Proposed Residential Subdivision

Hill Street North, Richmond

TRANSPORTATION ASSESSMENT

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New Zealand

December 2007

Proposed Residential Subdivision

Hill Street North, Richmond

QUALITY ASSURANCE STATEMENT

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1. INTRODUCTION

It is proposed that an existing block of land located on the corner of Hill Street North and Champion Road be developed to provide 82 new residential lots for which resource consent for subdivision is sought. The land lies just within Nelson City Council's boundary at the southern edge of the city and will have new access onto each of Champion Road and Hill Street North within Tasman District Council and Nelson City Council's jurisdictions, respectively.

The purpose of this report is to provide an assessment of the transport effects of the proposed subdivision, and advise on how these effects on the surrounding roading network are able to be managed in a manner that provides safe and convenient access to all residents, while not compromising the safety and convenience of other road users. Particular considerations include accessibility for pedestrians and cyclists as well as for vehicles, and an assessment of the capacity of the existing road network with regard to the estimated traffic generation from this particular subdivision in conjunction with future background traffic growth.

From this position, an assessment has been made of the manner in which the subdivision layout is able to satisfy the requirements of all transport modes in a sustainable manner, and provide for traffic generated by the subdivision to be safely, efficiently and effectively accommodated by the surrounding road network.

The detailed analysis will confirm that the transportation effects of the residential subdivision are able to be accommodated within the local road network with less than minor effects.

2. LOCATION IN THE ROAD NETWORK

Figure 1 shows the roading hierarchy in the vicinity of the site, as defined in the Nelson Resource Management Plan (NRMP) and the Tasman Resource Management Plan (TRMP).

As shown, Champion Road has recently been re-classified as a Distributor Road between Salisbury Road and Hill Street North, in conjunction with Hill Street North to the south of Champion Road. Across the frontage of the site, Champion Road is a Collector Road, and this section of Hill Street North is currently a Local Road with no through access, although it is understood that it is likely to become a Collector Road in the future.

As shown, the site is strategically well located with convenient access available via Hill Street to Richmond and via Champion Road to Main Road Stoke and Salisbury Road, as well as to SH6 (Whakatu Drive), the main routes linking Richmond to the south with Nelson to the north. Accordingly, the site is well connected to the roading network of Tasman District and Nelson City and is ideally suited for ongoing residential development of this part of the city.

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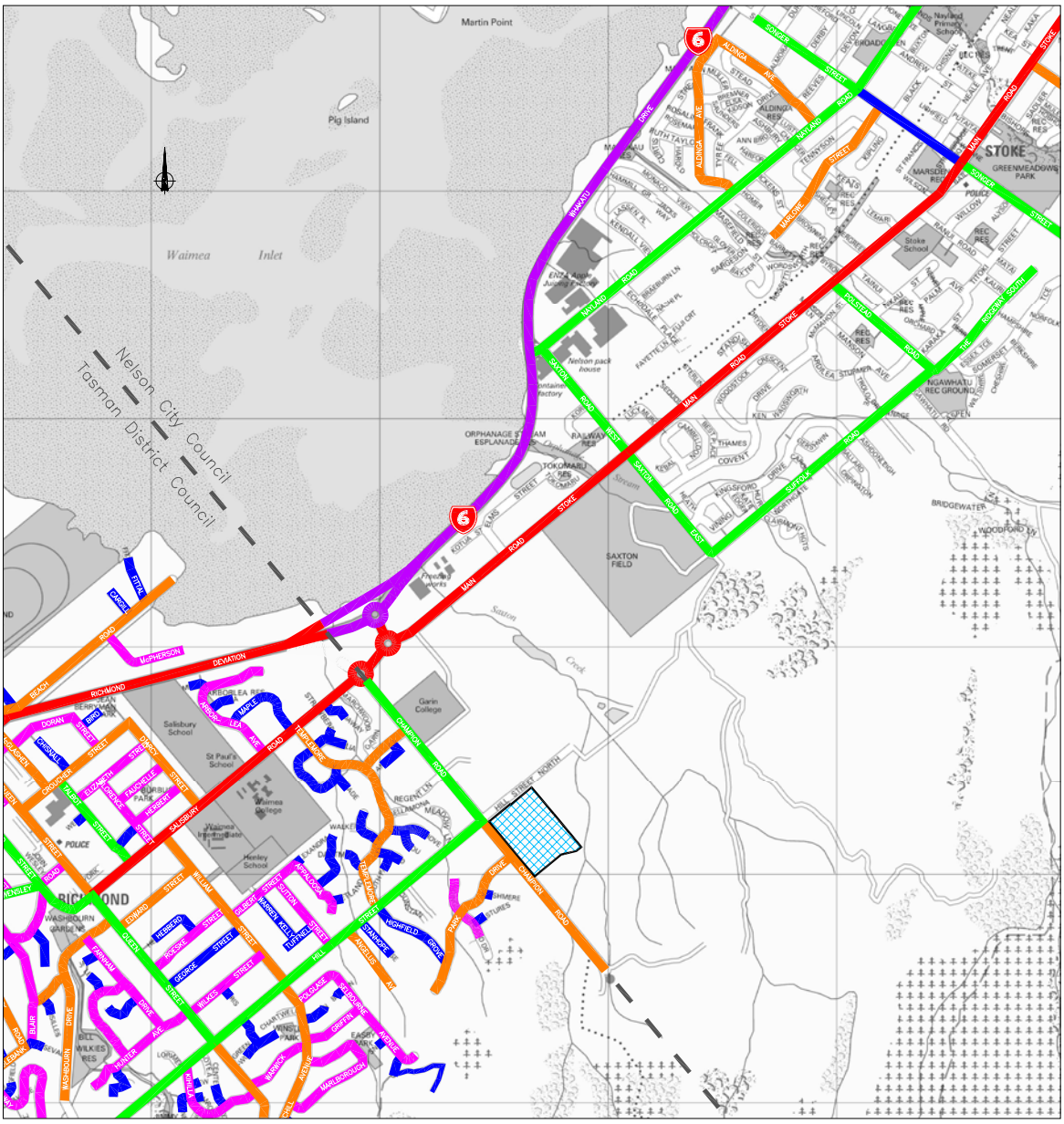

RICHMOND ROADING HIERARCHY

- ARTERIAL
- DISTRIBUTOR
- COLLECTOR
- ACCESS ROAD
- ACCESS PLACE

NELSON ROADING HIERARCHY

- STATE HIGHWAY
- ARTERIAL
- PRINCIPAL
- COLLECTOR
- SUB COLLECTOR
- SUBDIVISION SITE

LOCATION IN ROAD NETWORK 1

3. EXISTING ROAD ENVIRONMENT

3.1 Existing Road Network

The nearby roads and intersections within the local road network can be described as follows.

3.1.1 Champion Road

The section of Champion Road between Hill Street and Salisbury Road has been progressively upgraded and widened in conjunction with land development and is now a designated Distributor Road, and the section of Champion Road between Hill Street and the reservoir is a Collector Road. Champion Road intersects with Salisbury Road at a four-arm roundabout intersection where the fourth arm serves a local retail and leisure area. Some 300m south of this roundabout is Garin College which is served by a pedestrian crossing facility on Champion Road. Further to the south, Champion Road forms a crossroads intersection with Hill Street North, adjoining the corner of the subject site.

Between the Salisbury Road and Hill Street North intersections, Champion Road is 10m wide, kerb to kerb, on a straight and relatively level alignment. Champion Road is marked with a centreline, and footpaths are provided over much of its length, and street lighting is also provided. Beyond the Hill Street North intersection, Champion Road is 7.3m wide with no footpaths and grass verges on both sides, extending through to and beyond the access to the Park Drive subdivision. This section of Champion Road is subject to a 50km/h speed restriction.

At the Hill Street North intersection, the predominant traffic movements are on the 'Distributor Road' sections of Champion Road and Hill Street North, ie the new road hierarchy recognises the existing traffic environment and the particular functions of the various sections of road. A separate holding bay is provided on the approach from Hill Street to accommodate the turn into Champion Road (south-east) and for straight-through traffic to the short (no exit) section of Hill Street North.

3.1.2 Hill Street North

To the southwest of Champion Road, Hill Street is a Distributor Road, with a kerb to kerb carriageway width of some 10.2m, marked with a centreline. There is a 1.5m wide footpath and a 2m wide grass verge on its western side, and a 1.4m footpath and 1.5m wide grass verge on its eastern side. This section of Hill Street serves a large residential area including a number of recent subdivisions, and extends through to Queen Street in Richmond and further residential development to the south.

To the northwest of the proposed subdivision site, Hill Street North is a no-exit road with a Local Access Road classification. Traffic is 'stop' controlled at the intersection with Champion Road, with no further road markings along the road beyond this point. It has a sealed road carriageway width of some 6.1m, draining to 3m to 4m wide grass verges each side, and serves several rural/residential properties.

3.1.3 Salisbury Road

Salisbury Road is the major arterial route that connects to the centre of Richmond from the north via Main Road Stoke and Whakatu Drive. It is connected to Main Road Stoke by a roundabout at the Champion Road intersection located within an 80km/h speed zone.

3.1.4 Main Road Stoke

Main Road Stoke which extends northeast from Champion Road, was the old main road between Richmond and Nelson prior to the opening of Whakatu Drive. It operates as a two-lane two-way arterial highway, and is linked to Whakatu Drive and the Richmond Deviation (SH6) via a short link road.

3.1.5 Whakatu Drive Link Road

Some 150m northeast of Champion Road, the Whakatu Drive Link connects to Main Road Stoke at a two-lane circulating roundabout constructed in conjunction with Whakatu Drive (Stoke Bypass).

At the other end of this short (100m) link, where it connects to SH6 at the Richmond Deviation, there is another roundabout which handles all traffic between Whakatu Drive and Main Road Stoke, as well as all southbound state highway traffic from Whakatu Drive to Richmond via the Richmond Deviation. Northbound through traffic on the state highway bypasses this two-lane circulating roundabout.

Accordingly, the subdivision site is strategically well located in relation to the arterial road network in this part of Nelson.

3.2 Existing Traffic Patterns

3.2.1 Daily Patterns

The relative importance and function of each of the various roads in the vicinity of the site is reflected by the pattern of daily traffic volumes as shown in Table 1.

ROAD		DAILY TRAFFIC VOLUME (vpd)
Name	Type	
Whakatu Drive (near Songer Street)	SH6	20,440
Salisbury Road	Arterial	13,600
Champion Road (northwest of Hill Street)	Distributor	4,268
Champion Road (southeast of Hill Street)	Collector	810
Hill Street (northwest of Champion Road)	Distributor	2,860

Table 1 : Daily Traffic Volumes

The traffic volumes shown in the table have been assembled from recent traffic counts recorded by Tasman District Council and Transit NZ.

3.2.2 Peak Hour Patterns

In the course of investigations for a recent residential subdivision in Champion Road, a series of traffic counts was undertaken by Traffic Design Group that included weekday and Saturday peak hour periods at the following intersections:

- Whataku Drive/Richmond Deviation
- Whataku Drive/Main South Road/Salisbury Road
- Salisbury Road/Champion Road
- Hill Street North/Champion Road.

The detailed counts at the first three intersections were undertaken in March 2006 and the Hill Street intersection patterns were previously recorded in July 2005. These counts that were all taken during the school term, are illustrated in Figure 2.

Based on these counts, weekday peak hour traffic volumes along the section of Champion Road between Hill Street and Salisbury Road are around 550 vehicles per hour (vph).

Weekend traffic volumes are much lower, with a Saturday peak of around 300vph occurring at around noon.

Figure 3 is a diagram showing the projected traffic patterns once the recently approved Sutton and Wahanga subdivisions on the east side of Champion Road are fully developed. These flows are readily accommodated by this Distributor route, with ample capacity for additional traffic as the adjoining residential neighbourhood expands.

3.3 Existing Road Safety

A detailed search of the Land Transport New Zealand Crash Analysis System (CAS) was undertaken of reported accidents in the vicinity of the Hill Street/Champion Road intersection, for the period 2001-2007 inclusive. The records show that there was one reported accident (non-injury) at the Champion Road/Park Drive intersection, as follows:

- Friday 11 November 2005, 4:35pm
  A car travelling westbound on Champion Road hit a car reversing along the road at the Park Drive intersection. This was attributed to driver inattention.

No accidents were reported at the Champion Road/Hill Street North intersection.

With only one reported non-injury during the last five years within 500m of the site, it is considered that the roads in the vicinity have a particularly good safety record.

Accordingly, after reviewing the accident details and examining the accident site, it is considered that no remedial measures are necessary to the existing road infrastructure in the vicinity of the site.

4. PROPOSED RESIDENTIAL SUBDIVISION

The proposal is to develop an 82 lot residential subdivision on land located to the northeast of Champion Road and southeast of Hill Street North. It is currently anticipated that the development will proceed in two stages. Stage 1 will provide 42 sections in the area of the site east of Hill Street North and stage 2 will provide the remaining 40 sections on the remainder of the site. It is anticipated that the sections in the subdivision could be developed at a rate of around 10 to 15 sections per year, depending on the property market.

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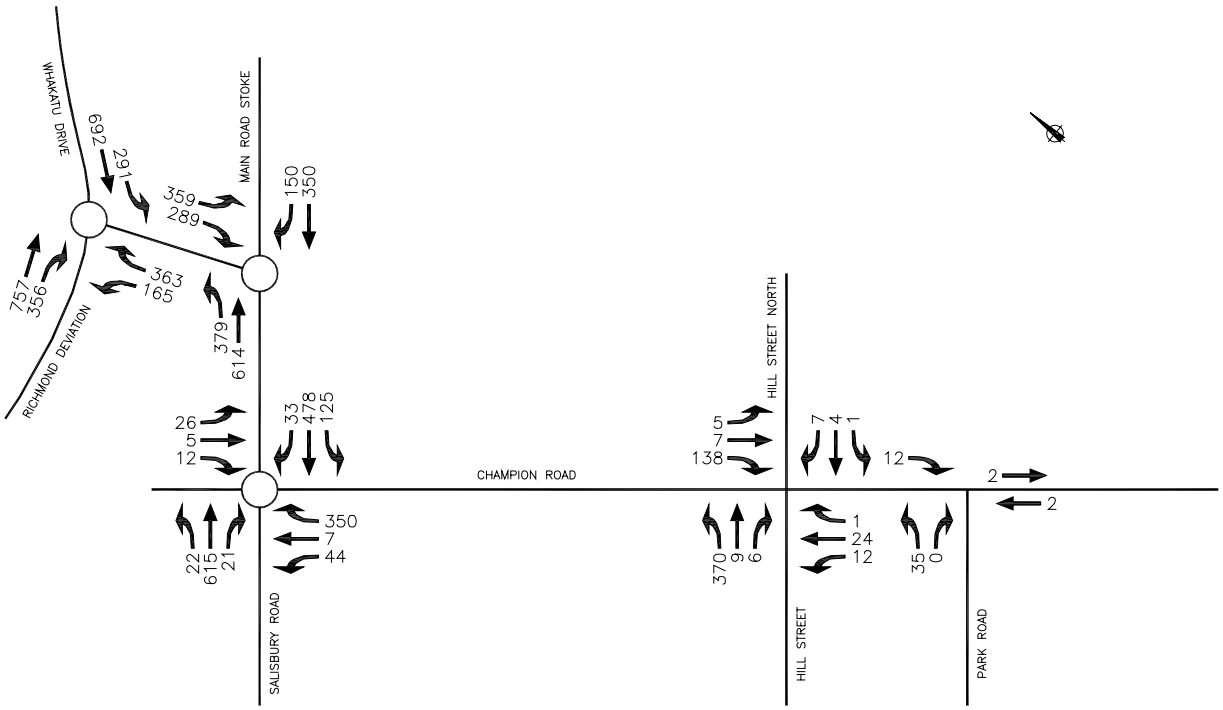
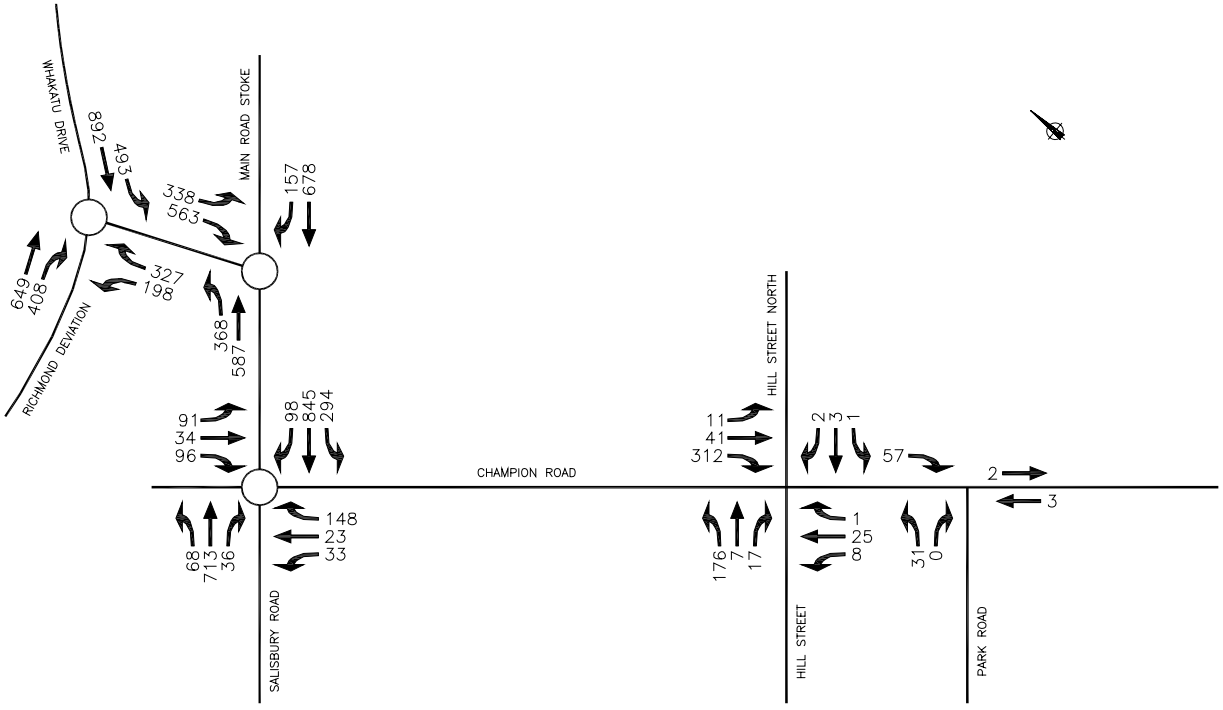


WEEKDAY AM PEAK HOUR
(7:45 - 8:45am)



WEEKDAY PM PEAK HOUR
(4:30 - 5:30pm)

EXISTING 2007 TRAFFIC FLOWS 2

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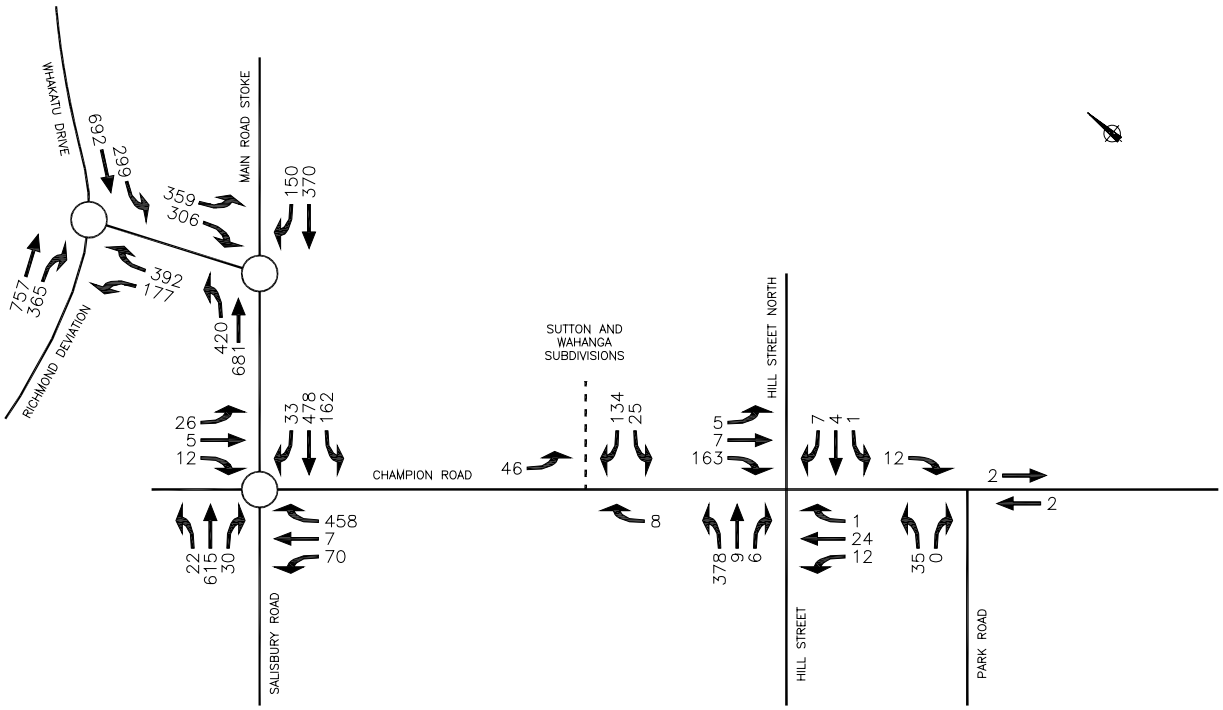
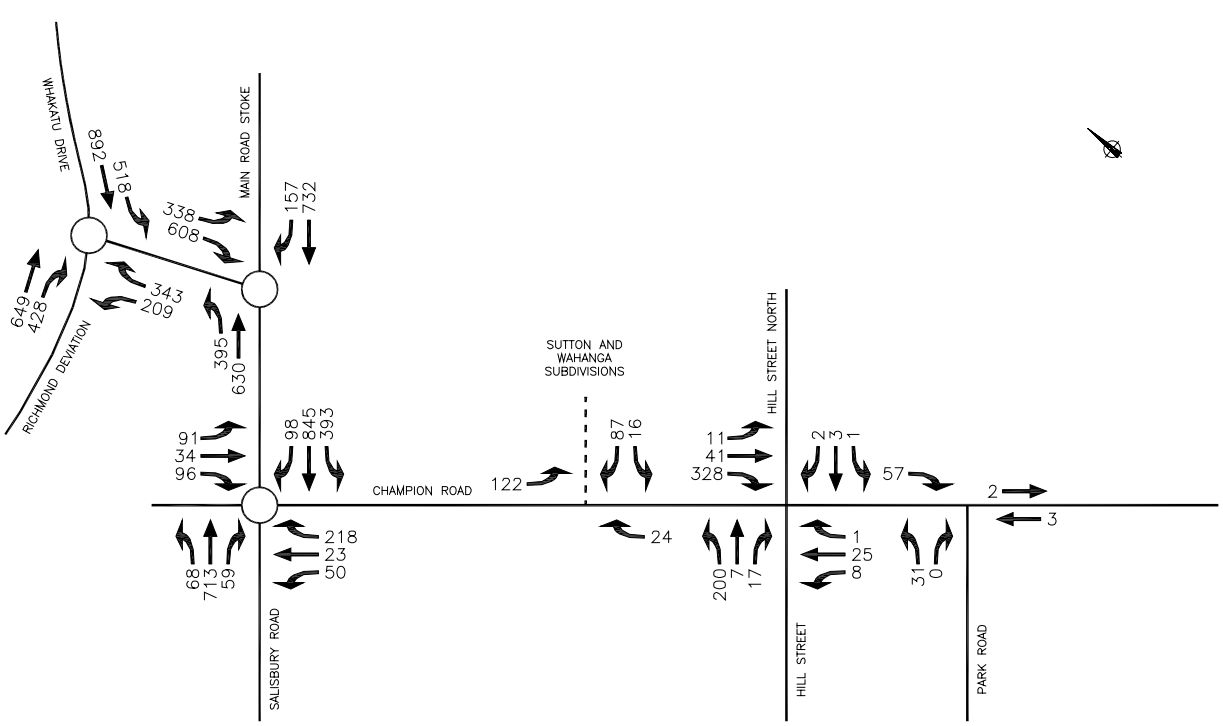


WEEKDAY AM PEAK HOUR
(7:45 - 8:45am)



WEEKDAY PM PEAK HOUR
(4:30 - 5:30pm)

2007 + COMMITTED DEVELOPMENT TRAFFIC FLOWS

3

Figure 4 is a plan showing the proposed subdivision layout as amended following detailed discussion with Council officers. It will be noted that the subdivision configuration is designed in accordance with new environmentally sustainable design practice that is intended to maintain low vehicle speeds as appropriate within residential precincts, and to discourage 'through' traffic. The design also meets the currently favoured 'grid' pattern of roads that are intended to assist 'way finding' within the subdivision.

Each section will be developed with separate drive-on access and associated on-site parking and garaging in full accordance with the requirements of the NRMP. It is intended that those lots that front existing roads will take their vehicle access directly from Champion Road and Hill Street North, respectively. All of the remaining lots will have access to the proposed internal local access roads and cul-de-sacs within the subdivision.

5. STATUTORY PROVISIONS

5.1 Regional Land Transport Strategy (RLTS)

Currently there are separate Land Transport Strategies for each of Nelson and Tasman, even though the urban areas are now juxtaposed. The Nelson strategy covers the period 2001 - 2006 and the Tasman Strategy appears to cover the period 2002 to 2007.

At the time of writing, it is understood that a draft new land transport strategy for the region as a whole is yet to be made public and so no details are currently available. Once approved, it is understood that a review of the ten year LTCCP will flow from the RLTS, with the identification of the road improvements that will need to be undertaken. It is envisaged that improvements to the strategic road network within the area covered by this assessment will be necessary, and that such improvements will accommodate anticipated residential subdivision not only of the applicant's site but across the region.

5.2 Nelson Resource Management Plan (NRMP)

As set out in the NRMP, the proposed subdivision is currently located in the Rural zone, although the Nelson Urban Growth Strategy (NUGS) identifies this 'South Nelson' area - defined as *"the rural area immediately north of Champion Road"* for residential development.

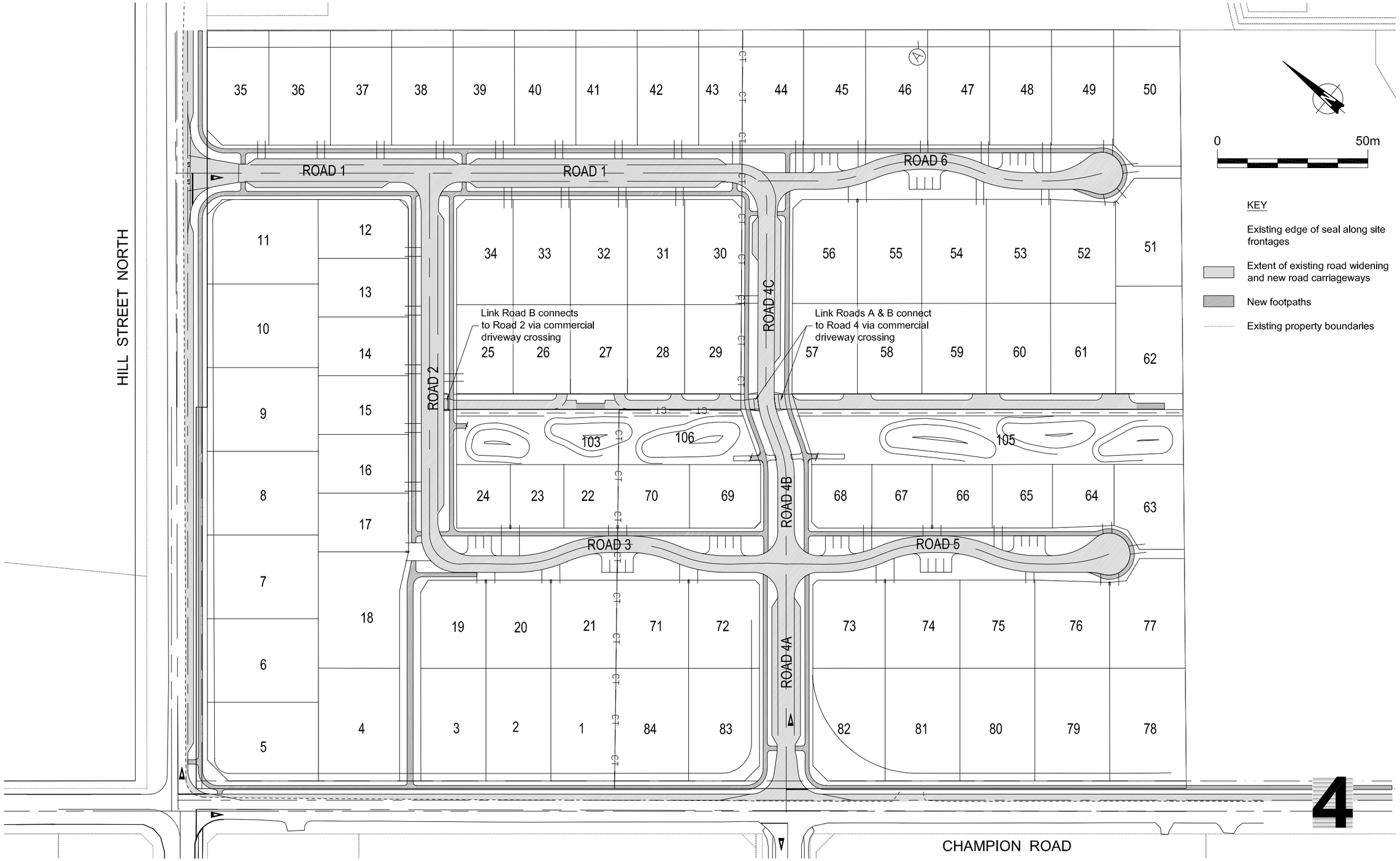
Subdivision in the Rural Zone is a controlled activity and in terms of traffic-related issues, control is reserved over matters contained in Appendices 10-14.

These particular sections of the NRMP as they apply to the proposed residential subdivision include:

5.2.1 Appendix 10 : Parking and Loading

Table 10.3.1 states that for a residential activity a minimum of one space per one bedroom residential unit must be provided. For units with more than one bedroom the following is required:

a) 2 spaces for 2 to 4 bedrooms
b) 3 spaces for 5 or more bedrooms.



ISSUE	DATE	REVISION
A	18/07/07	REPLACE WITH TCB PLAN – W06242 PR01–PR03.
B	05/11/07	REPLACE WITH TCB PLAN – W06242 PR01.
C	29/11/07	REPLACE WITH TCB PLAN – W06242XPR01.
D	07/12/07	REPLACE WITH TCB PLAN – W06242XPR01.

WAIMEHA SUBDIVISION - CHAMPION ROAD, RICHMOND

PROPOSED SUBDIVISION LAYOUT

TRAFFIC DESIGN GROUP

DRN. BC	DATE: 18/10/2007	DRG.No
SCALE 1:1250	ORIGINAL SIZE A3	CAD:9058-1W1/4

The development will comply fully with this requirement.

5.2.2 Appendix 11 : Access Standards

AP11.1 Minimum distance of vehicle crossing from intersections

AP11.1.i No part of a vehicle crossing shall be closer to a road intersection than the distances permitted in Table 11.1.1 below.

Table 11.1.1 Minimum Distance of Vehicle Crossing From Intersections

FRONTAGE ROAD	INTERSECTING ROAD TYPE (in metres)		
	State Highway/ Arterial	Principal/ Collector	Sub Collector/ Local
T1.1 Speed Limit - up to 50km/h			
State Highway/Arterial	60	50	35
Principal/Collector	50	35	20
Sub Collector/Local	30	25	10
T1.2 Speed Limit 80km/h			
State Highway/Arterial	110	90	60
Principal/Collector	85	70	50
Sub Collector/Local	60	50	40

The frontage road within Nelson City Council's jurisdiction is Hill Street North, which at present has a local road status and for which the minimum spacing of a crossing to its intersection with Champion Road is 25m. Similarly, the required minimum crossing spacing to the proposed subdivision road, (local access road) is 10m. These minimum distances between crossings and intersections will be met.

All the driveways within the subdivision are to be designed to comply with the Residential Zone standards as set out in Tables 11.2.1 and 11.3.1 of the NRMP.

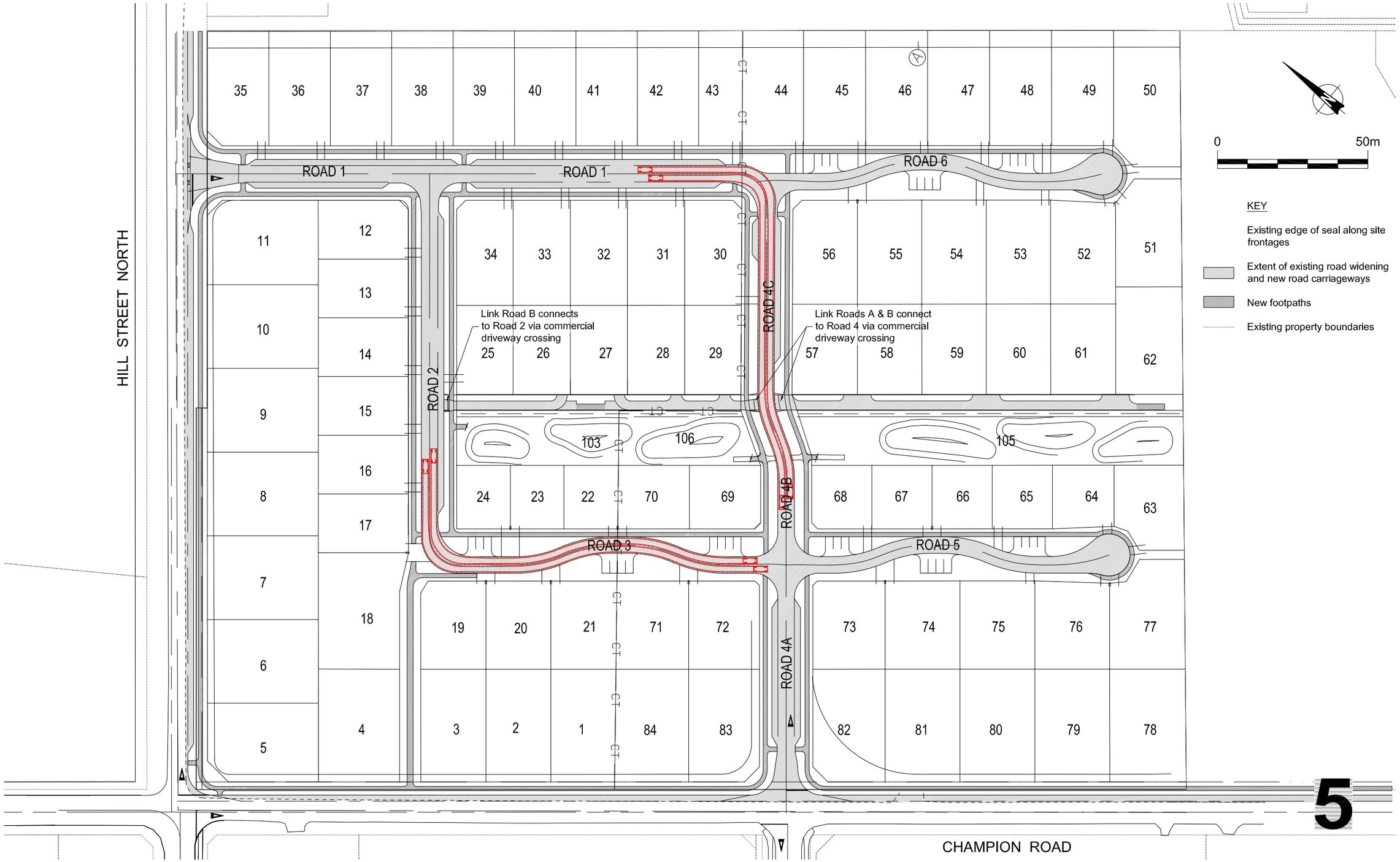
5.2.3 Appendix 12 : Tracking Curves

Figure 5 of this report illustrates the swept paths for a 90th percentile car negotiating the internal roads within the subdivision in accordance with the requirements for vehicle tracking within the site. Single unit trucks are also able to negotiate the subdivision, and turn as needed in the cul-de-sac heads, which are designed to a 7m radius in accordance with Council's Engineering Standards.

The main access roads from the subdivision onto Hill Street North and Champion Road (Roads 1, 4A and 4C, respectively) have generally been designed with a carriageway width of 9.5m (ie wider than the minimum 9m for a type V minor residential road), with narrow points (thresholds) at the two entry points to limit speed into and out of the proposed residential precinct, two traffic lanes of 2.75m, and for the most part either one or two parking lanes at 2m, parallel to the kerb. Road 4B has been designed with a carriageway width of 5.5m comprising two traffic lanes of 2.75m. These access roads each include 1.4m wide footpaths to be provided on both sides of these roads, in accordance with the NRMP for a minor access road (Class V) in Table 14.5.1 of the NRMP.

The other roads within the subdivision also generally comply with either Type V - (minor residential), Type VII - (minor cul-de-sac) or Type VIII (Minor residential access) standards, as appropriate, ie:

> Road 2 provides a carriageway width of 5.5m, with one 2m parking lane and a 1.4m footpath on each side of the road, in full compliance with NRMP standards.



ISSUE	DATE	REVISION
A	18/07/07	REPLACE WITH TCB PLAN – W06242 PR01–PR03. ADD 99 PERCENTILE CAR MANOEUVRES.
B	05/11/07	REPLACE WITH TCB PLAN – W06242 PR01.
C	29/11/07	REPLACE WITH TCB PLAN – W06242XPR01.
D	07/12/07	REPLACE WITH TCB PLAN – W06242XPR01.

WAIMEHA SUBDIVISION - CHAMPION ROAD, RICHMOND

90 PERCENTILE CAR MANOEUVRES

TRAFFIC DESIGN GROUP

DRN. BC	DATE: 18/10/2007	DRG.No
SCALE 1:1250	ORIGINAL SIZE A3	CAD:9058-1W1/5

Road 3 provides a 5.5m wide road with parking spaces provided in groups of 3 and 4 at intervals along the road at 90° to the carriageway, and a 1.4m wide footpath along one side of the street.

Roads 5 and 6 have a similar layout to Road 3, except with a cul-de-sac turning head, ie with a 5.5m wide carriageway and off-street parking bays at intervals (at 90° to the carriageway) in lieu of a parking lane parallel to the carriageway.

Three minor residential access roads in Figures 4 and 5 provide property access and also front onto the proposed reserve areas. They serve two, three and six residential units, respectively, via a 3m wide sealed carriageway within a 5.3m legal reserve width, with provision for vehicle access to each property without any on-street parking provision as shown.

These arrangements are specifically to provide for a slower speed environment than would otherwise be the case for a conventional arrangement, and include extra widening as needed at bends and intersections to facilitate safe manoeuvring, as indicated by Figure 5.

5.2.4 Further Policy Considerations

The development has been assessed against the following land transport policies of the NRMP:

Policy D010.1.1 environmental effects of vehicles
The environmental effects of vehicles should be avoided or mitigated by minimising the number and length of vehicle trips.

Policy D010.1.3 expansion of the road network
New roads and intersections should not adversely affect the safety or efficiency of the road network and should avoid, remedy or mitigate adverse environmental effects.

In summary, the site is located in an area that has a high standard of access to local facilities such as schools and recreation areas. This will help limit vehicle movements, as some journeys can be made on foot or by cycle to these local facilities. The proposed subdivision layout is entirely appropriate to serve this relatively confined residential precinct where there is no warrant for through vehicle access to adjoining areas. As previously described, the proposed new subdivision roads can be expected to moderate vehicle speeds consistent with the design of the local residential activity proposed, and to encourage pedestrian and cycle activity within a safe environment. The connection provided to both of the existing frontage roads also minimises the length of vehicle trips from any point within the subdivision, giving full effect to the policy of minimising the length of vehicle trips.

5.3 Tasman Resource Management Plan (PTRMP)

Although the land proposed for subdivision lies within Nelson City, Champion Road from which access is to be provided is within Tasman District. Therefore, as part of this transportation assessment, a review has also been undertaken of the relevant traffic related provisions of the proposed Tasman Resource Management Plan (PTRMP) as they apply to this particular application for a residential development. Along with other residential subdivision in the locality, this proposed subdivision will effectively become an extension of the Richmond urban area.

The objective of the PTRMP regarding Land Transport effects is to provide:

> A safe and efficient transport system, where any adverse effects of the subdivision, use or development of land on the transport system are avoided, remedied or mitigated.

The policies pertaining to land transport effects, and the compliance of the proposed subdivision with these policies are summarised as follows:

11.1.1 To promote the location and form of built development, particularly in urban areas, that:

> (a) avoids, remedies or mitigates adverse effects of traffic generation.

As discussed later in this report, the traffic generated by the proposed subdivision can be safely and sustainably accommodated within the Richmond roading network with appropriate network improvements where necessary.

> (b) provides direct and short travel routes by vehicle, cycling and pedestrian modes between living, working, service, and recreational areas.

The existing site, although some distance from the Richmond CBD, has excellent connections to the centre of Richmond via Salisbury Road and Hill Street North. To the north, Main Road Stoke (and Whakatu Drive) provide convenient access to Nelson. The manner in which vehicles, cycles, and pedestrians are able to be safely and conveniently accommodated is described in later sections of this report.

> (c) avoids an increase in traffic safety risk.

The detailed design arrangements as outlined in this report provide for the necessary mitigation and/or design measures that are able to avoid any significant increase in traffic risk.

> (d) allows opportunities for viable passenger transport services to be realised.

The proximity of this subdivision along with a number of other recent residential subdivisions to Champion Road and Hill Street North will increase the potential for these routes to be conveniently and efficiently serviced by public transport.

> (e) provides a clear distinction between the urban and rural environments.

The subdivision will extend the existing urban environment, reflecting the recent residential development that has been undertaken on the opposite side of Champion Road and further to the north along Champion Road, on the same side of the road. It is understood that the location is within a wider area currently being assessed on behalf of both Councils with a view to residential development.

> (f) segregates roads and land uses sensitive to effects of traffic

The proposed development will provide for access to most individual lots to be internal to the subdivision, where vehicle traffic speeds are lower, and pedestrian and cycle modes are encouraged within a safe environment.

11.1.2 To ensure that land uses generating significant traffic volume:

(a) are located so that the traffic has access to classes of roads that are able to receive the increase in traffic volume without reducing safety or efficiency;

The proposed subdivision will have access onto each of Champion Road and Hill Street North, from where traffic can then use Salisbury Road or Hill Street to access the wider road network. As an integral component of the subdivision, both Champion Road and Hill Street are to be widened and upgraded so as to facilitate the intended Collector Road function for each of these roads. As shown in the application plans and by the hatching in Figure 4 of this report, the existing carriageway along Hill Street North is to be widened by some 2m, providing a parking lane along the subdivision frontage side of the road, together with provision of kerb and channel and a 1.4m wide footpath. On Champion Road, kerb and channel is also proposed in conjunction with carriageway widening to provide a parking lane along the full frontage of the site together with provision of a 1.4m wide footpath and grass berm to replace the existing berm/drainage ditch along the site frontage. These arrangements represent a substantial improvement over the existing amenity.

As discussed in this report, some intersection improvements will be required remote from the site, irrespective of this development, and with these improvements there will be sufficient capacity to accommodate the additional traffic generated by the development, both now and in the future.

(b) are designed so that traffic access and egress points avoid or mitigate adverse effects on the safety and efficiency of the road network.

The subdivision layout will be provided with well designed access points along Champion Road and Hill Street North helping distribute traffic over the road network. Each of these connections is to have a threshold treatment designed to moderate the speed of vehicle traffic into and out of the subdivision.

11.1.2A To avoid, remedy or mitigate adverse effects of high traffic-generating land uses on the community cost of the road network resource of the District.

The proposed subdivision will essentially be residential in nature and does not provide for high traffic generating activities.

11.1.2B To avoid, remedy or mitigate adverse effects of traffic on amenity values.

The subdivision is specifically designed to avoid any adverse effects on amenity values.

11.1.2C To ensure that all subdivision design, including the position of site boundaries, has the ability to provide each allotment with vehicle access and a vehicle crossing sited to avoid adverse effects on the safety and efficiency of the road network.

The proposed design of the subdivision provides each allotment with vehicle access to an existing external or new internal road, with safe and well-spaced access points.

11.1.3 To control the design, number, location and use of vehicle accesses to roads; including their

proximity to intersections and any need for reversing to or from roads; so that the safety and efficiency of the road network is not adversely affected.

It is proposed that all individual property access onto Champion Road and Hill Street North be properly designed in full compliance with the PTRMP.

11.1.4 To ensure that adequate and efficient parking and loading spaces are provided, either on individual sites or collectively, to avoid or mitigate adverse effects on the safety and efficiency of the road network.

As previously described, appropriate off-street parking provision is to be provided in accordance with the NRMP.

11.1.4A To avoid, remedy or mitigate adverse effects from the location, design and operation of intersections.

The intersection of the subdivision access road onto Champion Road opposite Park Drive has been designed to avoid any adverse effects on its operation.

It is proposed that a 'platform' treatment in conjunction with road narrowing be provided so as to reduce speeds into and out of the subdivision and mitigate any potential adverse effects, as described in the following Section 6.1 of this report.

11.1.6 To avoid or mitigate likely adverse effects on the integrity of the road network arising from sea-level rise, climatic change and natural hazards.

This subdivision adjoining the southern foothills is sufficiently above sea level that any rise will not effect the integrity of the road network in this locality.

11.1.7 To ensure that signs do not detract from traffic safety by causing confusion or distraction to or obstructing the views of motorists or pedestrians.

It is not envisaged that there will be any signs within what is for the most part a residential area, that could compromise traffic safety.

In summary, all of the various policies of the Tasman District Council in relation to transport matters, will be met.

In accordance with Chapter 16 of the PTRMP, sight distances and on-site turning provisions are to be provided in accordance with the rules.

6. PROPOSED ACCESS

The plans of the proposed subdivision, as shown in the previous Figure 4, provide for the subdivision to be connected to both Champion Road and Hill Street North, with the intersection with Champion Road to be located opposite Park Drive, some 200m to the south of the Hill Street North intersection, as previously described.

As previously described, both Hill Street North and Champion Road are to be upgraded across the full extent of the subdivision frontage by the applicant.

The proposed road layout within the site has been designed to provide a high standard of connectivity between Hill Street North and Champion Road, firstly for pedestrian movement and also for cycle and vehicular traffic to and from the subdivision. The internal roads have been designed to meet practical requirements and include features to control traffic speeds by providing some curvilinear alignment to the internal roads and kerb build-outs at each internal intersection and between intersections. This physical narrowing of the carriageway provides the inherent cues to the driver to moderate vehicle speed, whilst also offering protection to the on-street parking provided.

The proposed footpath provision both within and around the site is designed to provide convenient pedestrian connectivity both within the subdivision, between the subdivision and the Champion Road/ Hill Street intersection, and with potential future adjoining subdivisions, as well as providing an improved pedestrian amenity and connectivity between the existing Park Drive subdivisions and the nearby Saxton Field recreation area.

Provision for pedestrians and cyclists is also available through the proposed new local reserve within the subdivision itself, that also provides rear access to lots 22 to 24, 69 and 70 and lots 63 to 68 inclusive. A very high pedestrian amenity is therefore provided throughout the subdivision that will benefit not only future residents but the wider local community in full accordance with current sustainability policies that promote greater reliance on alternative non-vehicular transport modes.

The internal subdivision roadways have been specifically designed with traffic calming features to control speed and discourage through traffic whilst maintaining sufficient width for two-way vehicle movement.

The proposed access roads servicing lots 25 and 26 and 27 to 29, and 57 to 62 fronting the local reserves are to be constructed within a cross section comprising a 3m wide carriageway within an overall road reserve width of 5.3m. This carriageway arrangement allows for a 2m wide strip of landscaping area to be provided along the lot frontages.

The access roads serving Lots 25 and 26 and 27 to 29 comply with the NCC requirements for a Type IX road which provides for a minimum 2.9m wide carriageway within a 3m road reserve to serve two to four dwellings.

On the opposite side of Road 4, also alongside the reserve, the access road serving six properties (Lots 57 - 62), has similarly been designed with a 3m carriageway within a 5.3m wide road reserve. This road layout is considered to be appropriate in order to minimise vehicle traffic next to the reserve, noting also that in this instance the 3m carriageway width can be accepted, as the individual driveway entrances to each property along the road form effective passing places. This, coupled with the level

and straight alignment of the road, will mitigate against any possible vehicle passing issues, although such demand is expected to be very light given the low numbers of expected traffic movements.

In order to provide unrestricted public access to the reserve areas it is proposed that these roads are vested in Council so as to ensure that the openness and accessibility to the reserve areas is maintained, and not closed off to the public.

Since a minimum of two parking spaces are to be provided within each subdivision lot, wide carriageways with continuous parallel parking provision along each side of the road are unnecessary, and the more limited on-street parking for visitors as shown on the plans is considered to be more than adequate in a residential precinct such as this.

A detailed assessment of the on-street parking provision within the subdivision shows that a total of 100 on-street parking spaces is provided as compared with 136 spaces under a conventional layout with parallel parking throughout. This still represents an on-street provision of 1.5 spaces for every lot accessed from within the subdivision (ie 64 of the 82 lots).

These arrangements are therefore readily able to accommodate all of the anticipated subdivision traffic and parking demands both safely and conveniently.

6.1 Pedestrian Walkway Link With Champion Road

Following consultation with Council officers, and with a view to minimising walk lengths between the subdivision and schools, public transport and the like, a direct walkway is to be provided onto Champion Road. As shown in Figure 4, this walkway is to be located within a generous 7m wide reserve, to be appropriately landscaped and fenced in accordance with Council requirements. This represents a very high quality pedestrian facility.

6.2 Intersection with Champion Road

Following careful consideration in conjunction with other environmental factors including pedestrian and cycle connectivity to and through the subdivision to the adjoining recreational area and esplanade reserve from Park Drive, and the maintenance of view shafts, the proposed location opposite Park Drive is confirmed. Various forms of intersection have been considered, with preference for a 'traffic calmed' entry rather than a roundabout, since volumes to and from the subdivision by way of this local residential access onto Champion Road at this location are projected to be significantly lower than the future traffic associated with the Collector Road function of each of the other approaches to the intersection. Furthermore, the configuration of this and other future residential development at this location will be such that there can be expected to be only minimal cross traffic between Park Drive and the new subdivision, with the large majority of all traffic to and from Hill Street and the wider road network.

As shown previously in Figure 3, virtually all vehicles to and from the subdivision served by Park Drive turn to and from the direction of Hill Street North. This is to be expected since all access to the wider region is via this route. This situation will remain unchanged when this subdivision is developed, so that there will be little if any generation of traffic across Champion Road. Such incentive has been further discouraged by the internal layout proposed for the subdivision.

As shown in Figure 6, it is proposed to provide a distinctively paved threshold treatment at the entrance to the proposed main subdivision access road. A flat-top speed-table offering vertical deflection is proposed, and that will physically restrict the speed of traffic entering and exiting the subdivision.

As for Park Drive, the subdivision traffic into Champion Road is able to be appropriately controlled by a give way.

It is considered that the proposed arrangement is more appropriate in this location than a roundabout, given that the traffic flows are unbalanced, in accordance with advice contained within the document titled '*A Review of Subdivision Road Design Criteria*' published by the Australian Road Research Board, which recommends that in a highly unbalanced flow situation, alternative treatments will probably be preferred.

Furthermore, the particular traffic flow characteristics of vehicles on Champion Road, Park Drive and the proposed subdivision access result in a greatly reduced risk of movement conflict for the reasons described earlier in the report and accordingly there is no reason why a roundabout would offer greater safety than a crossroads.

Rather, overseas (UK) research[1] regarding street design is promoting the provision of crossroads in residential situations for the following reasons:

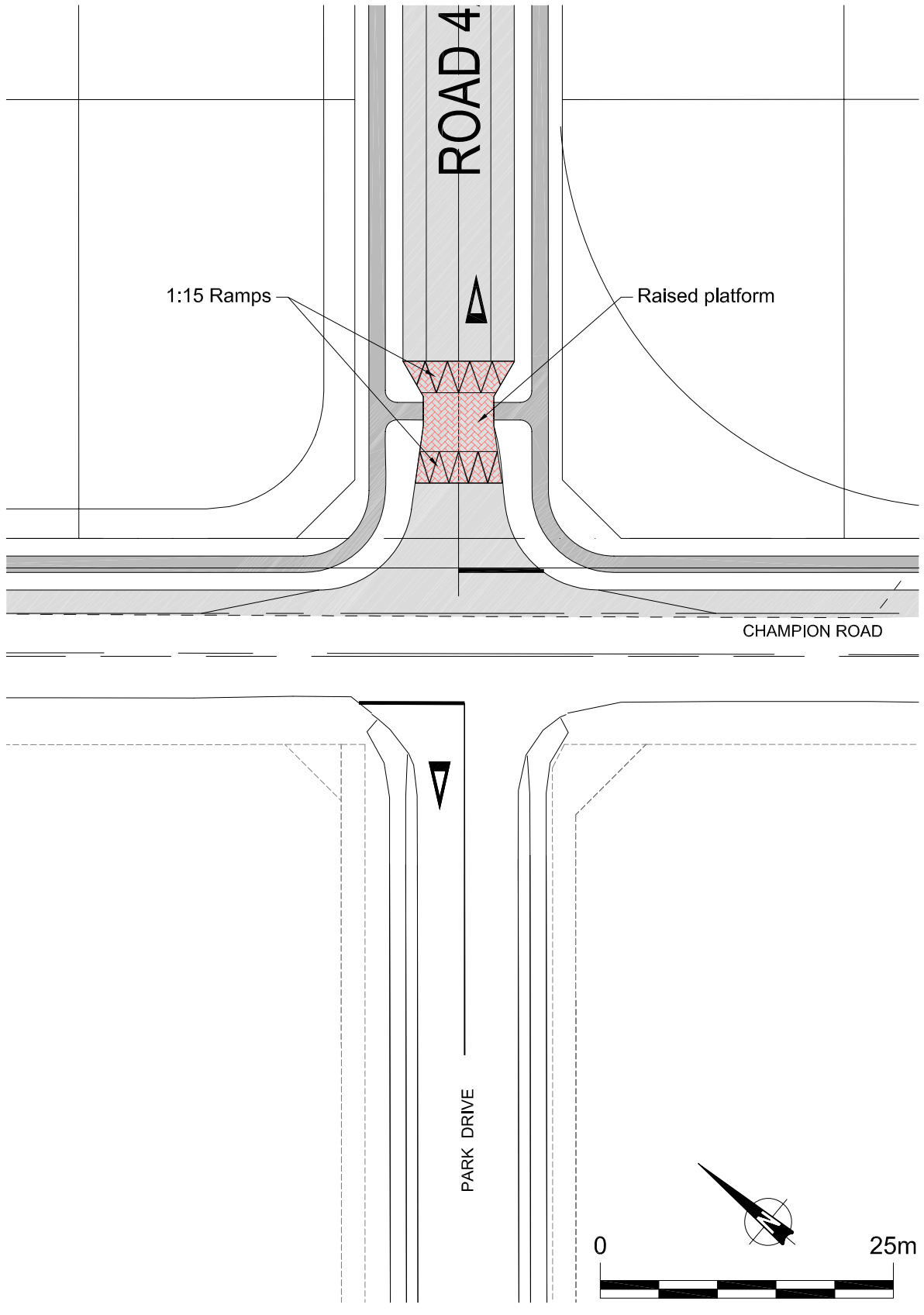
- crossroads are convenient for pedestrians, as they minimise diversion from desire lines when crossing the street. They also make it easier to create permeable and legible street networks
- staggered junctions can reduce vehicle conflict compared with crossroads, but may reduce directness for pedestrians
- where designers are concerned about potential user conflict, they may consider placing the junction on a speed table.

With regard to roundabouts in residential situations, the same UK documentation[1] provides the following advice:

> "Conventional roundabouts are not generally appropriate for residential developments. Their capacity advantages are not usually relevant, they can have a negative impact on vulnerable road users, and they often do little for the street scene".
>
> "Larger roundabouts are inconvenient for pedestrians because they are deflected from their desire lines, and people waiting to cross one of the arms may not be able to anticipate easily the movement of motor vehicles on the roundabout, or entering or leaving it".
>
> "Roundabouts can be hazardous for cyclists. Drivers entering at relatively high speed may not notice cyclists on the circulatory carriageway, and cyclists travelling past an arm are vulnerable to being hit by vehicles entering or leaving the junction".

Accordingly, in view of these design principles and practice, and the limited risk of conflict provided by the proposed subdivision connection at Park Drive, a crossroads layout will in this instance provide a safe and convenient intersection layout, as proposed.

[1] Manual For Streets (Department for Transport UK)



TRAFFIC DESIGN GROUP

DRN. QDO'S | DATE: 05/11/2007 | DRG.No
SCALE 1:500 | ORIGINAL SIZE A4 | 9058-1W1/6

WAIMEHA SUBDIVISION - CHAMPION ROAD, RICHMOND

PROPOSED THRESHOLD FEATURE

ISSUE	DATE	REVISION
A	05/11/07	CREATE FROM TCB PLAN W06242PR01. ADD PROPOSED THRESHOLD FEATURE.
B	09/11/07	REPLACE WITH TCB PLAN - W06242PR01.

PROPOSED THRESHOLD FEATURE

6

It may be noted however that the boundary set backs and splays provide for future upgrading to a roundabout or similar so as to 'future-proof' this intersection.

6.3 Intersection with Hill Street North

The proposed intersection onto Hill Street North will be located approximately 210m east of the Champion Road intersection and will form a standard tee junction with Hill Street North. As with Champion Road, Hill Street North is a no-exit road and the majority if not all traffic to and from the subdivision will accordingly turn right-in/left-out. The tee intersection proposed will provide a safe and convenient layout.

7. TRIP GENERATION

The estimated traffic generation for this subdivision has been determined based on the trip generation rates measured at the nearby local residential subdivision that is accessed from Champion Road via Park Drive, as follows:

TIME PERIOD	VEHICLE MOVEMENTS PER HOUR PER DWELLING		
	In	Out	Total
Weekday morning peak hour	0.28	0.82	1.10
Weekday evening peak hour	0.75	0.53	1.28
Saturday peak hour	0.70	0.60	1.30

Table 2 : Park Drive Generation Rates

The tabulated data shows peak traffic generation rates to and from the existing subdivision of 1.10 and 1.28 vehicle trips per hour per household for the morning and evening weekday commuter peaks respectively. On a Saturday, the equivalent peak traffic generation rate is 1.30. It is therefore expected that the proposed 82 lot residential subdivision on Champion Road will generate the following vehicle movements:

TIME PERIOD	VEHICLE MOVEMENTS PER HOUR		
	In	Out	Total
Weekday morning peak hour	23	67	90
Weekday evening peak hour	62	44	106
Saturday peak hour	57	49	107

Table 3 : Estimated Trip Generation for Proposed Subdivision

Accordingly, when fully developed, the proposed subdivision can be expected to generate around 90 trips (in and out), during a typical weekday morning peak hour, and up to around 110 trips during the evening and Saturday traffic peak hours.

8. TRAFFIC DISTRIBUTION

Richmond and Nelson are expected to attract the majority of peak hour trips to and from the proposed subdivision.

Typically, during the morning peak, around 80% of the outbound trips are expected to be work-related. A lesser proportion of the evening peak involves work-related trips.

The subdivision site is located adjoining an area where the predominant traffic is related to residential activity. Therefore, the surveyed turning proportions at nearby intersections on the road network have been used as the basis for traffic distribution to and from the proposed subdivision.

The projected future subdivision traffic distribution pattern assumed for analysis of the traffic effects of the subdivision is shown in Figure 7.

Using the trip generation from Table 3, the resulting expected future distribution of traffic flows to and from the proposed subdivisions, assuming full development by 2017, is shown for each of the weekday AM and PM peak periods in Figure 8.

9. FUTURE TRAFFIC FLOWS

9.1 Without Subdivision

Recent daily traffic growth across Nelson City and Tasman District has been reported at a level of at least 3 to 4% per year along key arterials over the most recent five-year period. For the weekday peak hours, however, the traffic growth has typically been lower at around only 1.5 to 2.5% per year as measured on Whakatu Drive.

In order to assess the future performance of the road network excluding the anticipated traffic that will be generated by this proposed subdivision, a generous underlying peak hour traffic growth of 2.5% per year has been allowed over the ten year period from 2007 during which it is assumed that the subdivision could potentially be fully developed. In practice, however, it is likely that peak-hour traffic growth will be lower than this.

This conservative assessment of the future patterns is illustrated for 2017 in Figure 9.

9.2 With Subdivision

In order to assess the additional traffic effects of the subdivision on the local road network, it has been conservatively assumed that all of the residential traffic is additive, ie over and above the growth already assumed for future years. Accordingly, the 2017 traffic forecasts have been based on the 2017 traffic without the subdivision (shown in Figure 9) plus the subdivision traffic as shown in Figure 8. The resulting forecasts for the weekday traffic peaks, including the traffic that is expected to be generated by the proposed subdivision, are shown in Figure 10.

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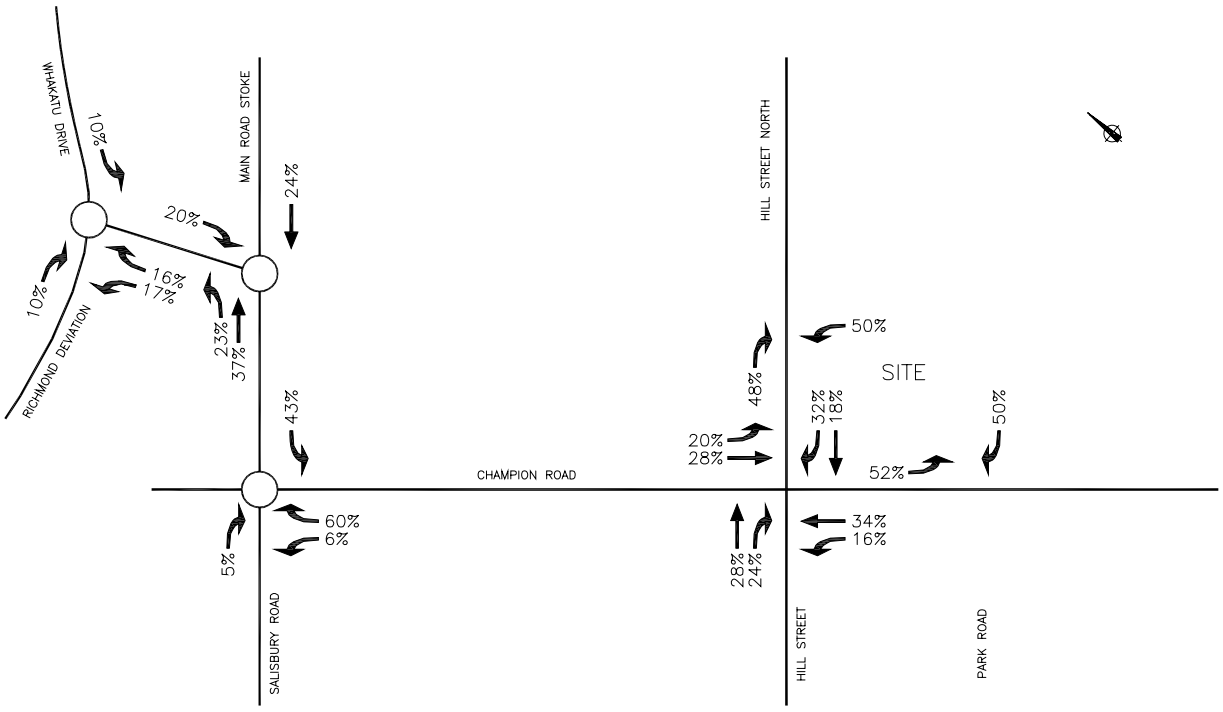
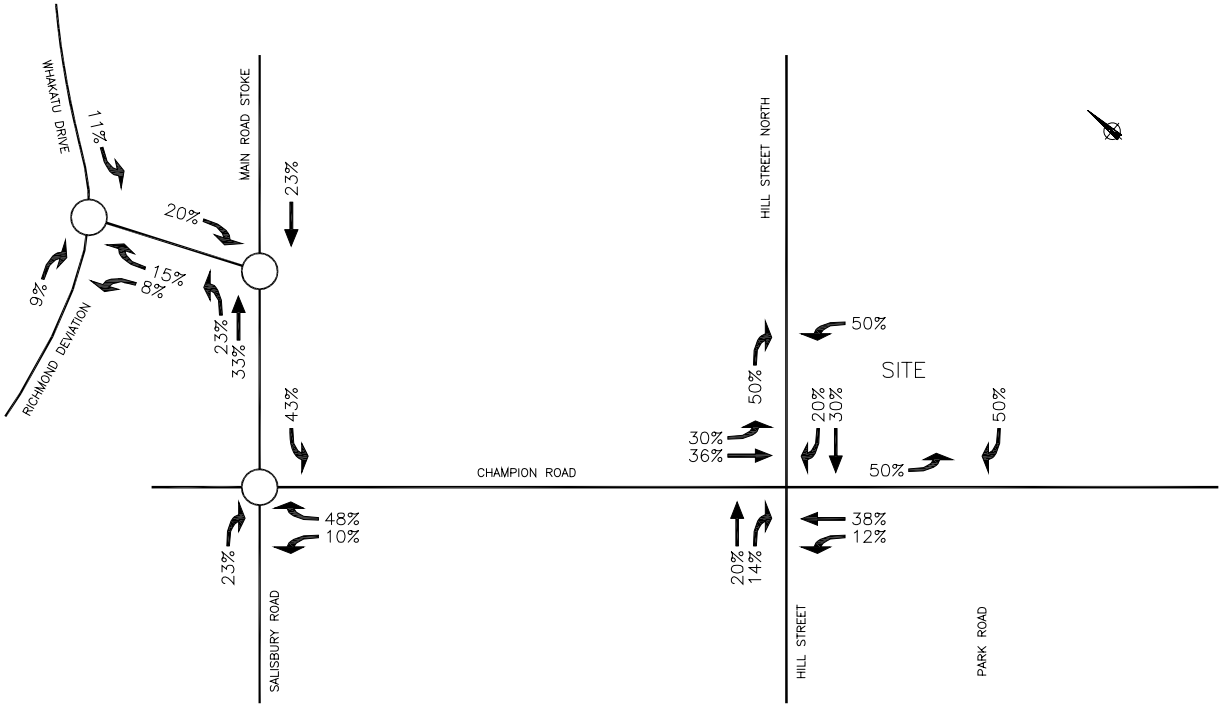


AM PEAK HOUR
(ASSIGNMENT)



PM PEAK HOUR
(ASSIGNMENT)

PROJECTED SUBDIVISION TRAFFIC DISTRIBUTION

7

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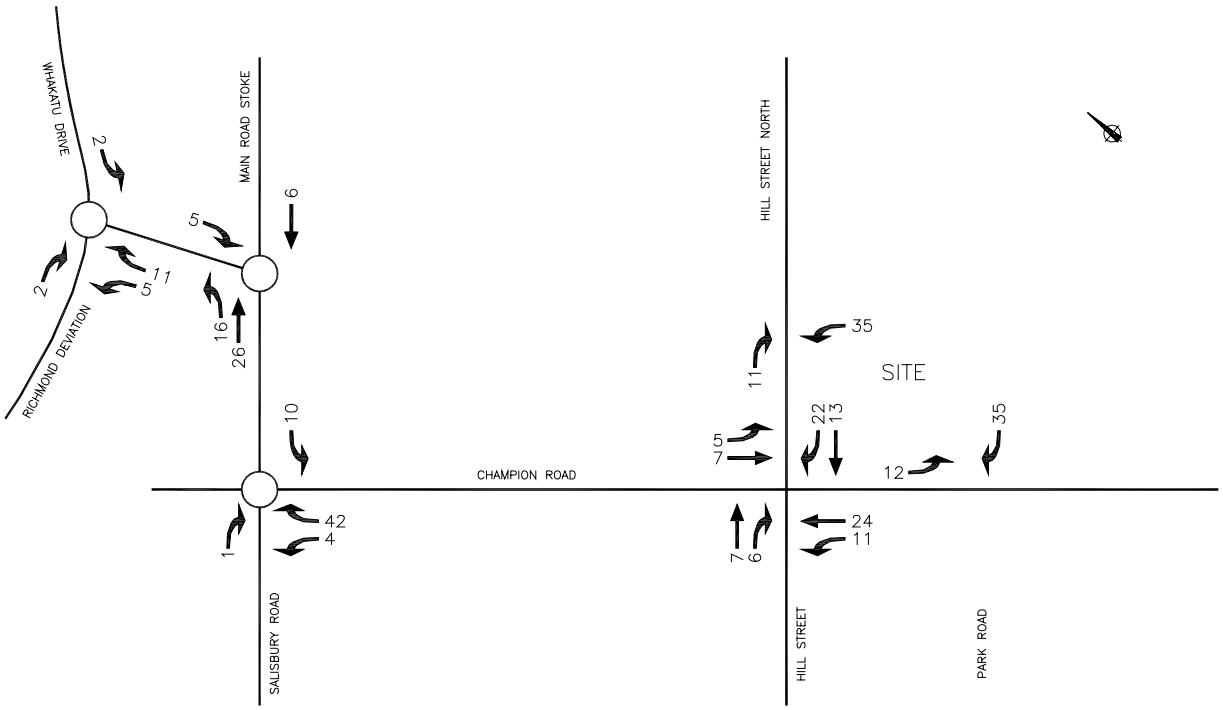
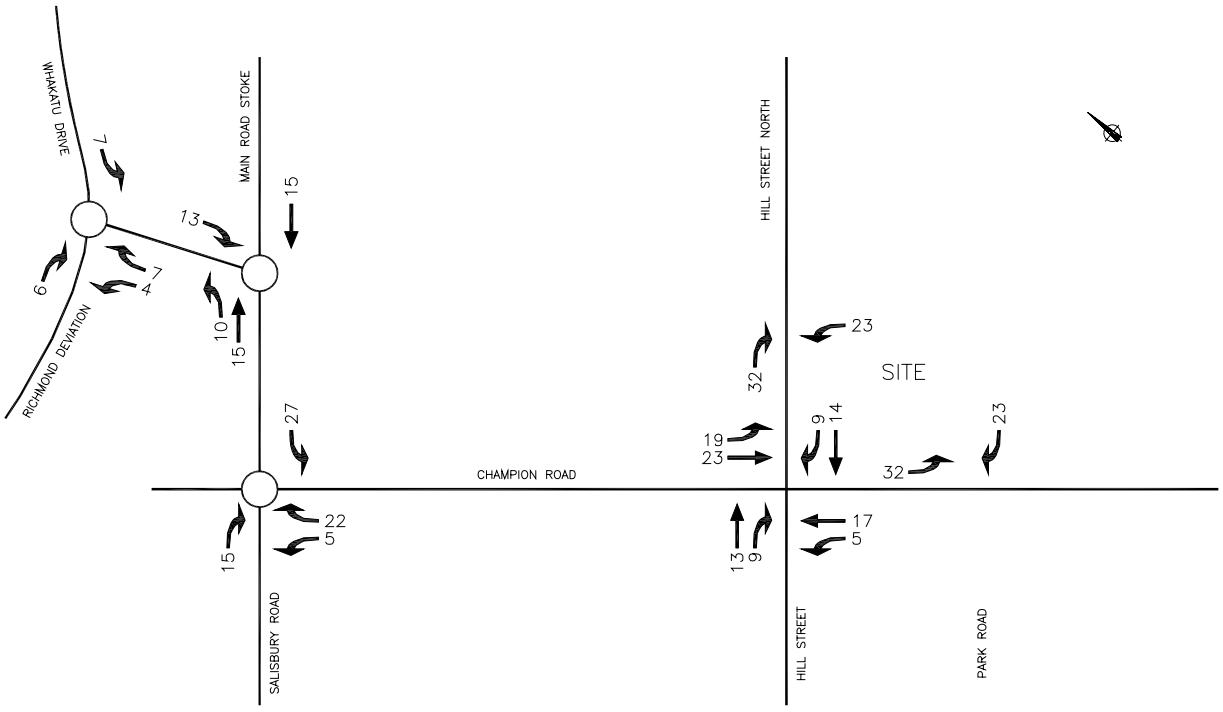


WEEKDAY AM PEAK HOUR
(7:45 - 8:45am)



WEEKDAY PM PEAK HOUR
(4:30 - 5:30pm)

2017 FUTURE DISTRIBUTION OF RESIDENTIAL SUBDIVISION TRAFFIC

8

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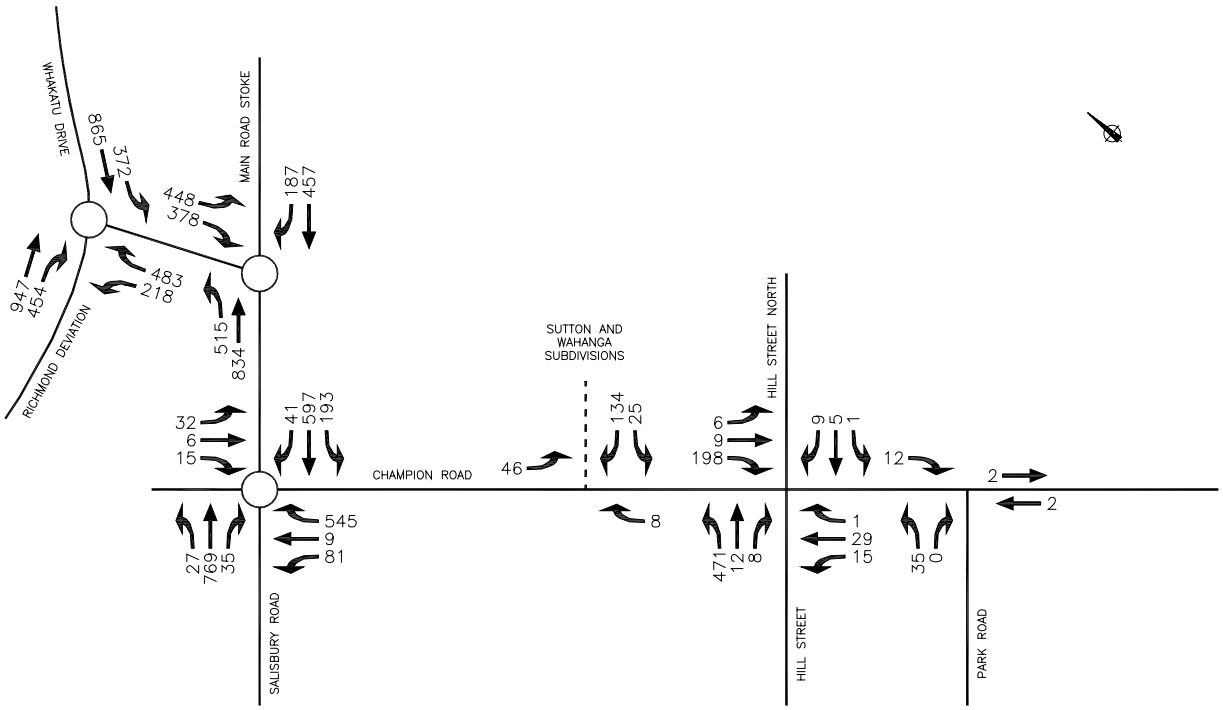
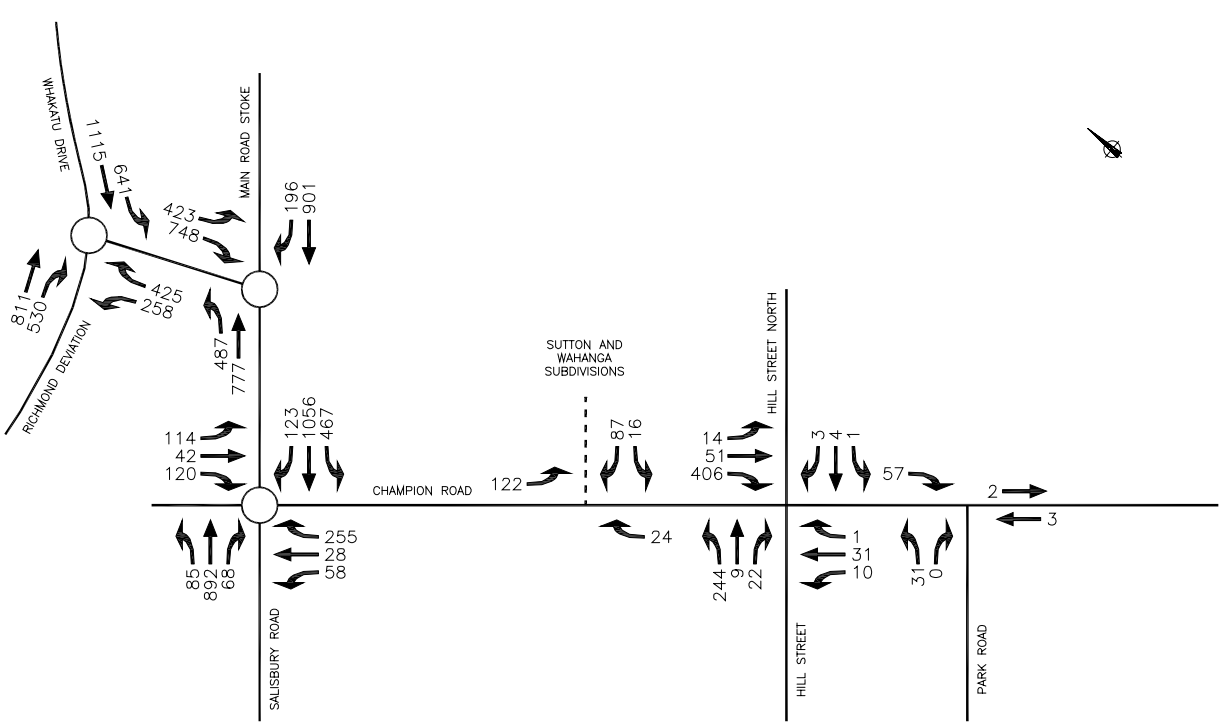


WEEKDAY AM PEAK HOUR
(7:45 - 8:45am)



WEEKDAY PM PEAK HOUR
(4:30 - 5:30pm)

2017 FUTURE TRAFFIC FLOWS (Including committed development) WITHOUT SUBDIVISION

9

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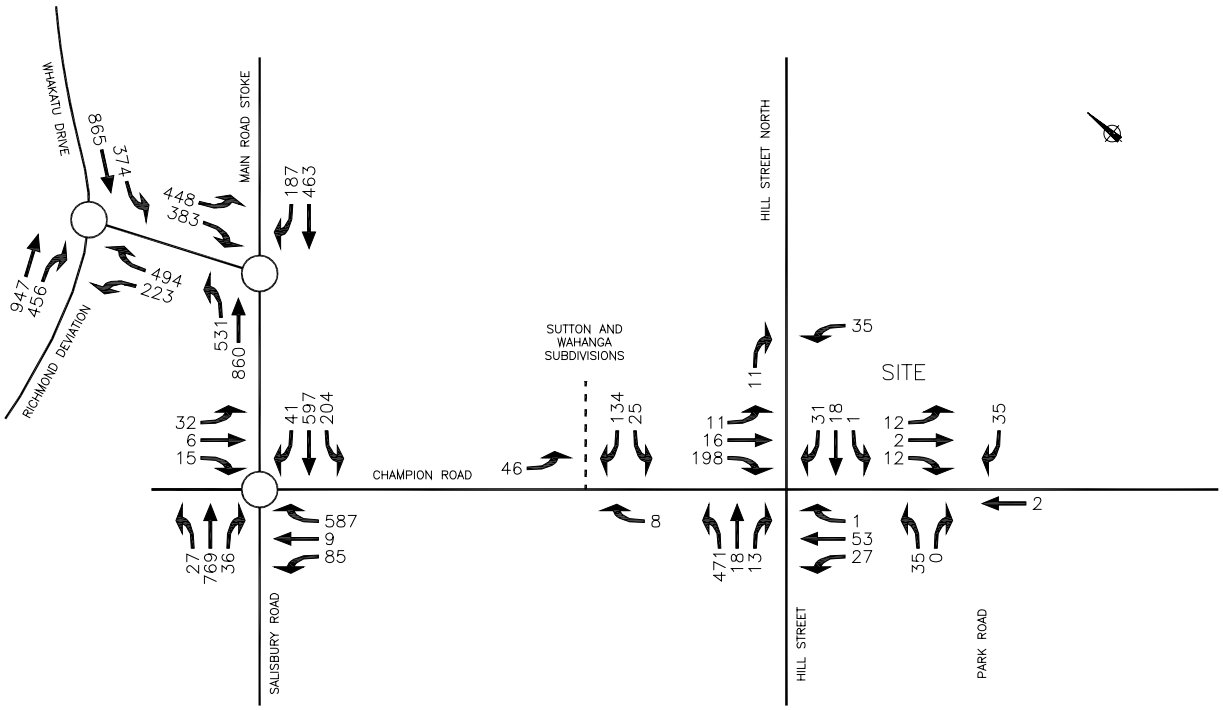
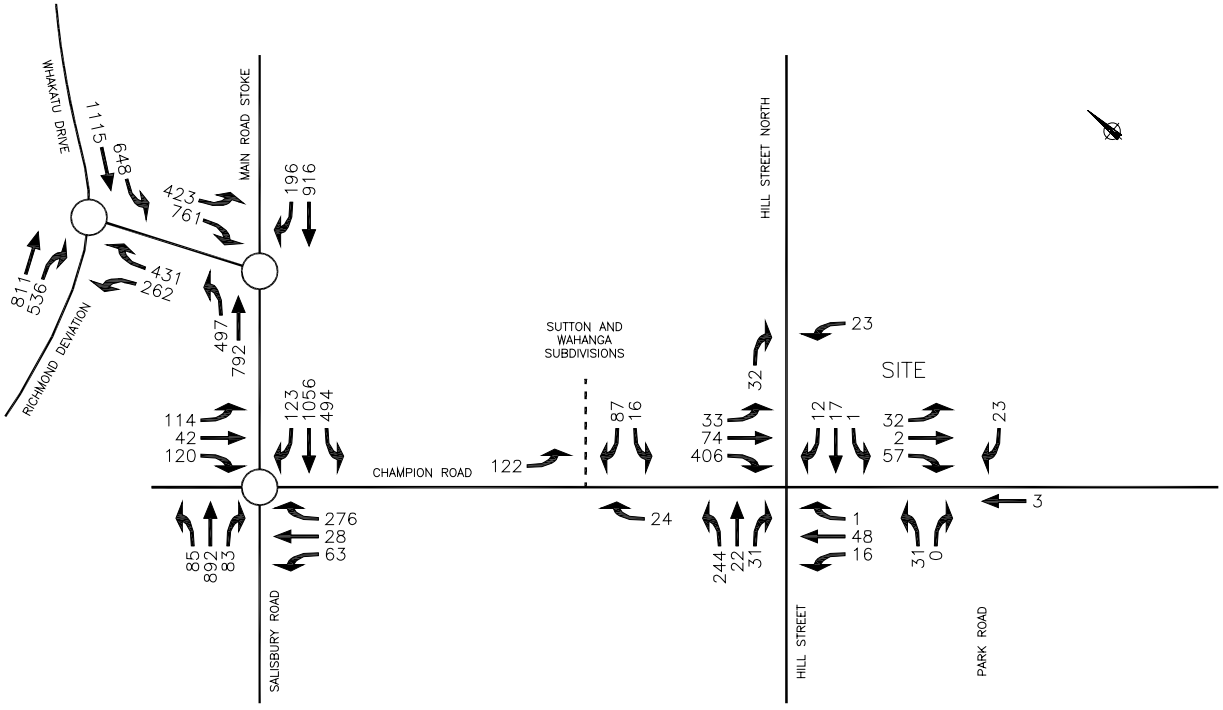


WEEKDAY AM PEAK HOUR
(7:45 - 8:45am)



WEEKDAY PM PEAK HOUR
(4:30 - 5:30pm)

2017 FUTURE TRAFFIC FLOWS WITH WAIMEHA SUBDIVISION

10

Again, this is a very conservative approach. In practice, it can be expected that if the residential growth does not occur here, then it will occur elsewhere, and much of the traffic generated by such subdivisions can still be expected to use the only two north/south arterial routes that connect Nelson and Richmond, ie SH6 (Whakatu Drive) and Salisbury Road/Main Road Stoke.

9.3 Modelled Traffic Patterns

For the purpose of analysis, the following scenarios have been assessed:

- 2007 traffic flows without the proposed subdivision plus committed[2] development flows
- 2007 traffic flows plus committed development flows, plus traffic from Waimeha subdivision
- future 2017 traffic flows allowing 2.5%pa peak hour traffic growth without Waimeha subdivision
- future 2017 traffic flows plus committed[2] development flows with Waimeha subdivision (over and above the 2.5% pa growth).

The resulting performance of the various intersections under these scenarios is described in detail in the next section of this report.

10. EFFECTS ON THE ROAD NETWORK

In order to enable a comparison between the existing and future performance of the local road network, 'SIDRA Intersection' models were developed to evaluate the performance of the following intersections:

- proposed new intersection with Champion Road
- Hill Street North/Champion Road
- Salisbury Road/Champion Road
- Main Road Stoke/Whakatu Drive link
- Richmond deviation/Whakatu Drive.

'SIDRA Intersection' is a widely used and recognised intersection modelling tool. The queues recorded during the traffic counts have been used to calibrate the SIDRA models for each intersection against the existing measured 2006 traffic flows. Accordingly, the results of the analysis are considered to provide a sound measure of the performance of each of the intersections as follows.

10.1 Champion Road/Park Drive/Subdivision Road

The existing intersection serving Park Drive is a standard tee type junction. As proposed, once the Waimeha access road is formed, the intersection will become a crossroads type junction with the new access road located on Champion Road directly opposite the existing Park Drive.

[2] Includes Wahanga and Sutton subdivisions, Champion Road

The existing and future expected levels of performance during each of the weekday AM and PM peak periods are summarised in the following tables:

INTERSECTION ARM	VOLUME (vph)	AVERAGE DELAY (sec/veh)	95%ILE QUEUES (vehs)	LEVEL OF SERVICE
2007 AM Peak Flows				
Champion Road (S)	3	2	0	A
Champion Road (N)	15	6	0	A
Park Drive	38	6	1	A
OVERALL	56	6	1	A
2007 PM Peak Flows				
Champion Road (S)	4	2	0	A
Champion Road (N)	62	7	2	A
Park Drive	34	7	1	A
OVERALL	100	6	2	A

Table 4 : Champion Road/Park Drive Weekday AM and PM Peak Hour Performance

INTERSECTION ARM	VOLUME (vph)	AVERAGE DELAY (sec/veh)	95%ILE QUEUES (vehs)	LEVEL OF SERVICE
2017 AM Peak Flows With Subdivision				
Champion Road (S)	4	3	0	A
Waimeha Subdivision	39	7	1	A
Champion Road (N)	28	7	2	A
Park Drive	39	7	1	A
OVERALL	110	7	2	A
2017 PM Peak Flows With Subdivision				
Champion Road (S)	5	3	0	A
Waimeha Subdivision	26	7	2	A
Champion Road (N)	96	6	1	A
Park Drive	35	7	1	A
OVERALL	162	7	2	A

Table 5 : Champion Road/Park Drive/Subdivision Access Road
Weekday AM and PM Peak Hour Performance

As can be seen from the analysis, the existing and proposed intersection operates satisfactorily in all peak periods in 2007 and 2017, with the delays increasing by one second to seven seconds and queues increasing by one vehicle to two vehicles. The overall level of service remains at the highest LOS 'A' for all peak periods.

10.2 Hill Street North/Champion Road

This existing intersection is a four-arm crossroads intersection, with priority to vehicles travelling north along Hill Street North and turning left into Champion Road, and vice versa. Champion Road (East) and Hill Street North (N) are both stop controlled. The existing and future expected levels of performance during each of the weekday peak periods are summarised in the following tables:

INTERSECTION ARM	VOLUME (vph)	AVERAGE DELAY (sec/veh)	95%ILE QUEUES (vehs)	LEVEL OF SERVICE
2007 AM Peak Flows With Committed Development				
Champion Road (E)	37	13	1	B
Hill Street North (N)	12	12	0	B
Champion Road (W)	175	8	1	A
Hill Street North (S)	393	6	0	A
OVERALL	617	7	-	A
2007 AM Peak Flows (plus Committed) With Subdivision				
Champion Road (E)	71	14	1	B
Hill Street North (N)	47	13	1	B
Champion Road (W)	187	8	1	A
Hill Street North (S)	406	6	0	A
OVERALL	711	8	-	A
2017 AM Peak Flows With Committed Development				
Champion Road (E)	45	16	1	C
Hill Street North (N)	15	15	0	C
Champion Road (W)	213	9	2	A
Hill Street North (S)	491	6	0	A
OVERALL	764	8	-	A
2017 AM Peak Flows (plus Committed) With Subdivision				
Champion Road (E)	81	19	2	C
Hill Street North (N)	50	16	1	C
Champion Road (W)	225	9	2	A
Hill Street North (S)	502	6	0	A
OVERALL	858	9	-	A

Table 6 : Hill Street North/Champion Road Weekday Morning Peak Hour Intersection Performance

The tables show that the existing intersection operates very satisfactorily with no significant queues or delays on any of the approaches. The longest delay for any approach is projected to increase from an average of 13 seconds/vehicle currently in the 2007 morning traffic peak, to 16 seconds/vehicle in 2017 without subdivision, and to only 19 seconds per vehicle with the added subdivision traffic. Such a small change is not significant and an overall LOS A is maintained.

Accordingly, the minor increase in traffic volumes through this intersection as a result of the proposed subdivisions will have only a negligible effect on the operation of the intersection as a whole during the AM peak, and the very small incremental changes in vehicle delays are not likely to be noticeable to road users.

ROUNDABOUT ARM	VOLUME (vph)	AVERAGE DELAY (sec/veh)	95%ILE QUEUES (vehs)	LEVEL OF SERVICE
2007 PM Peak Flows With Committed Development				
Champion Road (E)	34	14	1	B
Hill Street North (N)	6	13	0	B
Champion Road (W)	380	7	3	A
Hill Street North (S)	224	7	0	A
OVERALL	644	7	-	A
2007 PM Peak Flows (plus Committed) With Subdivision				
Champion Road (E)	57	15	1	C
Hill Street North (N)	29	14	0	B
Champion Road (W)	422	7	3	A
Hill Street North (S)	246	7	1	A
OVERALL	754	8	-	A
2017 PM Peak Flows With Committed Development				
Champion Road (E)	42	17	1	C
Hill Street North (N)	8	15	0	C
Champion Road (W)	471	7	4	A
Hill Street North (S)	275	7	0	A
OVERALL	796	8	-	A
2017 PM Peak Flows (plus Committed) With Subdivision				
Champion Road (E)	65	20	1	C
Hill Street North (N)	30	18	1	C
Champion Road (W)	513	8	4	A
Hill Street North (S)	297	7	1	A
OVERALL	905	9	-	A

Table 7 : Hill Street North/Champion Road Weekday Evening Peak Hour Intersection Performance

Similarly, the future projected increase in delay in the PM traffic peak, is only of the order of three seconds per vehicle on any one approach, and there is no change to levels of service with the addition of the subdivision traffic.

However, it is acknowledged that the layout of this intersection is such that it is likely to require upgrading at a point in the future as traffic grows in this area. Tasman District Council have acknowledged this fact and have requested that a 15m x 15m corner snipe across the applicant's land at the northeast corner of the intersection be vested in Council as road reserve.

It is understood that the snipe is required by TDC in order to provide for a roundabout at the intersection, although it is further understood that no decision for such a facility has yet been undertaken by Council. In view of the extraordinarily large snipe requested in this instance, the applicant has commissioned the schematic design of a suitable roundabout with a view to establishing the extent of corner snipe that would be necessary to accommodate it.

It may also be noted in this regard that the proposed new (10 June 2007) TDC Engineering Dwg No 602 only requires a 5m x 5m splay at the intersection of a Collector or Local Road with a Distributor or Arterial Road. The design was prepared by Traffic Design Group and indicates that a reduced corner snipe of 5m x 5m would be sufficient to enable an appropriate roundabout to be provided at the intersection. In view of this outcome the applicant will be offering a snipe of 5m x 5m as shown on the site layout plans as submitted.

10.3 Salisbury Road/Champion Road

This existing intersection is a four-arm roundabout. However, even though it is on an arterial route, it has been designed with only one entering lane per approach arm, and a one-lane circulating carriageway. The existing and future expected levels of performance during each of the weekday AM and PM peak periods are summarised in the following tables.

ROUNDABOUT ARM	VOLUME (vph)	AVERAGE DELAY (sec/veh)	95%ILE QUEUES (vehs)	LEVEL OF SERVICE
2007 AM Peak Flows With Committed Development				
Champion Road (S)	535	17	9	B
Salisbury Road (E)	673	9	5	A
Craft Habitat	43	19	1	B
Salisbury Road (W)	667	12	12	B
OVERALL	1918	12	-	B
2007 AM Peak Flows (plus Committed) With Subdivision				
Champion Road (S)	580	19	11	B
Salisbury Road (E)	683	9	5	A
Craft Habitat	43	20	1	C
Salisbury Road (W)	683	15	14	B
OVERALL	1989	14	-	B
2017 AM Peak Flows With Committed Development				
Champion Road (S)	635	66	37	E
Salisbury Road (E)	831	9	7	A
Craft Habitat	53	30	2	C
Salisbury Road (W)	831	101	68	F
OVERALL	2350	57	-	E
2017 AM Peak Flows (plus Committed) With Subdivision				
Champion Road (S)	681	114	58	F
Salisbury Road (E)	842	9	7	A
Craft Habitat	53	30	2	C
Salisbury Road (W)	832	103	69	F
OVERALL	2408	72	-	E

Table 8 : Salisbury Road/Champion Road Weekday Morning Peak Hour Intersection Performance

As shown, the full development of this subdivision by the design year (2017) provides for an expected increase of 60 vehicles per hour (vph) in the AM peak, which represents a 2.4% increase (or one year's annual growth) in the total traffic flow through this intersection. This modest increase in traffic has a

minor effect in the 2017 AM traffic peak, increasing queues on Champion Road without change to the projected level of service. However, improvements to this intersection will be warranted before the LOS reaches E, which in this case implies a very poor LOS F on Salisbury Road.

Of course, the same level of subdivision of any other land that has access to Champion Road or Hill Street North could be expected to have a similar effect.

The weekday PM effects are more critical in this instance as illustrated in the following table.

ROUNDABOUT ARM	VOLUME (vph)	AVERAGE DELAY (sec/veh)	95%ILE QUEUES (vehs)	LEVEL OF SERVICE
2007 PM Peak Flows With Committed Development				
Champion Road (S)	291	68	17	E
Salisbury Road (E)	1,336	23	43	C
Craft Habitat	221	25	7	C
Salisbury Road (W)	840	8	11	A
OVERALL	2,688	23	-	C
2007 PM Peak Flows (plus Committed) With Subdivision				
Champion Road (S)	316	87	23	F
Salisbury Road (E)	1,364	38	59	D
Craft Habitat	221	29	8	C
Salisbury Road (W)	855	9	12	A
OVERALL	2,756	34	-	C
2017 PM Peak Flows With Committed Development				
Champion Road (S)	341	197	47	F
Salisbury Road (E)	1,646	211	229	F
Craft Habitat	276	280	50	F
Salisbury Road (W)	1,045	14	23	B
OVERALL	3,308	153	-	F
2017 PM Peak Flows (plus Committed) With Subdivision				
Champion Road (S)	367	210	52	F
Salisbury Road (E)	1,673	232	232	F
Craft Habitat	276	350	58	F
Salisbury Road (W)	1,060	17	26	B
OVERALL	3,376	172	-	F

Table 9 : Salisbury Road/Champion Road Weekday Evening Peak Hour Intersection Performance

With the subdivisional traffic added to the 2007 traffic volumes, there would be some further minor deterioration in traffic delays and queues, but overall the intersection would still operate at LOS C. In the design year (2017), even without the addition of the traffic generated by this subdivision, the intersection in its current configuration will operate at a very poor LOS F, and is likely to reach a LOS D or E when intervention is necessary, well before 2017.

From observation, and as indicated by the queuing patterns predicted by SIDRA, there are already lengthy queues on the approach from Main Road Stoke. Since there is only some 150 metres between this roundabout and the next roundabout at the Main Road Stoke/Whakatu Drive link intersection to the north, queues already extend back into this next roundabout for short periods during the evening traffic

peak. Therefore, even though the performance of the Champion/ Salisbury roundabout (LOS C) currently appears to be satisfactory in isolation, it is already having some adverse effect on the adjoining roundabout. As traffic volumes increase, this problem is likely to deteriorate markedly and is not sustainable in the longer term.

The limited capacity of the existing roundabout to accommodate future traffic growth is not surprising, given that Salisbury Road/Main Road Stoke is an arterial route carrying high volumes of through traffic, and Champion Road is already serving a large residential catchment. This roundabout is a significant constraint in the corridor, severely limiting its potential to accommodate future traffic growth. It can be expected that, within the next two years, local improvements will be required to this intersection to prevent more extensive queuing back through the Whakatu Link roundabout during the evening peak.

It is expected that it will be necessary to reconstruct this roundabout to provide for two-lane approaches on each entry in conjunction with two circulating lanes around the central island, and provide four lanes between the two closely-spaced roundabouts on Main Road Stoke since this short section is a potential bottleneck, being fed on one side by Champion Road and Salisbury Road, and on the other by Main Road Stoke and Whakatu Drive.

For the purposes of identifying that sufficient capacity can be provided at the roundabout for the future flows, an upgraded roundabout design has been tested for the critical peak hours, for the projected 2017 flows as previously identified. The upgraded design assumes two-lane approaches on Champion Road, Salisbury Road and Main Road Stoke, for which the projected future performance is summarised in the following table.

ROUNDABOUT ARM	VOLUME (vph)	AVERAGE DELAY (sec/veh)	95%ILE QUEUES (vehs)	LEVEL OF SERVICE
2017 AM Peak Flows (plus Committed) With Subdivision				
Champion Road (S)	681	14	7	B
Salisbury Road (E)	842	9	2	A
Craft Habitat	53	17	1	B
Salisbury Road (W)	832	10	6	A
OVERALL	2,408	11	-	B
2017 PM Peak Flows (plus Committed) With Subdivision				
Champion Road (S)	367	26	8	C
Salisbury Road (E)	1,673	10	7	B
Craft Habitat	276	23	7	C
Salisbury Road (W)	1,060	7	5	A
OVERALL	3,376	12	-	B

Table 10 : Salisbury Road /Champion Road Upgraded Roundabout: 2017 Weekday Peak Hour Performance

As can be seen from the above analysis, the improvements to the roundabout as described will enable it to operate at a high level of service in the design year, reducing queues appreciably on all approaches to less than ten vehicles per lane in peak periods.

10.4 Main Road Stoke/Whakatu Drive Link

This three-arm roundabout is situated some 150m north of the Champion/Salisbury roundabout. However, it has better traffic capacity, providing two lanes on each approach and two circulating lanes. The additional traffic generated by the subdivision represents less than 2% of the total traffic through this intersection. Accordingly, the SIDRA results show that there is no noticeable effect of the subdivision on the performance of this roundabout.

10.5 Whakatu Bypass/Link Road/Richmond Deviation

This 'seagull' roundabout provides the most direct link from the subdivision to the state highway via the intersections just described. At this location, flows to/from the subdivision have dissipated to such a degree that the proportion of subdivision traffic using this roundabout is less than 1%. Accordingly, the proposed subdivision has little if any measurable effect on the performance of this roundabout and would not be noticeable in the day to day fluctuations in traffic patterns that occur.

10.6 Champion Road

Tasman District Council recently reviewed all of the roads within Tasman District and as a result Champion Road was re-classified as a Distributor Road over the section between Hill Street and Salisbury Road, and the section between Hill Street North and the reservoir as a Collector Road in conjunction with Park Drive (refer report to the Environment and Planning Committee in November 2006).

It is also acknowledged that a structure plan is currently being prepared for the Champion Road locality jointly by NCC and TDC 'Nelson South – Richmond East Structure Plan (Draft – September 2007)'. The objective of the Structure Plan is to provide an overall development framework for the whole of the NSRE area. This Structure Plan document carries no weight at present due to its draft status and lack of public consultation. It is noted however that the Structure Plan does identify the main areas of residential subdivision and these are located in and around the Champion Road area, including the site of this proposed subdivision.

In broad terms it can be expected that the two-way peak hour traffic on Champion Road (south-east of Hill Street) will increase from its current level of around 100 vehicles per hour to 300vph in the busiest PM peak period by 2026, or the equivalent of around 2,500 to 3,000vpd in the long term.

Such volumes are readily able to be accommodated within a 20 metre road reserve with a carriageway comprising of 2 x 3.6m traffic lanes and 2 x 2m parking lanes, ie a Collector Road standard width without cycle lanes due to the limited cycle traffic use anticipated along this section of road in the future.

Accordingly, the applicant proposes to set back the boundary along the Champion Road frontage by some 10m from the existing centreline and to vest the additional land as road reserve. The applicant will also construct the widened carriageway, kerb and channel, berm and footpath along its side of the road.

10.7 Summary

In summary, the key findings from the detailed analysis of each of the various intersections and the future provision along Champion Road, as described, are:

- with the upgrading proposed along the frontage of the site, there is ample capacity on Champion Road and at the intersections with Hill Street North and with the proposed new intersection at Park Road for the foreseeable future
- there are already capacity constraints at the single lane circulating roundabout at the Champion Road/Salisbury Road intersection due to its design, which can most readily be overcome by increasing its size. These improvements are required irrespective of the proposed subdivision although the associated traffic flows might bring forward the need for such improvements by perhaps a year. Nevertheless, a queuing problem exists now and the roundabout already warrants improvement. Such improvements, remote from the site, would ordinarily be funded from roading contributions as provided for by the respective road controlling authority through the LTCCP
- there is ample capacity at the Main Road Stoke/Whakatu Drive Link Road roundabout itself but, due to the close proximity of adjoining intersections, improvements will be required to avoid queues extending back to the adjoining roundabouts which will occur irrespective of where future residential development occurs. The contribution of traffic from the proposed subdivision is tiny in relation to other traffic at this location and will increase incrementally as the subdivision proceeds. Accordingly, the subdivision will not significantly effect the timing of improvements to the intersection or the approaches
- the Richmond Deviation/Whakatu Drive roundabout is quite remote from the subdivision sites, and carrying such high underlying traffic volumes as to not be affected to any measurable degree whatever by traffic which will be generated by the future subdivisions. Again, as for the other adjoining roundabouts, future improvements will be required irrespective of the proposed subdivisions.

These outcomes are consistent with the reported findings of the 'North Nelson to Brightwater Corridor Study' (Stage 2, Nov 2005), where, not surprisingly, Level of Service 'F' is predicted in this part of the network in 25 years time if no improvements are undertaken.

It is therefore concluded that no specific new traffic mitigation measures are required in order to accommodate the future projected traffic likely to be generated by the proposed subdivision, other than those described along the subdivision frontage as described in the application.

11. CONCLUSION

This report provides a very detailed and conservative assessment of the effect of anticipated future traffic volumes that can be expected to result from the proposed subdivision of land south of Hill Street North for residential purposes.

Overall, this assessment finds that the proposed residential subdivision is readily able to be supported by both the new internal roading arrangements and the wider road infrastructure, subject to improvements which will be required to accommodate normal traffic growth.

Within the subdivision itself, the proposed layout provides for an appropriate level and scale of road and pedestrian facilities to safely and conveniently accommodate the expected local pedestrian, cycle, and vehicle traffic and parking demands within a low-speed safe residential environment. The pedestrian links are designed to provide both for access into the subdivision itself, along each frontage of this large site, and also for access through the subdivision to the proposed walking tracks associated with the Saxton Field Recreation area and adjoining esplanade reserve. On the other hand, vehicle traffic not related to the subdivision itself is actively discouraged from using the subdivision as a through route by the on-site traffic calming arrangements at entry to and throughout the site. The subdivision carriageways themselves are specifically designed to provide ample on-street parking to meet all anticipated local visitor demand, with the associated carriageway alignments designed to control traffic speeds through this residential subdivision.

Across the wider road network, a detailed assessment of all of the key intersections beyond the site as far as State Highway 6 has been undertaken, from which it is determined that no mitigation works other than would be required anyway to accommodate future traffic growth, are required. At most it is considered that the proposed subdivision potentially brings forward the need to upgrade the Champion Road/Salisbury Road roundabout by a year. However, the additional traffic will only be added incrementally with take-up of the subdivision, along further other subdivisions within this general locality.

This outcome is consistent with the findings of the Corridor Study undertaken recently by Transit in conjunction with the local authorities.

In summary, the internal subdivision access arrangements for pedestrians, cyclists and motorists are appropriately scaled and designed for the size of this subdivision on the outskirts of this urban area. As described, the proposed Waimeha subdivision is fully able to be supported by the surrounding road infrastructure, as it is progressively upgraded, as required, over the next several years.

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