0	0	0	0	0	0	0	0	4
7:58 am	0	5	0	5	0	1	0	1	0	0	0	0	0	0	0	0	6
7:59 am	0	2	1	3	0	2	0	2	0	1	0	1	2	0	0	2	8
8:00 am	0	0	2	2	0	1	0	1	0	0	0	0	4	0	0	4	7
8:01 am	0	3	0	3	0	1	0	1	0	0	0	0	2	0	0	2	6
8:02 am	0	0	2	2	0	1	0	1	0	0	0	0	2	0	1	3	6
8:03 am	0	2	1	3	0	4	0	4	0	0	0	0	1	0	1	2	9
8:04 am	0	3	0	3	0	2	0	2	0	1	0	1	3	0	0	3	9
8:05 am	0	6	1	7	0	3	0	3	0	0	0	0	4	0	0	4	14
8:06 am	0	2	0	2	0	4	0	4	0	0	0	0	0	0	0	0	6
8:07 am	0	2	1	3	0	2	0	2	0	0	0	0	2	0	2	4	9
8:08 am	0	0	0	0	0	3	0	3	0	0	1	1	3	0	0	3	7
8:09 am	0	2	2	4	0	3	0	3	0	0	0	0	2	0	0	2	9
8:10 am	0	1	0	1	1	0	0	1	0	0	0	0	2	0	0	2	4
8:11 am	0	1	1	2	0	6	0	6	0	0	0	0	0	1	1	2	10
8:12 am	0	6	0	6	0	1	0	1	0	0	0	0	1	0	0	1	8
8:13 am	0	5	0	5	0	0	0	0	0	0	0	0	2	0	0	2	7
8:14 am	0	1	0	1	0	5	0	5	0	0	0	0	2	0	0	2	8
8:15 am	0	0	0	0	0	2	0	2	0	0	0	0	2	0	0	2	4
8:16 am	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	2
8:17 am	0	4	0	4	0	3	0	3	0	0	0	0	5	0	0	5	12
8:18 am	0	3	0	3	0	1	0	1	0	0	0	0	4	0	0	4	8
8:19 am	0	2	0	2	0	2	0	2	0	0	0	0	6	0	0	6	10
8:20 am	0	4	2	6	0	2	0	2	0	0	0	0	3	0	1	4	12
8:21 am	1	2	0	3	0	6	0	6	0	0	0	0	2	0	0	2	11
8:22 am	0	4	1	5	0	4	0	4	0	0	0	0	1	0	1	2	11
8:23 am	0	4	1	5	0	1	0	1	0	0	0	0	4	0	0	4	10
8:24 am	0	3	1	4	0	0	0	0	0	0	0	0	4	0	0	4	8
8:25 am	0	2	1	3	0	8	0	8	0	0	0	0	4	0	1	5	16
8:26 am	0	10	1	11	0	5	0	5	0	0	0	0	2	0	0	2	18
8:27 am	0	4	1	5	0	2	0	2	0	0	0	0	5	0	1	6	13
8:28 am	0	0	1	1	0	3	0	3	0	0	0	0	2	0	0	2	6
8:29 am	0	4	0	4	0	3	0	3	0	0	0	0	2	0	1	3	10
8:30 am	0	2	0	2	0	3	0	3	0	0	0	0	1	0	0	1	6
8:31 am	0	4	1	5	0	2	1	3	0	0	0	0	2	0	0	2	10
8:32 am	0	1	0	1	0	3	0	3	0	0	1	1	3	0	0	3	8
8:33 am	0	2	1	3	0	1	0	1	0	0	0	0	2	0	0	2	6
8:34 am	0	3	0	3	0	4	0	4	0	0	0	0	6	0	0	6	13
8:35 am	0	5	1	6	1	1	0	2	0	0	0	0	0	0	0	0	8
8:36 am	0	6	2	8	0	5	0	5	0	0	0	0	5	0	0	5	18
8:37 am	0	0	0	0	0	3	0	3	0	0	0	0	9	0	0	9	12
8:38 am	0	3	1	4	0	4	0	4	0	0	0	0	5	0	0	5	13
8:39 am	0	1	0	1	0	7	0	7	0	0	0	0	2	0	0	2	10
8:40 am	0	0	0	0	0	2	0	2	0	0	0	0	2	1	0	3	5
8:41 am	0	3	0	3	1	5	0	6	0	0	0	0	3	0	0	3	12
8:42 am	0	2	1	3	0	2	0	2	0	0	0	0	3	0	0	3	8
8:43 am	0	1	0	1	1	4	0	5	0	0	0	0	3	0	1	4	10
8:44 am	0	3	1	4	0	1	0	1	0	0	0	0	2	0	0	2	7
8:45 am	0	4	0	4	0	7	1	8	0	0	0	0	1	0	0	1	13
8:46 am	0	2	0	2	0	3	0	3	0	0	1	1	4	0	1	5	11
8:47 am	0	3	2	5	0	2	0	2	0	0	0	0	2	0	0	2	9
8:48 am	0	0	1	1	0	2	0	2	0	0	0	0	3	0	0	3	6
8:49 am	0	2	1	3	0	9	0	9	0	0	0	0	2	0	2	4	16
8:50 am	0	1	0	1	0	1	0	1	0	0	0	0	3	0	0	3	5
8:51 am	0	2	2	4	0	1	0	1	0	0	0	0	0	0	0	0	5
8:52 am	0	5	1	6	0	7	0	7	0	0	0	0	1	0	0	1	14
8:53 am	0	3	0	3	0	7	0	7	0	0	0	0	1	0	1	2	12
8:54 am	0	3	3	6	0	2	0	2	0	0	0	0	4	0	0	4	12
8:55 am	0	4	0	4	0	2	0	2	0	0	0	0	1	0	0	1	7
8:56 am	0	1	0	1	0	3	0	3	0	0	0	0	1	0	0	1	5
8:57 am	0	4	4	8	0	1	0	1	0	0	0	0	0	0	0	0	9
8:58 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:59 am	0	2	1	3	0	3	0	3	0	0	0	0	2	0	0	2	8
9:00 am	0	0	0	0	0	1	0	1	0	1	0	1	1	0	1	2	4
9:01 am	0	7	1	8	0	3	0	3	0	0	0	0	2	0	0	2	13
9:02 am	0	1	2	3	0	3	0	3	0	0	0	0	2	0	0	2	8
9:03 am	0	0	2	2	0	1	0	1	0	0	0	0	2	0	0	2	5
9:04 am	0	4	3	7	0	5	0	5	0	0	0	0	2	0	0	2	14
9:05 am	0	2	1	3	0	1	0	1	0	0	0	0	0	0	0	0	4
9:06 am	0	2	2	4	1	0	0	1	0	0	0	0	0	0	0	0	5
9:07 am	0	0	1	1	0	3	0	3	0	0	0	0	0	0	0	0	4
9:08 am	0	1	1	2	0	1	0	1	0	0	0	0	0	0	0	0	3
9:09 am	0	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	3
9:10 am	0	0	2	2	0	2	0	2	0	0	0	0	0	0	0	0	4
9:11 am	0	5	2	7	0	1	0	1	0	0	0	0	0	0	0	0	8
9:12 am	0	1	0	1	0	0	0	0	0	0	0	0	3	0	0	3	4
9:13 am	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
9:14 am	0	2	0	2	0	2	0	2	0	0	0	0	0	0	0	0	4
9:15 am	0	1	1	2	0	1	0	1	0	0	0	0	0	0	0	0	3
Total	1	100	41	142	4	123	2	129	0	1	2	3	85	1	6	92	366

Light Trucks	State Highway 6 Northbound				State Highway 6 Southbound				Clark Road Eastbound				Pisa Moorings Road Westbound				
Start Time	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total All
7:28 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:29 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 am	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
7:31 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:32 am	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	3
7:33 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:34 am	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
7:35 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:36 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:37 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:38 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7:39 am	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
7:40 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
7:41 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:42 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:43 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:44 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
7:45 am	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
7:46 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:47 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7:48 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7:49 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7:50 am	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7:51 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
7:52 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7:53 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7:54 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7:55 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:56 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7:57 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:58 am	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
7:59 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 am	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	1	2
8:01 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:02 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:03 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:04 am	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
8:05 am	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:06 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:07 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:08 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:09 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:10 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:11 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:12 am	0	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3
8:13 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:14 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:16 am	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
8:17 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:18 am	0	2	1	3	0	0	0	0	0	0	0	0	0	0	0	0	3
8:19 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:20 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:21 am	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
8:22 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:23 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:24 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:25 am	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
8:26 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:27 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:28 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:29 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1

Light Trucks	State Highway 6 Northbound				State Highway 6 Southbound				Clark Road Eastbound				Pisa Moorings Road Westbound				
Start Time	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total All
8:30 am	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
8:31 am	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	3
8:32 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:33 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:34 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:35 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:36 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:37 am	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
8:38 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:39 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:40 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:41 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:42 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:43 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:44 am	0	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	3
8:45 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:46 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:47 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:48 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:49 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:50 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:51 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:52 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:53 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:54 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:55 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:56 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:57 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:58 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:59 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
9:00 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:01 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
9:02 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:03 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
9:04 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
9:05 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
9:06 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:07 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
9:08 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:09 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:10 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:11 am	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
9:12 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
9:13 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
9:14 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 am	0	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	3
Total	0	49	3	18	0	28	0	28	0	0	0	0	0	0	0	0	30

Heavy Trucks	State Highway 6 Northbound				State Highway 6 Southbound				Clark Road Eastbound				Pisa Moorings Road Westbound				
Start Time	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total All
7:28 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:29 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
7:30 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
7:31 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
7:32 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:33 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:34 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:35 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:36 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
7:37 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:38 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:39 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:40 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:41 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:42 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:43 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
7:44 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:46 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:47 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:48 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:49 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:50 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:51 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7:52 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:53 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:54 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:55 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:56 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:57 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
7:58 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
7:59 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:01 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:02 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:03 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:04 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:05 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:06 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:07 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:08 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:09 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:10 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:11 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:12 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:13 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:14 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:16 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:17 am	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
8:18 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:19 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:20 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:21 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:22 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:23 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:24 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:25 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:26 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:27 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:28 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:29 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1

Heavy Trucks	State Highway 6 Northbound				State Highway 6 Southbound				Clark Road Eastbound				Pisa Moorings Road Westbound				
Start Time	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total All
8:30 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:31 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:32 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:33 am	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
8:34 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:35 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:36 am	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
8:37 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:38 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:39 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:40 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:41 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:42 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:43 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:44 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:46 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:47 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:48 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:49 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:50 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:51 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:52 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:53 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
8:54 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:55 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:56 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:57 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:58 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:59 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
9:00 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:01 am	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
9:02 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:03 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:04 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:05 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:06 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:07 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:08 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:09 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:10 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:11 am	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
9:12 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:13 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:14 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9:15 am	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	11	0	4	0	16	0	16	0	0	0	0	0	0	0	0	27

Cars	State Highway 6 Northbound				State Highway 6 Southbound				Clark Road Eastbound				Pisa Moorings Road Westbound				
Start Time	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total All
3:44 pm	0	2	1	3	1	4	0	5	0	0	0	0	1	0	1	2	10
3:45 pm	0	1	0	1	0	7	0	7	0	0	0	0	2	0	0	2	10
3:46 pm	0	1	1	2	0	2	0	2	0	0	0	0	0	0	1	1	5
3:47 pm	0	8	1	9	1	2	0	3	0	0	0	0	0	0	0	0	12
3:48 pm	3	8	6	17	0	6	0	6	0	0	0	0	2	0	0	2	25
3:49 pm	0	0	0	0	0	3	0	3	0	0	0	0	2	0	1	3	6
3:50 pm	0	2	1	3	0	5	0	5	0	0	0	0	0	0	0	0	8
3:51 pm	0	3	0	3	0	6	0	6	0	0	0	0	1	0	0	1	10
3:52 pm	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	2
3:53 pm	0	1	3	4	0	4	0	4	0	0	0	0	0	0	0	0	8
3:54 pm	0	3	2	5	0	2	0	2	0	0	0	0	2	0	0	2	9
3:55 pm	0	3	0	3	1	2	0	3	0	0	0	0	0	0	0	0	6
3:56 pm	0	1	1	2	2	7	0	9	0	0	0	0	0	0	0	0	11
3:57 pm	0	6	3	9	0	3	0	3	0	0	0	0	1	0	0	1	13
3:58 pm	0	4	1	5	1	6	0	7	0	0	0	0	0	0	0	0	12
3:59 pm	0	1	1	2	1	3	0	4	0	0	0	0	0	0	0	0	6
4:00 pm	0	5	1	6	0	3	0	3	0	0	0	0	1	0	0	1	10
4:01 pm	0	3	1	4	0	1	0	1	0	0	0	0	1	0	0	1	6
4:02 pm	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
4:03 pm	0	3	0	3	0	7	0	7	0	0	0	0	2	0	1	3	13
4:04 pm	0	3	4	7	0	5	0	5	0	0	0	0	2	0	0	2	14
4:05 pm	0	2	2	4	0	2	0	2	0	0	0	0	0	0	0	0	6
4:06 pm	0	5	6	11	0	7	0	7	0	0	0	0	1	0	0	1	19
4:07 pm	0	0	2	2	0	7	0	7	0	0	0	0	2	0	0	2	11
4:08 pm	0	4	2	6	0	3	0	3	0	0	0	0	0	0	1	1	10
4:09 pm	0	0	3	3	0	6	0	6	0	0	0	0	0	0	0	0	9
4:10 pm	0	3	2	5	0	8	0	8	0	0	0	0	2	0	1	3	16
4:11 pm	0	4	1	5	0	2	0	2	0	0	0	0	1	0	0	1	8
4:12 pm	0	3	2	5	0	3	0	3	0	0	0	0	0	0	0	0	8
4:13 pm	0	7	3	10	0	6	0	6	0	0	0	0	2	1	0	3	19
4:14 pm	0	2	2	4	1	6	0	7	0	0	0	0	1	0	0	1	12
4:15 pm	0	2	2	4	0	5	0	5	0	1	0	1	2	0	0	2	12
4:16 pm	0	5	4	9	1	5	0	6	0	0	0	0	2	0	0	2	17
4:17 pm	0	4	4	8	0	2	0	2	0	1	0	1	1	0	0	1	12
4:18 pm	0	5	3	8	0	6	0	6	0	0	0	0	0	0	0	0	14
4:19 pm	1	2	1	4	0	3	0	3	0	0	0	0	0	0	0	0	7
4:20 pm	0	2	2	4	1	2	0	3	0	0	0	0	3	0	0	3	10
4:21 pm	0	3	3	6	0	1	0	1	0	0	0	0	1	0	0	1	8
4:22 pm	0	3	2	5	0	7	0	7	0	0	0	0	0	0	0	0	12
4:23 pm	0	9	4	13	0	4	0	4	0	0	0	0	1	0	0	1	18
4:24 pm	1	4	2	7	0	2	0	2	0	0	0	0	0	0	0	0	9
4:25 pm	0	2	1	3	0	5	0	5	0	0	0	0	0	0	0	0	8
4:26 pm	0	4	2	6	0	2	0	2	0	0	0	0	1	0	0	1	9
4:27 pm	0	2	1	3	0	3	0	3	0	0	0	0	0	0	0	0	6
4:28 pm	0	2	4	6	0	5	0	5	0	0	0	0	0	0	0	0	11
4:29 pm	0	2	3	5	0	3	0	3	0	0	0	0	0	0	0	0	8
4:30 pm	0	2	3	5	1	1	0	2	0	0	0	0	0	0	0	0	7
4:31 pm	0	4	0	4	0	1	0	1	0	0	0	0	0	0	0	0	5
4:32 pm	0	5	2	7	2	7	0	9	0	0	0	0	2	0	0	2	18
4:33 pm	0	7	2	9	0	1	0	1	0	0	0	0	2	0	0	2	12
4:34 pm	1	3	1	5	0	2	0	2	0	0	0	0	0	0	0	0	7
4:35 pm	0	2	1	3	0	1	0	1	0	0	0	0	0	0	0	0	4
4:36 pm	0	9	2	11	0	2	0	2	0	0	0	0	0	0	0	0	13
4:37 pm	0	1	1	2	0	4	0	4	0	0	0	0	1	0	0	1	7
4:38 pm	1	1	0	2	0	1	0	1	0	0	0	0	2	0	0	2	5
4:39 pm	0	4	1	5	0	3	0	3	0	0	0	0	1	0	0	1	9
4:40 pm	0	6	2	8	0	3	0	3	1	0	0	1	3	0	0	3	15
4:41 pm	0	6	4	10	0	4	0	4	0	0	1	1	0	0	0	0	15
4:42 pm	0	1	2	3	0	6	0	6	0	0	0	0	0	0	0	0	9
4:43 pm	0	7	3	10	0	1	0	1	0	0	0	0	1	0	0	1	12
4:44 pm	0	4	1	5	1	2	0	3	0	0	0	0	1	0	0	1	9
4:45 pm	0	2	0	2	1	2	0	3	0	0	0	0	3	0	0	3	8
4:46 pm	0	4	0	4	0	3	0	3	0	0	0	0	3	0	0	3	10
4:47 pm	0	2	0	2	0	2	0	2	0	0	0	0	0	0	1	1	5
4:48 pm	0	2	2	4	0	7	0	7	0	0	0	0	2	0	0	2	13
4:49 pm	0	4	1	5	0	0	0	0	0	0	0	0	2	0	0	2	7
4:50 pm	0	2	4	6	0	0	0	0	0	0	0	0	1	0	0	1	7
4:51 pm	0	5	2	7	0	5	0	5	0	0	0	0	0	0	0	0	12
4:52 pm	0	0	2	2	0	3	0	3	0	0	0	0	0	0	0	0	5
4:53 pm	0	2	1	3	0	4	0	4	0	0	0	0	0	0	0	0	7
4:54 pm	0	1	0	1	0	1	0	1	0	0	0	0	2	0	0	2	4
4:55 pm	0	3	1	4	2	2	0	4	0	0	0	0	2	0	0	2	10
4:56 pm	0	5	3	8	0	3	0	3	0	0	0	0	0	0	0	0	11
4:57 pm	0	13	0	13	0	4	0	4	0	0	0	0	2	0	0	2	19
4:58 pm	0	0	6	6	0	1	0	1	0	0	0	0	1	0	0	1	8
4:59 pm	0	2	0	2	0	0	0	0	0	0	0	0	1	0	0	1	3

Cars	State Highway 6 Northbound				State Highway 6 Southbound				Clark Road Eastbound				Pisa Moorings Road Westbound				
Start Time	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total All
5:00 pm	0	3	1	4	0	4	0	4	0	0	0	0	1	0	0	1	9
5:01 pm	0	3	3	6	0	4	0	4	0	0	0	0	1	0	0	1	11
5:02 pm	0	4	0	4	0	5	0	5	0	0	0	0	0	0	0	0	9
5:03 pm	1	7	6	14	0	10	0	10	0	0	0	0	1	0	0	1	25
5:04 pm	0	3	0	3	0	7	0	7	0	0	1	1	0	0	0	0	11
5:05 pm	0	8	3	11	0	8	0	8	0	0	0	0	1	0	0	1	20
5:06 pm	0	4	2	6	0	3	0	3	0	0	0	0	0	0	0	0	9
5:07 pm	0	4	2	6	0	10	0	10	0	0	0	0	1	0	0	1	17
5:08 pm	1	3	5	9	0	1	0	1	0	0	0	0	0	0	0	0	10
5:09 pm	0	10	2	12	0	0	0	0	0	0	0	0	0	0	0	0	12
5:10 pm	0	8	3	11	1	8	0	9	0	0	0	0	1	0	0	1	21
5:11 pm	0	4	1	5	0	2	0	2	0	0	0	0	0	0	0	0	7
5:12 pm	0	7	4	11	0	8	0	8	0	0	0	0	0	0	0	0	19
5:13 pm	0	4	6	10	0	2	0	2	0	1	0	1	2	0	0	2	15
5:14 pm	0	5	2	7	1	5	0	6	0	0	0	0	0	0	0	0	13
5:15 pm	0	3	5	8	0	3	0	3	0	0	0	0	2	0	0	2	13
5:16 pm	0	4	0	4	1	5	0	6	0	0	0	0	1	0	0	1	11
5:17 pm	0	3	2	5	1	7	0	8	0	0	0	0	0	0	0	0	13
5:18 pm	0	1	5	6	0	2	0	2	0	0	0	0	1	0	0	1	9
5:19 pm	1	8	4	13	0	1	0	1	0	0	0	0	2	0	0	2	16
5:20 pm	0	6	4	10	2	1	0	3	0	0	0	0	1	0	0	1	14
5:21 pm	1	0	1	2	0	7	0	7	0	0	0	0	1	0	0	1	10
5:22 pm	0	4	3	7	0	1	0	1	0	0	0	0	0	0	0	0	8
5:23 pm	0	2	0	2	1	5	0	6	0	0	0	0	1	0	0	1	9
5:24 pm	1	3	3	7	0	6	0	6	1	0	0	1	1	0	0	1	15
5:25 pm	1	6	0	7	0	4	0	4	0	0	0	0	0	0	0	0	11
5:26 pm	0	6	5	11	0	3	0	3	0	0	0	0	2	0	0	2	16
5:27 pm	0	3	4	7	0	2	0	2	0	0	0	0	0	0	0	0	9
5:28 pm	0	3	4	7	0	3	0	3	0	0	0	0	1	0	0	1	11
5:29 pm	0	4	0	4	0	6	0	6	0	0	0	0	0	0	0	0	10
5:30 pm	0	2	3	5	0	3	0	3	0	0	0	0	1	0	0	1	9
5:31 pm	0	4	5	9	1	1	0	2	0	0	0	0	0	0	0	0	11
5:32 pm	0	1	4	5	0	6	0	6	0	0	0	0	2	0	0	2	13
5:33 pm	0	4	2	6	1	6	0	7	0	0	1	1	0	0	0	0	14
5:34 pm	0	5	3	8	1	5	0	6	0	0	0	0	1	0	0	1	15
5:35 pm	0	3	2	5	1	3	0	4	0	0	0	0	0	0	0	0	9
5:36 pm	0	7	4	11	0	2	0	2	0	0	0	0	0	0	0	0	13
5:37 pm	0	3	5	8	1	4	0	5	0	0	0	0	0	0	0	0	13
5:38 pm	0	4	4	8	1	2	0	3	0	0	0	0	4	0	0	4	15
5:39 pm	0	3	8	11	0	3	0	3	0	0	0	0	0	0	0	0	14
5:40 pm	0	6	3	9	0	3	0	3	0	0	0	0	2	0	0	2	14
5:41 pm	0	9	2	11	1	5	0	6	0	0	0	0	1	0	0	1	18
5:42 pm	0	6	4	10	0	0	0	0	0	0	0	0	2	0	0	2	12
5:43 pm	0	4	3	7	0	7	0	7	0	0	0	0	0	0	0	0	14
5:44 pm	0	1	2	3	1	5	0	6	0	0	0	0	0	0	0	0	9
5:45 pm	0	3	7	10	0	2	0	2	0	0	0	0	0	0	0	0	12
5:46 pm	0	1	1	2	0	4	0	4	0	0	1	1	2	0	0	2	9
5:47 pm	0	1	0	1	2	0	0	2	0	0	0	0	0	0	0	0	3
5:48 pm	1	4	1	6	0	2	0	2	0	0	0	0	1	0	0	1	9
5:49 pm	0	3	0	3	1	1	0	2	0	0	0	0	0	0	0	0	5
5:50 pm	0	4	3	7	2	3	0	5	0	0	0	0	2	0	0	2	14
5:51 pm	0	4	3	7	0	3	0	3	0	0	0	0	1	0	0	1	11
5:52 pm	0	3	1	4	0	4	0	4	0	0	0	0	2	0	0	2	10
5:53 pm	0	1	3	4	0	1	0	1	0	0	0	0	2	0	1	3	8
5:54 pm	0	2	1	3	2	2	0	4	0	0	0	0	0	0	0	0	7
5:55 pm	0	2	1	3	0	2	0	2	0	0	0	0	3	0	0	3	8
5:56 pm	0	2	0	2	0	1	0	1	0	0	0	0	2	0	0	2	5
5:57 pm	0	0	1	1	0	1	0	1	0	0	0	0	1	1	0	2	4
5:58 pm	0	4	5	9	0	7	0	7	0	0	0	0	1	0	0	1	17
5:59 pm	0	3	3	6	0	6	0	6	0	0	0	0	0	0	0	0	12
6:00 pm	1	3	3	7	1	2	0	3	0	0	0	0	1	0	0	1	11
6:01 pm	0	0	0	0	1	2	0	3	0	0	0	0	1	0	0	1	4
6:02 pm	0	1	6	7	0	5	0	5	0	0	0	0	1	0	0	1	13
6:03 pm	0	4	1	5	0	3	0	3	0	0	0	0	0	0	0	0	8
6:04 pm	0	2	1	3	1	8	0	9	0	0	0	0	0	0	0	0	12
6:05 pm	0	0	2	2	1	4	0	5	0	0	0	0	0	0	0	0	7
6:06 pm	0	4	1	5	0	6	0	6	0	0	0	0	1	0	0	1	12
6:07 pm	0	1	3	4	0	1	0	1	0	0	0	0	0	0	0	0	5
6:08 pm	0	1	1	2	0	8	0	8	0	0	0	0	0	0	0	0	10
6:09 pm	0	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0	3
6:10 pm	0	0	1	1	0	5	0	5	0	0	0	0	1	0	0	1	7
6:11 pm	0	0	2	2	1	5	0	6	0	0	0	0	0	0	0	0	8
6:12 pm	0	0	2	2	0	4	0	4	0	0	0	0	0	0	0	0	6
6:13 pm	0	0	1	1	0	0	0	0	0	0	0	0	1	0	0	1	2
6:14 pm	0	2	3	5	0	5	0	5	0	0	0	0	0	0	0	0	10
6:15 pm	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Total	15	502	332	849	44	544	0	588	2	3	4	9	126	2	8	136	1582

Light trucks	State Highway 6 Northbound				State Highway 6 Southbound				Clark Road Eastbound				Pisa Moorings Road Westbound				
Start Time	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total All
3:44 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
3:45 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:46 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:47 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:48 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:49 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:50 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
3:51 pm	0	2	0	2	0	1	0	1	0	0	0	0	1	0	0	1	4
3:52 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:53 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
3:54 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:55 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:56 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
3:57 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:58 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
3:59 pm	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	3
4:00 pm	0	0	0	0	0	1	0	1	0	1	0	1	0	0	0	0	2
4:01 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:02 pm	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
4:03 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:04 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:05 pm	0	0	0	0	0	2	0	2	0	0	0	0	0	1	0	1	3
4:06 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:07 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:08 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:09 pm	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	2
4:10 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:11 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:12 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:13 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:14 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:15 pm	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2
4:16 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:17 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:18 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:19 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:20 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:21 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:22 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:23 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:24 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:25 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:26 pm	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:27 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:28 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:29 pm	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
4:30 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:31 pm	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	2
4:32 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:33 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:34 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:35 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:36 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:37 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:38 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:39 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:40 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:41 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:42 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:43 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:44 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:45 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:46 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:47 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:48 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:49 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:50 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:51 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:52 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:53 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:54 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:55 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:56 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:57 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:58 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:59 pm	0	0	1	1	0	1	0	1	0	0	0	0	0	0	0	0	2

Light trucks	State Highway 6 Northbound				State Highway 6 Southbound				Clark Road Eastbound				Pisa Moorings Road Westbound				
Start Time	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total All
5:00 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:01 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:02 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:03 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:04 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:05 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:06 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:07 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:08 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:09 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:10 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:11 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:12 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:13 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:14 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:16 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:17 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:18 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:19 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:20 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:21 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:22 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:23 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:24 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:25 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:26 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:27 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:28 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:29 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:31 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:32 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:33 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:34 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:35 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:36 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:37 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:38 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:39 pm	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
5:40 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:41 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:42 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:43 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:44 pm	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
5:45 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:46 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:47 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:48 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:49 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:50 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:51 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:52 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:53 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:54 pm	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
5:55 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:56 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:57 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:58 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:59 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:01 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:02 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:03 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
6:04 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:05 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:06 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:07 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:08 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
6:09 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:10 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:11 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:12 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:13 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
6:14 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
6:15 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	30	4	34	0	33	0	33	0	1	0	1	2	1	0	3	71

Heavy trucks	State Highway 6 Northbound				State Highway 6 Southbound				Clark Road Eastbound				Pisa Moorings Road Westbound				
Start Time	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total All
3:44 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:45 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:46 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:47 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:48 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:49 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
3:50 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:51 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:52 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:53 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:54 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:55 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:56 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:57 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:58 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3:59 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:01 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:02 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:03 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:04 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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4:06 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:07 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:08 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:09 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:10 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:11 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:12 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:13 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:14 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:15 pm	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
4:16 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:17 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:18 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
4:19 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:20 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:21 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:22 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:23 pm	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	2
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4:31 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:32 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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4:40 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:41 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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4:43 pm	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	0	2
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4:47 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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4:56 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:57 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:58 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:59 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Heavy trucks	State Highway 6 Northbound				State Highway 6 Southbound				Clark Road Eastbound				Pisa Moorings Road Westbound				
Start Time	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total All
5:00 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:01 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:02 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:03 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:04 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:05 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:06 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:07 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:08 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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5:16 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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5:35 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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5:41 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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5:43 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:44 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:46 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:47 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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5:57 pm	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:58 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:59 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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6:09 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:10 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:11 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:12 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:13 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:14 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 pm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	7	0	8	1	19	0	20	0	0	0	0	0	0	0	0	28

Annexure C

Modelling Results

CARRIAGEWAY
CONSULTING

CCL Ref: 15090-311025-dewe

31 October 2025

CARRIAGEWAY CONSULTING
A. PO Box 29623, Christchurch, 8540
P. 03 377 7010
E. office@carriageway.co.nz

Greg Dewe
Fulton Hogan Land Development Limited

By e-mail only: [redacted]

Dear Greg

Parkburn: Update of Transportation Matters

This letter sets out an update to the transportation modelling associated with the Parkburn subdivision, adjacent to Pisa Moorings, Cromwell. It builds on and updates the analysis that was carried out for Plan Change 21 (**PC21**), and consequently we have not repeated much of the background information associated with PC21 other than where needed to understand this outcomes of this letter.

Much of this letter report replicates information previously provided in our letter of 4 July 2025. However subsequent to this being issued, an error was identified in the modelling undertaken for two intersections (State Highway 6 / Lowburn Valley Road and State Highway 6 / Burn Cottage Road) and we therefore consider it appropriate to include the revised modelling outcomes within an updated letter report. We stress however that these changes do not materially affect our previous conclusions.

Site Location and Previous Analysis for PC21

The Parkburn site is located approximately 9km north of Cromwell (with Cromwell being the closest settlement). Wanaka lies approximately 45km towards the northwest, with Queenstown being 67km to the west. To the immediate south lies the small settlement of Pisa Moorings, and to the immediate north lies a site owned by HWR Property Limited which is presently being quarried.

Because Lake Dunstan lies to the immediate east of the site, vehicular access to the site can only be achieved via State Highway 6, which runs along the western site boundary. State Highway 6 provides the primary roading connection to Cromwell, Wanaka and Queenstown.

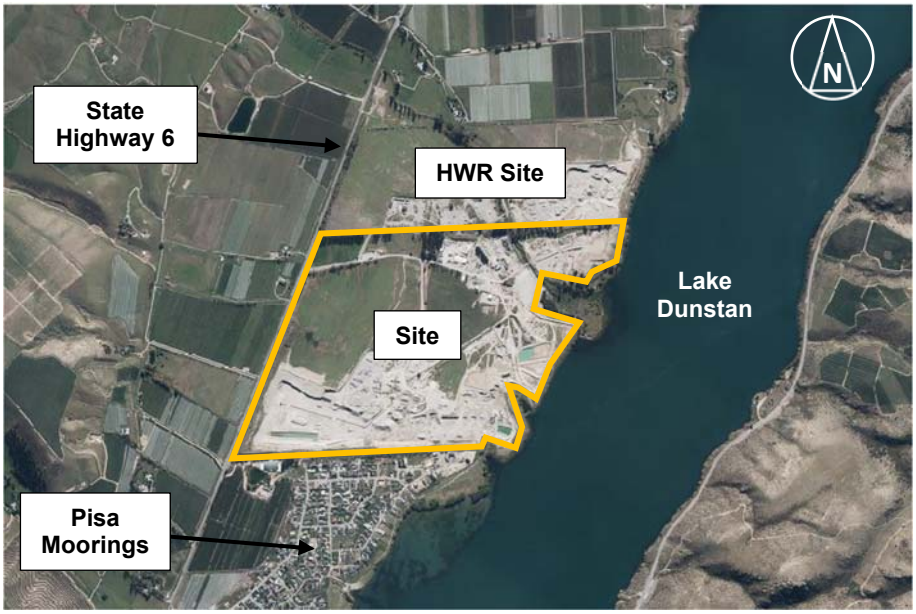


Figure 1: Site Location and Environs

Given that the site is required to gain access onto State Highway 6, the function and performance of the intersections on the highway are of critical importance to the accessibility of the development. This depends on the traffic generation of the proposal and this in turn is influenced by the nature and scale of land use activities. These have been revisited as part of the current project.

The nature of the traffic is that it will approach from, and depart towards, the north and south of the site via the state highway. There are no major roads that connect to State Highway 6 to the immediate north and south of the site, and so traffic travelling to and from the site will pass through intersections some distance from the site itself. The effects on the performance of these that arises from the development also needs to be evaluated.

In considering the development of the site through PC21, the effects on roading capacity were modelled using the Council's transportation model. The current proposal has also been assessed using the Council's transportation model[1], which provides a consistent approach between the two. We highlight that the Council only has a weekday evening peak hour model not a morning peak hour model.

The masterplan tested within PC21 is shown below:

[1] Council's permission to use the model was received by mail on 26 March 2025



Figure 2: Masterplan Proposed in PC21 (Extract from Baxter Design Drawing)

This scale of development allowed for:

- 81.15ha of Residential Resource Area (Low-Density Residential);
- 10.09ha of Residential Resource Area (Medium-Density Residential);
- 4.72ha of Business Resource Area (3);
- 2.32ha of Industrial Resource Area (2); and
- 22.28ha of Industrial Resource Area (3).

Current Proposal

An updated masterplan for the proposed layout has been received and is shown below:



Figure 3: Proposed Masterplan (Extract from Woods Drawing)

It can be seen that the current proposal anticipates a more intensive use of the area for residential activity, with a corresponding reduction in the extent of commercial / non-residential use.

Traffic Generation of Pisa Moorings

During initial discussions with the modelling team, it emerged that the traffic generation rate used for residential activities for PC21 had been based on a typical residential subdivision within Cromwell. Intuitively this introduces a potential error, because residences that are some distance from settlements usually have different trip-making characteristics to those that are within towns. For example, drivers living more remotely will set off earlier on their journey due to longer travel distances, and trips into town will be organised to visit several different destinations as part of the same trip ('trip-chaining').

Given that the site is proximate to Pisa Moorings, we anticipate that the trip generation per household of the site will be the same (or very similar) to that of Pisa Moorings. Helpfully, there is only one point of access to Pisa Moorings, and accordingly, we arranged for a traffic survey to be undertaken at the State Highway 6 / Pisa Moorings Road / Clark Road intersection during a typical weekday in March 2025, in the periods 7:30am to 9:30am and 3:45pm to 6:15pm. The results for the peak hours are summarised below.

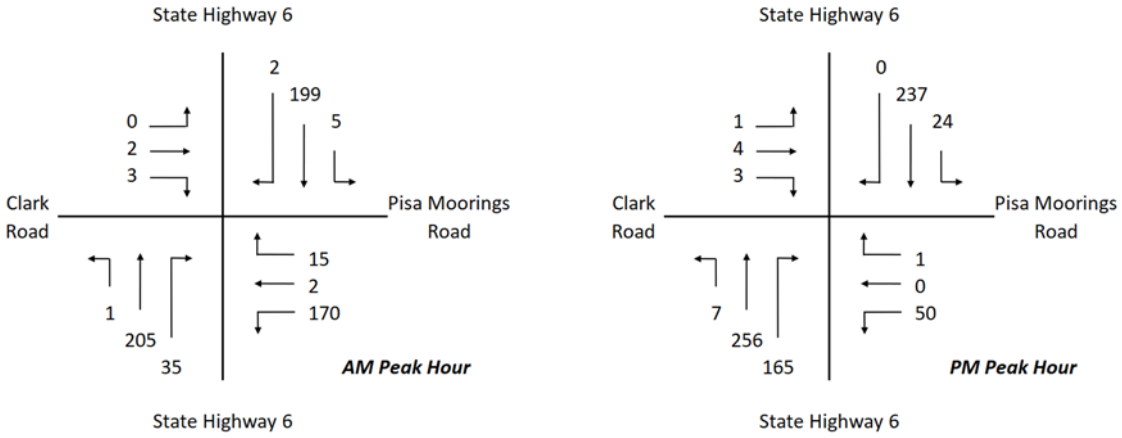


Figure 4: Turning Volumes at Access to Pisa Moorings, March 2025

When these results are compared to the assumed traffic generation at Pisa Moorings used within the PC21 assessment, considerable differences are noted. The PC21 work was based on a peak hour traffic generation rate for Pisa Moorings (and the site) of 1.33 vehicle movements per household, with all households being occupied. We have counted the current extent of development within Pisa Moorings and have identified approximately 450 residences. The survey shows peak hour volumes of 229 and 244 vehicles (two-way) on Pisa Moorings Road, and this equates to a traffic generation rate of 0.51 to 0.54 vehicle movements per household, that is, around 60% lower than had previously been anticipated.

This outcome could occur if a high proportion of holiday/second homes were present in Pisa Moorings. If, say, 50% of the houses were unoccupied, then this would equate to a traffic generation rate per occupied residence of 1.02 to 1.08 vehicle movements per household, much closer to the original estimates. However the 2023 census showed that on census night (held on Tuesday 7 March 2023), only 19% of residences in Pisa Moorings were unoccupied. While the extent of occupancy can vary, our traffic survey was fortuitously carried out on Tuesday 4 March 2025. This means that it is highly likely that there was the same pattern of household occupancy at the time of the survey as for the census, almost exactly two years prior. In other words, we can expect, with a reasonable degree of confidence, that during our survey 81% of the households were occupied.

We also assessed the traffic passing by the site on the state highway to ensure that it was consistent with the previous analysis. This was to eliminate the possibility that there had been some event elsewhere on the roading network that resulted in fewer vehicles entering and exiting Pisa

Moorings. While the observed volumes were slightly lower than the modelled volumes, this alone would not account for the difference in the trip generation rate per household.

With this in mind, we consider that the previous modelling carried out for PC21 adopted a trip generation rate that was too high. For the assessment of the masterplan, we have adopted a rate of 0.57 vehicle movements per household for both Pisa Moorings and also for the development site. This is the higher of the observed values from the survey, plus an additional 5% for day-to-day variability.

As a final comment, the surveys show that 90% of the traffic associated with Pisa Moorings was travelling to or from the south. This is consistent with the assumptions made through PC21 and so it has not proved necessary to adjust the distribution of traffic (only the traffic volume has been changed).

Additional Modelling Undertaken

The new masterplan has been coded into the model. We have then critically reviewed the model inputs.

Parameters Used in the Model

The initial PC21 yield was for 543 residences and this has now been increased to 1,047 residences based on the plans provided. As set out above though, the trip rate per household has been reduced.

Scaling from the plans, the masterplan includes approximately 6,500sqm GFA of commercial activities and a potential primary school. In view of the location of the site, we have assumed that the final scale of the commercial activities will be appropriate only for servicing Pisa Moorings and the development site (and also the HWR site to the north, if it is developed). This matter is important because if the commercial development was to attract traffic from further afield then this would increase the turning volumes at the new intersections onto the highway. Conversely, serving the immediate area only means that the traffic generation of the commercial activities is contained wholly within the sites (subject to a road link being provided between them, as discussed subsequently).

PC21 was modelled on the basis of a 'design year' of 2034, and the same approach has been taken for the new modelling. As noted above, the Council only has a weekday evening peak period model, and thus at this stage no analysis has been carried out for the morning peak hour.

With regard to the speed environment at the access points into the site, the State Highway 6 / Pisa Moorings Road / Clark Road intersection presently operates with a 100km/h speed limit on the highway, although the average operating speed across all traffic is affected by the slower speeds of vehicles as they slow to enter the side roads and accelerate after exiting. The model has adopted the same parameter as for PC21, of a free-flow speed of 85km/h past the site. This is lower than the maximum speed limit, but in practice, there is little difference between this and allowing for a 100km/h speed past the site (and again, this speed environment is the same as per the earlier PC21 assessment).

We consider that in due course, it is possible that the speed limit on the highway past Pisa Moorings and the site (and potentially further north) will be reduced. Crashes involving a side-on collision, as is common at priority intersections, typically have a higher rate of injury and more severe injuries than nose-to-tail crashes, and so there may be a case for implementing a lower (80km/h) speed

limit. However this is not included within the modelling at this stage since there can be no reliance on this being implemented.

The modelling has allowed for the site accesses to be priority intersections, with auxiliary left-turn and right-turn lanes. This is aligned with the approach taken in PC21. It also means that through traffic on the highway will not be delayed by vehicles that are slowing to enter the site.

Delay at intersections is typically expressed in terms of a Level of Service, on a scale of A (the best) to F (the worst). Levels of Service A, B, C and D are considered to represent a situation of 'stable' flow but where Level of Service D represents the point at which 'congestion' starts to occur. As such, Level of Service E is considered to be 'unstable' operating conditions, which delays are significant and Level of Service F represents severe queues and delays. For the purposes of this exercise then, we have identified the thresholds for development where Level of Service D changes to Level of Service E as being the point just prior to which intersection improvement schemes are required.

Results

Introduction

PC21 reported on three scenarios:

- Scenario 0: 2034, with no development of the site;
- Scenario 1: 2034, with 50% development of the site; and
- Scenario 2: 2034, with 100% development of the site

To enable comparison of the outputs, we have endeavoured to retain some degree of consistency with this approach. We have extracted the relevant results from the model and summarised these below, alongside the results that were previously presented in the Transportation Assessment for PC21.

PC21 Scenario 0: No Site Development

Although this scenario does not include any development traffic, there are differences in the results because of the lower traffic generation rate at Pisa Moorings.

Intersection	PC21 Modelling as per ITA			Updated Modelling		
	Veh/hr	Delay (s)	LoS	Veh/hr	Delay (s)	LoS
SH6 / PC21 South	651	2	A	768	3	A
SH6 / PC21 North	667	5	A	786	7	A
SH6 / Pisa Moorings Rd / Clark Rd	1,329	8	A	1,097	7	A
SH6 / Lowburn Valley Road	1,429	>150	F	1,295	33	D
SH6 / Burn Cottage Road	1,499	36	E	1,308	20	C
SH6 / Shortcut Road	1,529	14	B	1,337	9	A
SH6 / SH8B	2,109	12	B	1,960	9	A

Table 1: Intersection Performance, No Site Development

It can be seen that with the updated modelling, most intersections operate with an excellent level of service. Lower levels of service arise at the Lowburn Valley Road and Burn Cottage Road intersections.

The previous Integrated Transportation Assessment (**ITA**) for PC21 identified that the SH6 / Lowburn Valley Road intersection would have a poor level of service and although this is shown to be improved under the recent modelling, it is on the cusp of moving into Level of Service E (the delay for right-turning vehicles is 34.2 seconds and Level of Service E commences at 35 seconds).

The SH6 / Burn Cottage Road intersection was similarly identified in PC21 as being close to capacity, but again, this appears to be improved through the more recent modelling.

PC21 identified that the poor levels of service arose at these two intersections arose due to extraneous factors rather than the plan change itself, and accordingly, that solutions should be progressed independently to the plan change (that is, PC21). On our reading of the commissioner's decision, this appears to have been accepted and we note that the final plan change provisions did not make any mention of the need to upgrade these intersections.

PC21 Scenario 1: 50% Development of the PC21 Site (270 households)

Under the ITA, 50% of the site development was considered as an option because at this threshold, it would be necessary to upgrade the SH6 / SH8B roundabout with a second circulating lane, and the SH6 / Pisa Moorings Road / Clark Road intersection needed to be converted to a roundabout.

Due to the lower traffic flows generated by the site, no modelling has been carried out of this scenario.

PC21 Scenario 2: 100% Development of the PC21 Site (543 households)

Under the ITA, this scenario required intersection improvements. In the results set out below for the new modelling, no intersection improvements have been modelled.

Intersection	PC21 Modelling as per ITA (Incl Intersection Improvements)			Updated Modelling (No Intersection Improvements)		
	Veh/hr	Delay (s)	LoS	Veh/hr	Delay (s)	LoS
SH6 / PC21 South	1,328	11	B	1,187	19	C
SH6 / PC21 North	869	7	A	952	8	A
SH6 / Pisa Moorings Rd / Clark Rd	1,982	6	A	1,512	28	D
SH6 / Lowburn Valley Road	2,127	>150	F	1,553	166	F
SH6 / Burn Cottage Road	2,095	10	A	1,551	36	E
SH6 / Shortcut Road	2,118	4	A	1,575	13	B
SH6 / SH8b	2,564	5	A	2,163	15	B

Table 2: Intersection Performance, 543 Households in the Site

It can be seen that under this scenario, both the SH6 / Lowburn Valley Road and SH6 / Burn Cottage Road intersection continue to provide a poor level of service (as would be expected).

At the SH6 / SH8B roundabout, the ITA for PC21 commented that the delay on the southern approach was 106 seconds and Level of Service F. Under the revised modelling, this has been reduced to 35 seconds and Level of Service C (again noting that this is due to the lower trip rate used and without any upgrading). and As set out above, Level of Service C lies within a range that indicates that an intersection is functioning satisfactorily.

The situation is more complex at the SH6 / Pisa Moorings Road / Clark Road intersection. In this case, an overall Level of Service D arises for traffic approaching from the east (the Pisa Moorings

Road approach) which is unable to exit onto the highway. This occurs because the traffic travelling to and from the site reduces the gaps in the traffic stream on the highway, and limits the ability for drivers to exit Pisa Moorings. Further, the site traffic also limits the ability of drivers to turn right into Pisa Moorings Road, and these vehicles then obstruct drivers attempting to turning right out of Pisa Moorings Road.

Level of Service D spans a range of 25 to 35 seconds delay per vehicle, and the modelling shows that the delay is 28 seconds, meaning it falls mid-way in the range. As set out above, Level of Service D represents satisfactory performance.

New Scenario 3: Assessment of When Level of Service D at the SH6 / Pisa Moorings Road / Clark Road Intersection Changes to Level of Service E

In order to identify where the extent of development results in a change to Level of Service E and an unsatisfactory outcome, in practice the only approach is to repeatedly run the model with different amounts of development and review the results. This could be done by increasing the yield by one lot each time and re-running the model but this would be highly time-consuming. Consequently the approach taken in this instance has been to model yields in increments of 200 residences, and then interpolate between these results to identify the point where Level of Service E arises.

On this basis, we find that Level of Service D changes to Level of Service E at a yield of 710 residences.

Consequently we recommend that development within Parkburn is limited to 710 residences until such time as roading improvements are put in place. We discuss options for this below.

Variation to Scenario 3

One way to achieve greater capacity for traffic turning onto State Highway 6 is to create an additional point of access. Under this scenario, drivers would therefore have a second option for exiting Pisa Moorings.

One option in this regard is Pony Court. This is presently a cul-de-sac located at the northwestern corner of Pisa Moorings, but is close to the southern boundary of the site. If a roading link could be formed in this location, then this would create additional capacity for traffic that is attempting to exit Pisa Moorings – drivers would not be obliged to exit via Pisa Moorings Road but could instead make use of the southern site access. Furthermore, trips that are presently made for a short distance on State Highway 6 (such as between Pisa Moorings and the commercial area within the site) would occur wholly internally and this would also reduce the amount of traffic turning to and from the highway and providing a further beneficial effect.

The option of a Pony Court link has been modelled and the interpolation of the results shows that with 710 dwellings within the site, the SH6 / Pisa Moorings Rd / Clark Rd intersection would operate with Level of Service C. That is, if there is a connection to Pony Court and options to gain access to the highway via alternative routes, then the level of service at the SH6 / Pisa Moorings Road / Clark Road intersection improves such that an intersection improvement scheme would not be required in that location.

On this basis then, we consider that one condition of consent for the site could be that development within Parkburn is limited to 710 residences until such time as a direct roading link is provided between the site and Pisa Moorings to the south.

New Scenario 4: 100% Development of the Site (1,047 households)

The result shown below set out the outcomes of the full extent of development within the site, and including for the Pony Court link. For clarity, no intersection improvements are included within these results.

Intersection	Updated Modelling (No Intersection Improvements) with Pony Court Link		
	Veh/hr	Delay (s)	LoS
SH6 / PC21 South	1,389	30	D
SH6 / PC21 North	985	9	A
SH6 / Pisa Moorings Rd / Clark Rd	1,657	25	C
SH6 / Lowburn Valley Road	1,776	665	F
SH6 / Burn Cottage Road	1,799	52	F
SH6 / Shortcut Road	1,823	22	C
SH6 / SH8b	2,393	26	C

Table 3: Intersection Performance, 1,047 Households in the Site with a Pony Court Link

It can be seen that the effects of the Pony Court link mean that the level of service at the SH6 / Pisa Moorings Road / Clark Road intersection remains appropriate, and no intersection improvement would be required to provide additional capacity.

Upon more detailed review of the results, we find that although the overall level of service at the SH6 / SH8B roundabout is acceptable (Level of Service C), this masks that Level of Service E arises on the southern approach to the roundabout (a similar outcome was seen for the previous PC21 work). As such, we have assessed the point at which this transitions from Level of Service D to E, using the interpolation approach described above. This shows that Level of Service E arises at a threshold of 875 residences within the site.

Consequently we recommend that once development within Parkburn reaches 875 residences, some form of improvement scheme is required at the SH6 / SH8B roundabout (for example, the installation of a second northbound approach lane).

Summary and Conclusions

The traffic survey carried out at Pisa Moorings indicates that the trip generation rate used for the development contemplated in PC21 was too high, although the direction of vehicle movements was appropriate. The use of a revised trip generation rate has identified that a greater proportion of the site can be developed before intersection improvements are required. However it continues to show that full site development cannot occur unless improvements are put in place, albeit that the site is anticipated to be more intensively developed than was initially evaluated.

It is possible to model any scale of yield in the site, but to maintain consistency with the work carried out previously, the modelling work to date has considered the previous full development of the site (543 residences) and the new full development of the site (1,047 residences). While other parameters in the model have been reviewed, these have not been changed from the PC21 modelling.

The model shows that without development of the site, the key intersections on the roading network operate with an excellent level of service. The intersections of Lowburn Valley Road and Burn Cottage Road with the highway have lower levels of service, but this outcome is consistent with the

earlier modelling work carried out for PC21 where it was identified that improvements to those intersections would need to be progressed separately to that plan change.

With 543 residences (being the previous full development of the site through PC21 and approximately 50% of the new yield), the key intersections on the roading network generally continue to provide a good level of service. This is based on the site accesses being formed as priority intersections, with auxiliary left-turn and right-turn lanes. However the SH6 / Pisa Moorings Road / Clark Road intersection is starting to approach an unsatisfactory level of service and further testing (and interpolation of results) shows that development within the site should be limited to 710 residences until roading improvements are put in place. In practice, the formation of a direct link between the site and Pisa Moorings addresses this issue without the need for any intersection improvements.

When the new full development of the site is considered (1,047 residences), the key intersections continue to provide a good level of service. However Level of Service E arises on the southern approach to the SH6 / SH8B roundabout (and a similar outcome was seen through the previous PC21 modelling). Further assessment shows that this reaches an unsatisfactory level of service at 875 residences and so we consider that improvement of the southern roundabout approach will be justified at this point.

We have compared the PC21 provisions with the new modelling results:

PC21 Provision (SUB-S2)	Comment / Assessment
2. No more than 559 residential allotments shall be created (titled) within the Schedule 19.28 Parkburn Structure Plan area	The modelling now shows that additional residential lots can be accommodated
3. No residential allotments shall be created (titled) within the Schedule 19.28 Parkburn Structure Plan, until:	
i. The existing northern priority intersection onto SH6 is upgraded to include a separated left turn lane; and	We consider that this remains a valid provision, given that NZTA now seeks separated left-turn lanes at priority intersections for safety reasons
ii. The new intersection to the south of the existing northern intersection onto SH6 is constructed as a priority controlled intersection or single lane roundabout	The modelling shows that a priority intersection has sufficient capacity and that a roundabout is not required at this point.
4. No more than 286 residential allotments shall be created (titled) within Schedule 19.28 Parkburn Structure Plan, until:	
i. The SH6/SH8B intersection has been upgraded to a dual lane roundabout	The modelling shows that this upgrading is not needed at 286 lots, but rather, at 875 lots.
ii. The SH6/Pisa Moorings Road has been upgraded to a single lane roundabout	The modelling shows that such an upgrade is not needed at 286 lots, and that the full site development can be achieved provided that a direct link to Pisa Moorings is formed
OR	
other upgrade solution including banning turns and/or providing an alternative roundabout connection to SH6 through the Schedule 19.28 Parkburn Structure Plan area.	We have not assessed alternative options as part of this exercise

5. No residential allotments shall be created (titled) within Lot 16 DP 514674 of the Schedule 19.28 Parkburn Structure Plan, until:	
i. The Pony Court road connection has been vested as road.	The modelling shows that the Pony Court connection provides a benefit to the site, but it is not needed at lower numbers of lots as discussed above.

Table 4: Commentary on PC21 Provisions

Concluding Comments

As set out in PC21 and earlier emails, one limitation of the modelling carried out is that the Council's model only assesses the weekday evening peak hour, and it is intuitive that travel patterns are different during the weekday mornings. However the modelling of the evening peak was used to confirm PC21 and consequently at this stage we anticipate that an assessment of the evening peak hour will be sufficient for this exercise also.

NZTA's submission to PC21 sought a direct connection between Pisa Moorings and the site, in order to ensure that short-distance trips between the two areas were not carried out on the highway. In our view, the modelling supports the benefits of such a link (from an efficiency perspective) at a threshold of 710 residences within the site. For clarity, although we have referred to a 'Pony Court link', the same positive outcomes would be achieved if a direct link was able to be provided elsewhere (in other words, the link does not have to be via Pony Court to be beneficial).

In summary, we consider that development within the site can be supported subject to the following:

- Development within the site should be limited to 710 residences until a direct link between the site and Pisa Moorings is created; and
- Development within the site should be limited to 875 residences until the southern approach to the SH6 / SH8B roundabout is improved to create additional capacity.

As always, we would be pleased to discuss this letter with you at your convenience.

Kind regards
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