The assessment of internal traffic volumes has indicted that neighbourhood roads will carry volumes under 300vpd and that the two secondary roads are anticipated to carry between 300vpd and 500vpd. As indicated by the table above, the specifications proposed for these road classifications are consistent with NZS4404:2004.

The District Plan provides requirements for new roads within Table E13.9 – Roading Standards, which incorporate local roads within rural residential developments. It is proposed to amend Table E13.9 as part of this Plan Change to incorporate the proposed Living 3 zone, with the changes proposed assessed in detail within Section 9.4 of this report.

7. Trip Generation and Distribution

7.1 Traffic Generation

In order to quantify the expected traffic generation of the rural residential development, a range of information related to residential subdivision developments from around the country has been collated, including numerous fringe urban residential areas in Christchurch, Selwyn District and Waimakariri District.

Surveys of typical suburban household traffic generation rates have resulted in an average trip generation rate between 8 and 10 movements per day per household (vpd/hh). In the suburban traffic environment, the ease and convenience of vehicle travel between households, work places, recreation venues and social destination are such that a series of individual vehicle trips is commonly made by residents of these areas.

Rural residential developments have lower traffic generation than suburban developments, and rates typically vary between about 6vpd/hh and 8vpd/hh. This lower traffic generation rate is because of the increased trip linking that is practised by residents in developments located further from urban destinations.

For the evaluation of the traffic effects of the proposed rural residential development, a rate of 8vpd/hh has been adopted as the generation rate for households. It is considered that the adopted rates are suitably conservative estimate to ensure that the maximum traffic impact of the potential development is evaluated.

The parallel Plan Change application by SPBL for the Holmes block to the north of the site involves the development of 160 rural residential lots, developed prior to 2016. Although the development of Holmes block is not committed, the analysis of the cumulative traffic effects of the site and the Holmes block together ensures a suitably conservative assessment of the potential effects of development of the site. On this basis analysis of the traffic generation of both the site and Holmes block has been considered in this assessment.

The following table summarises the traffic generating potential of the site and Holmes block based on the assessment outlined above.

Block	Lots	Daily Traffic Generation (vpd)
Site (Skellerup Block)	125	1,000
Holmes Block	160	1,280
Total	**285**	**2,280**

Table 4: Traffic Generation

At the adopted traffic generation rate of 8vpd/hh, the potential 125 sections anticipated within the site and further 160 lots within the Holmes block would generate 2,280vpd onto the road network daily and 285vph during each of the morning and evening peak hours.

7.2 Traffic Distribution Overview

The distribution of traffic from the site and Holmes block can be considered in terms of both the origin and destination distribution within the wider area, and the routes that are used between the site and those origins and destinations. At a broad level, the following distribution of traffic is expected:

- 35% within Rolleston urban area;
- 15% to/from the Rolleston Industrial area;
- 45% to/from the Northeast (Christchurch, Lincoln, Prebbleton); and
- 5% to/from the Southwest.

As indicated earlier, existing traffic patterns indicate that traffic from existing residential property fronting Dunns Crossing Road in the vicinity of the site prefer to utilise the high capacity signal controlled access at Rolleston Drive via local roads for access to SH1 or Selwyn Road and Shands Road for movements to and from Christchurch. Development on the site is likely to follow a similar pattern. However, with the Holmes block being located closer to the Dunns Crossing Road and SH1 intersection than the existing residential development it is likely that there will be a higher utilisation of the SH1 route for generated traffic from the this area.

7.3 Proposed Development Traffic Distribution

7.3.1 Site (Skellerup Block)

At the adopted traffic generation rate of 8vpd/hh, the potential 125 sections expected to be developed within the site are predicted to generate 1,000vpd daily. The distribution of traffic from the site is expected to represent high utilisation of the supporting Rolleston township network for access to and from SH1 via the strategic SH1 access points given its location in relation to the exiting Rolleston Township. In this regard, limited use of the SH1 / Dunns Crossing intersection is expected. On this basis it has been assessed that 80% of travel between the Skellerup block and the Rolleston industrial area will occur via local roads through Rolleston. For travel to and from the north and east it has been assessed that 80% will occur via the Selwyn Road and Shands Road, to areas such as Christchurch, Lincoln and Prebbleton and also through local roads through Rolleston to connect with the SH1 and Rolleston Drive signals for travel to Christchurch.

7.3.2 Holmes Block

At the adopted traffic generation rate of 8vpd/hh, the potential 160 sections anticipated within the Holmes block would generate 1,280vpd onto the road network daily. Travel time analysis has been

undertaken to compare route choice between the Holmes block and the Rolleston Drive / SH1 traffic signals. This assessment has indicated that the Dunns Crossing Road / SH1 route would be used predominantly for travel north from the Holmes block over the alternative local road routes. However, some use of the alternative local road routes also likely given the current use of these routes and ability to use the signal controlled access to SH1. On this basis it has been assessed that 80% of travel between the Holmes block and the Rolleston industrial area will occur via Dunns Crossing Road and SH1, while the remaining 20% will use local roads within Rolleston to cross SH1 at the Rolleston Drive signals. For travel to and from the northeast it has been assessed that 60% will occur via Dunns Crossing Road and SH1 with the remaining 40% occurring via the local road network within Rolleston and southeast on Dunns Crossing Road for travel to areas such as Lincoln and Prebbleton.

7.3.3 Combined Development Traffic Distribution

Based on the predicted traffic patterns in the Rolleston area outlined above for the site and Holmes block it is predicted that the combined traffic will distribute itself over the network as follows:

Origin / Destination	Traffic Distribution Percentage	Vehicle Movements per day (vpd)	Route	Vehicle Movements per day (vpd)
Rolleston Town Centre	35%	798	via local roads	798
Rolleston Industrial	15%	342	via SH1/Dunns Crossing	184
			via local roads	158
Christchurch, Northeast other (Lincoln, Prebbleton)	45%	1,026	via SH1/Dunns Crossing	436
			via other (Rolleston local, Selwyn /Shands)	590
Southwest (Ashburton)	5%	114	via SH1/Dunns Crossing	114
Total	**100%**	**2,280**		**2,280**

Table 5: Combined Traffic Distribution

The proposed number of lots within the site is under the rural residential thresholds set by the Variation 1 to PC1 and therefore it is considered that the effects of development on the strategic road network will have been taken into account in the strategic infrastructure planning. Further, even if the Skellerup block was fully developed by 2016, the proposed 125 lots on the Skellerup block equates to less than a 5% increase on the expected number of households in Rolleston at 2016 based on the RPS PC1 (Variation 1) projections. This percentage will halve by the year 2026 as Rolleston continues to expand. On this basis the key locations for assessment of the proposal are on the road network in the vicinity of the site. Given the expected distribution of traffic and consideration of existing traffic volumes, the key areas of the existing road network for assessment of potential effects from development of the site are the standard of Dunns Crossing Road and associated connections.

7.4 Other Modes of Travel

The LTSA 'National Travel Survey' identified the modal split of travel for home based trips. The proportions identified for all trips were as shown in the table below.

Mode	Percentage
Vehicle driver	50%
Vehicle passenger	27%
Walk	17%
Bicycle	2.5%
Bus	2.5%
Taxi	0.5%
Other	0.5%
Total	**100%**

Table 6: LTSA National Survey Modal Split

The location of the development on the fringe of the urban area will result in higher use of motor vehicle travel compared with the national surveys, although a small demand for walking, cycling and public transport will be generated.

8. Impacts of Proposed Development

8.1 Dunns Crossing Road

The present configuration of Dunns Crossing Road in the vicinity of the site involves a 7m wide unsealed road between the site and Selwyn Road and a 6.5m wide sealed north of the site. Not withstanding these standards, the CRETS report indentifies the need to upgrade Dunns Crossing Road to the standard of a Collector Road between Selwyn Road and Lowes Road, and such upgrades (as well as associated intersection upgrades) are provided for within TRIP. It is expected that this upgrading will occur within 10 years given that most of the land to the north of Dunns Crossing Road between SH1 and Selwyn Road is either currently zoned for residential purposes or is within the 2007-2016 development sequence of PC1. Hence, upgrading of the road is expected to either precede or occur at the same time as development of the Skellerup site.

The future standard of Dunns Crossing Road will largely depend on the level of access sought directly from the road by subdivision of the urban areas on the northern side of the road. The existing subdivision fronting the road would suggest that a more urban standard is appropriate rather than the District Arterial rural standard envisaged within CRETS, shown previously as Figure 6. However, either standard will provide adequately for the level of developed proposed within the site.

8.2 Lowes Road

Lowes Road is proposed to become a high standard urban Collector Road under CRETS, and upgrading of the road has already occurred along the sections of the road adjacent to developed areas. The section of Lowes Road between Dunns Crossing Road and central Rolleston is currently zoned for residential development, and therefore full upgrading of the road to Collector status (including intersections) can be expected prior to 2016. On this basis the road is expected to provide an efficient link to the township from the Plan Change site and is likely to be the favoured link between the site and Rolleston township, although there are alternative routes.

8.3 Dunns Crossing Road Intersections

Future traffic volumes on Dunns Crossing Road and connections are anticipated to be sufficiently low that the current priority controlled intersections will provide adequately for the future traffic demands, although right turns from Dunns Crossing Road onto SH1 will involve delays that correspond to a poor level of service. However, the site's position relative to the township means that development traffic will have little reliance on the Dunns Crossing Road and SH1 intersection for travel north and to the Rolleston industrial area.

Some remedial changes to intersections along Dunns Crossing Road may be undertaken as a result of development of urban subdivisions to the north of the road, such as local widening and revised markings. Development of the site is considered to have a minimal influence on the timing and need for these measures.

8.4 Future Collector Road

CRETS identifies the need to provide a new Collector Road parallel with and on the north-western side of Selwyn Road, running between Dunns Crossing Road to the southwest and Weedons Road in the northeast. The location of the future Collector as indicated by CRETS, as well as the site and proposed links to Dunns Crossing Road, are shown on Figure 9.

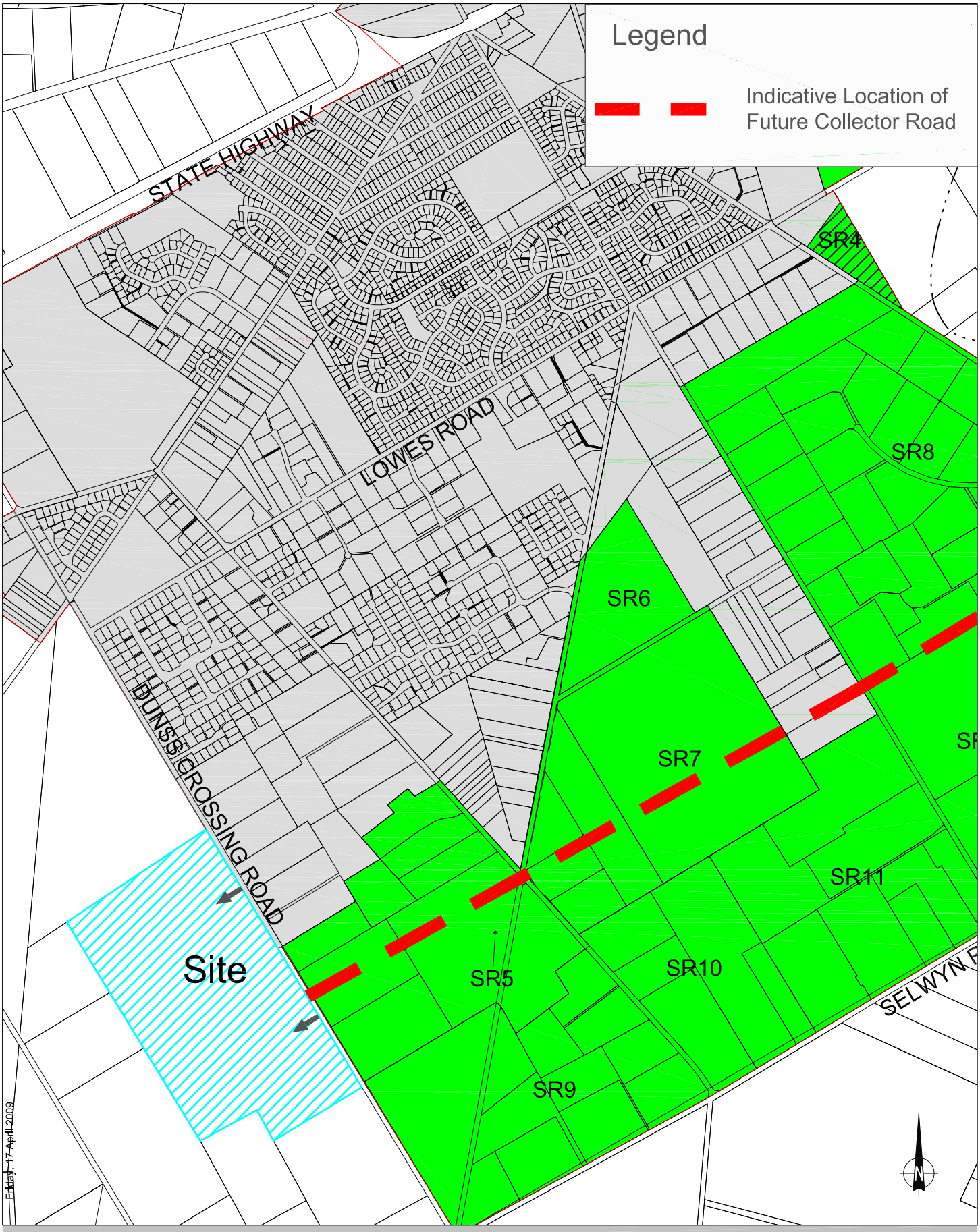
As indicated by Figure 9, the connection of the future Collector Road will occur in the vicinity of the proposed southern site connection with Dunns Crossing Road. It should be noted that the alignment as shown within the CRETS report is indicative only, particularly as the location of the urban extent of Rolleston at the time of the CRETS study differs from the extent now intended under PC1. The final location of the road will be developed in conjunction with planning and subdivision of the associated land. Based on PC1 sequencing construction of the Collector Road can be expected to occur prior to or at the same time as development of the Skellerup site. To meet intersection spacing requirements there may be a need to adjust the layout of the site from that shown on the Concept Plan. For development of an Outline Development Plan to assist the Plan Change it is recommended the southern connection from the site to Dunns Crossing Road is highlighted as indicative.

8.5 Cycling and Walking

The development has the potential to generate some pedestrian and cycling movements.

The volumes of traffic projected for Dunns Crossing Road will not form a barrier to sustainable transport modes between the site and the township. It is proposed to amend Table E13.9 - Roading Standards of the District Plan as part of the Plan Change to require footpaths be provided on roads within the Living 3 zone.

It is considered that cycling movements could readily be accommodated on-road within the site given the scale of the development. The site is within a comfortable cycling distance to central Rolleston, and therefore it is considered that the development of the site would not preclude cycling as a viable mode of transport. In comparison with development of rural residential lots detached from the urban area, there are positive benefits in being able to encourage alternative modes of travel with the proposed site.



SPBL Rural Residential Plan Change

Future Collector Road - South Rolleston

Traffic Design Group

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