

7 Transport Assessment

SH1 expressway options between Peka Peka and Poplar Avenue were tested using the calibrated Kapiti SATURN model. The traffic model is validated for a 2006 base year. 2016 and 2026 forecast year trip matrices are based upon information extracted from the Wellington (Region) Transport Strategy Model (WTSM). The matrices also reflect the additional traffic expected to be generated by permitted future developments. The do minimum scenario, used for tests presented in this chapter, does not include any element of the WLR.

7.1 Do Minimum Forecast

The Paraparaumu airport and town centre developments are expected to be complete before 2016. The additional traffic generated by these developments is forecast to have a significant impact on the traffic operations in Kapiti, particularly Paraparaumu. This is one of the reasons KCDC have been progressing plans for a WLR. Without this additional local arterial, motorists will continue to rely on the existing SH1 and local routes such as:

- Poplar Avenue,
- Raumati Road,
- Ihakara Street, and
- Kapiti Road

In 2016, with development, the Kapiti Road / SH1 intersection is expected to be over capacity in both the morning and evening peaks. Motorists that currently pass through this intersection already suffer congestion and delays. Queuing at this intersection not only impacts on the safe and efficient operation of SH1 but also impacts on the local road network that serves the existing Paraparaumu town centre (i.e. coastlands and municipal buildings). Motorists passing through the Kapiti / Rimu Road and Kapiti / Arawhata Road intersections are forecast to continue experiencing congestion and severe delays in 2016 if no improvements are introduced.

The main cause for this congestion is the volume of traffic using SH1. Motorists wishing to turn right from or into roads that intersect with SH1 will be delayed waiting because there will be fewer gaps in the traffic. Long queues of motorists waiting to turn right onto SH1 interfere with the operation of local roads such as Rimu Road. The volume to capacity (V/C) ratio for the worst turns at the SH1 intersections are forecast to be between 97% and 126% in every time period modelled for 2016⁸.

Existing congestion problems in Waikanae are also forecast to worsen. The V/C ratios for right turns at Te Moana Road are between 97% and 111% in the 2016 AM and PM peaks. The worst performing turns at Elizabeth Street are forecast to operate with V/C of between 71% and 91%.

⁸ A turn is considered to have a Level of Service D or worse when V/C ratios exceed 85%. At level of service D, motorists may be delayed by up to a minute.

The network summary statistics presented in Appendix C show that total intersection delays (i.e. queuing) more than triple between 2006 and 2016. Delay associated with congestion on links (i.e. between intersections) more than doubles over the same time period. By 2026, traffic volumes are forecast to have increased, exacerbating existing problems further. The network average peak hour travel speeds are forecast to decrease from about 50km/h (2006) to about 40km/h in 2016. By 2026 the network average travel speed is forecast to be as low as 33km/h in the PM peak hour.

7.2 Option Performance

The primary function of a SH1 expressway is to create a safe and efficient inter-regional connection providing a high quality route to Wellington. Table 7.1 shows the forecast travel time saving for a motorist travelling on the SH1 expressway. The forecasts were extracted from the Kapiti Saturn model and therefore include any delays associated with congestion. No delays are forecast for the SH1 expressway. Table 7.1 also shows forecast travel times between MacKays Crossing and Paraparaumu Airport. The travel times are for the route forecast to be used by the majority of motorists. In Options 1, 3 and 4 most motorists are forecast to use the southern part of the WLR. For Option 2 the most motorists use the existing SH1 to Kapiti Road, and then cut through the Town Centre⁹ and use Ihakara Street.

Option 2 results in a smaller reduction in travel times between MacKays Crossing and Paraparaumu Airport than the other three options. This is because Options 1, 3 & 4 all include the WLR between Poplar Avenue and Kapiti Road. Building this part of the WLR improves access to this area.

Table 7.1 – Forecast Travel Time Savings (Minutes) for 2026

Option	SH1	Local Roads
	MacKays - Peka Peka	MacKays – Airport
Option 1 - Upgrade the Existing SH1 Alignment	11:32	07:58
Option 2 - Expressway Follows WLR Designation	11:22	05:59
Option 3 - Expressway Follows Rail Corridor	12:36	07:40
Option 4 - Expressway Avoids Future Town Centres	11:44	08:16

The table shows that travel time reductions are similar for each of the expressway options. The smallest reduction is where the expressway follows the WLR designation (Option 2). This is because it is the longest of the four options. Option 4 is the second longest route because of the deviation around Waikanae. This additional length appears to add approximately 45 seconds to a journey between MacKays Crossing and Peka Peka.

Appendix C presents the network summary statistics for each of the options.

⁹ via Raumati, Rimu, Town Centre spine, Arawhata and Kapiti Roads

7.3 Forecast Transport Economic Efficiency Benefits

The forecast benefits and indicative BCR's for each option are shown in Table 7.2. The economic benefits are derived from forecast travel time savings and reduced vehicle operating costs. For the purposes of this assessment crash cost savings have been assumed as an additional 5% of the total benefits. This is likely to be conservative and crash savings could be as much as an additional 35% of the total benefits.

Table 7.2 – Benefit Indication

Option	NPV Tangible Benefits (\$M)	Indicative BCR
Option 1 - Upgrade the Existing SH1 Alignment	160	0.4 – 0.6
Option 2 - Expressway Follows WLR Designation	230	0.6 – 1.0
Option 3 - Expressway Follows Rail Corridor	140	0.4 – 0.6
Option 4 - Expressway Avoids Future Town Centres	180	0.5 – 0.8

Initial forecasts of transport economic efficiency benefits were based on the assumption that no benefits would be realised until the scheme was complete. Whilst this is realistic for Option 2, there is potential to increase the tangible benefits for Options 3 and 4 by more accurately reflecting potential staging. Whilst it is likely that Option 1 would be built in stages, any incremental benefits are likely to be countered by traffic disruption during construction.

The highest total benefits are forecast for Options 2 and 4. The benefits of Option 2 are higher because journeys on SH1 would be improved without affecting users of the local road network. The relatively swift construction period will also increase the number of years in which benefits are accrued. Option 4 is also expected to have a relatively fast construction period thereby increasing the number of years over which benefits are accrued.

Table 7.3 shows the first year rates of return for each option. It shows the return on investment as a proportion of the total cost. The results indicate that Option 2 is likely to generate a faster return than the other three options. There is little difference between Options 3 and 4.

Table 7.3 – First Year Rates of Return

Option	FYRR
Option 1 - Upgrade the Existing SH1 Alignment	2.0%
Option 2 - Expressway Follows WLR Designation	4.1%
Option 3 - Expressway Follows Rail Corridor	3.3%
Option 4 - Expressway Avoids Future Town Centres	3.1%

7.4 Summary

This section summarises the preceding technical assessment. Table 7.4 is a summary table presenting the key features of each option.

Option 1 – Upgrade the Existing SH1 Alignment

Upgrading the existing SH1 alignment is not inconsistent with KCDC's plans for developing Paraparaumu town centre. It would also allow the Council to progress plans for the WLR between Poplar Avenue and Waikanae.

This option is expected to be the most expensive to build and is likely to have a major impact on the efficiency of SH1 traffic flows during construction. It requires the demolition and re-construction of several structures. Of the four options, this has one of the latest opening dates. A significant drawback is that this option may restrict local movement since it does not create an eastern arterial for motorists, pedestrians and cyclists wanting to make local trips within the district. Unless a full diamond interchange is provided as close as possible to Waikanae, Option 1 will significantly impact on vehicles travelling between Waikanae and Otaihangā or between Waikanae and Wellington.

Option 2 - Expressway Follows WLR Designation

This option is expected to be the cheapest and the fastest to build. Early completion relative to the other options means that the transport economic efficiency benefits are realised earlier. This results in the accrual of more benefits within the return period than options with longer construction periods.

If this option were to progress, KCDC would need to revise land use plans for Paraparaumu. Instead of mixed-use employment, retail and light industrial uses, it would be necessary to plan for land-uses that result in lower trip generation because the local road network would be unable to accommodate additional traffic. Although this option creates an eastern arterial, it limits the potential for a future western arterial providing for north south movements in the west of the district.

Option 3 - Expressway Follows Rail Corridor

This is one of the options with a later opening date. Despite this it has a BCR comparable to the other options. Staging for this option is likely to increase the return on investment (BCR). Parts of this alignment option are located on greenfield land and could therefore be constructed without disrupting SH1 traffic.

This is the only option that allows the existing SH1 to become an eastern arterial without limiting options for a future local arterial to the west of the district thereby providing two north-south arterials. This option is likely to affect amenity of Waikanae Town Centre.

Option 4 - Expressway Avoids Future Town Centres

This option is a hybrid of Options 1 – 3. Costs and benefits are comparable to those associated with Option 3. Although approximately half of this alignment option is on greenfield land, options for staging to increase return on investment are more limited than for Option 3.

In the southern part of the district Option 4 follows the NIMT railway and the existing SH1 alignment minimising any increase in east-west severance. In the north the expressway

follows the WLR designation in order to avoid Waikanae Town Centre. However by avoiding the Waikanae Town Centre, a new element of severance is introduced into the northern part of the district.

Table 7.4 – Option Summary Table

	Option 1	Option 2	Option 3	Option 4
Cost Range (\$Millions)	560 – 920	380 – 580	500 – 770	450 – 740
Indicative BCR	0.4 – 0.6	0.6 – 1.0	0.4 – 0.6	0.5 – 0.8
First Year Rate of Return	2.0%	4.1%	3.3%	3.1%
Earliest Expected Opening Date	2021	2016	2021	2018
Inter-regional Travel Time Savings (Minutes)	11:32	11:22	12:36	11:44
Impact on East-West Severance	Moderate -ve	Significant -ve	Moderate -ve	Moderate -ve
Impact on Future Town Centres	Impact in Waikanae	Impact in Paraparaumu	Impact in Waikanae	None
Creates Eastern Arterial for Local Trips	No	Yes	Yes	Yes
Allows Future Western Arterial for Local Trips	Yes	No	Yes	Yes – south of Kapiti Rd