

9 Route Strategy

9.1 Constraints to Improvements

In addition to constraints identified in Section 7 of this report, any improvement work on the study route could be constrained by the level of available funding to RDC and TDC.

The location of services in the road corridor could also be a constraint to improvements such as realignments or seal widening works. Known services include:

- High-pressure natural gas pipeline adjacent to the road reserve on Broadlands Road, from View Road north to Broadlands township
- TelstraClear fibre optic cable in the road reserve on the eastern side of Broadlands Road TDC, Broadlands Road RDC and Settlers Road.
- Telecom copper cables in the road reserve at various locations on the study route.
- A private effluent pipeline running along the eastern side of Broadlands Road, from View Road north to Tasman Forests.
- Low voltage overhead power transmission lines.

9.2 Access and Road Protection

The declaration of roads as Limited Access Roads (LAR's) is an access management tool available for contributing to the control of the interface between the road and adjacent land in a way that protects the utility and amenity of both. By reducing or controlling access to arterial roads and influencing development along the road margins, the detrimental effects on the safety and efficiency of the road for roads users will be minimised.

The main candidates for LAR status on the study route appear to be Broadlands Road RDC, Broadlands Road TDC, and Settlers Road, which mainly act as strategic arterial routes. Reporoa Road is a relatively low-use local access road, Miro Street is an urban commercial/industrial access road in addition to its arterial role, while Crown Road will change significantly as a result of construction of the proposed ETA.

9.2.1 The LAR Process

The Local Government Act 2002 allows continued use of Section 346 of the Local Government Act 1974, which specifies how by special order Councils can declare a road in their district to be a limited access road. The following provisions apply in the declaration of a limited access road:

- (a) "Every declaration shall refer to a plan showing –
 - (i) The length of road to be declared LAR
 - (ii) Any crossing places to be authorised

- (iii) The boundaries of all road frontages of each parcel of land adjoining the road
 - (iv) The title references to every parcel of land referred to above
- (b) Every such declaration shall indicate where the plan is held and may be inspected;
- (c) The Council shall forward to the District Land Registrar a certificate authenticated by the Council (together with a copy of the plan mentioned above) describing every parcel of land that is affected by the LAR. The District Land Registrar will record it against the titles to all these parcels of land.
- (d) The Council will send (or have sent) a copy of the certificate to the owner and occupier of any land affected by the declaration.”

The Act goes on to detail the rights and powers of landowners and Council regarding access to and from a limited access road.

We consider that LAR status should be considered for Broadlands Road RDC, Broadlands Road TDC, and Settlers Road. As traffic or roadside development increases, so does the potential for conflict between through and turning/manoeuvring traffic. Applying this status will provide a useful tool for TDC and RDC to have a measure of control over access to this strategic arterial route, whether from rural-residential or farming/forestry developments along the route, especially considering the expected traffic growth.

9.3 Passing Opportunities

Passing opportunities on the study route are generally good due to the fairly straight flat nature of route. However, overtaking type crashes are over-represented on Broadlands Road as a whole.

Passing opportunities on Broadlands Road TDC could be improved by constructing a climbing lane in the southbound direction from RP 6,940-9,240, where the extended uphill gradient tends to slow heavy vehicles.

Other methods of improving the safety of passing manoeuvres include:

- Seal widening works, which will improve the current situation where there is little room for error in the passing manoeuvre, particularly where heavy vehicles are involved. The majority of groups consulted for this study noted the narrow seal width as a major issue for road users.
- Targeting maintenance on areas with significant rutting, as identified in Section 4.2.5 of this report, to improve safety in wet conditions

9.4 Horizontal and Vertical Alignment

This study has not identified any major realignment works along the study route. A number of curves, identified in Section 4.3 of this report, have radii less than desirable based on the approach speeds to the curves. We recommend a strategy of improving either the warning signage on each of these curves, or curve easing/realignment works, or both, to mitigate the potential safety hazards at these curves.

To achieve a workable programme that will maximise benefits we recommend prioritising the treatment of curves with the greatest potential safety hazard, followed in turn by less hazardous curves. The two main factors used in the prioritisation process are the crash history and the radius of the curve.

Table 39 and Table 40 give a prioritised list of the curves identified for treatment for each district. Curves recommended for realignment are identified in Section 9.10, and detailed in Appendix 8, of this report.

Priority	Subsection	Route Position (m)	Proposed Treatment
1	Settlers Road	5,300	Realignment
2	Settlers Road	2,500-2,750	Realignment
3	Broadlands Road	9,900	Signage
4	Settlers Road	1,100	Signage
5	Broadlands Road	2,780	Signage

Table 39. Rotorua District Council prioritised curves for treatment

Priority	Subsection	Route Position (m)	Proposed Treatment
1	Broadlands Road	23,500	Realignment
2	Broadlands Road	5,330	Realignment
3	Broadlands Road	11,700	Realignment
4	Broadlands Road	17,660	Signage
5	Broadlands Road	13,550	Signage
6	Broadlands Road	17,150	Signage
7	Broadlands Road	15,460	Signage

Table 40. Taupo District Council prioritised curves for treatment

Vertical alignment, as described in Section 4.4 of this report, is generally satisfactory. No improvement works are proposed in this report.

9.5 Cross Section

9.5.1 Width

As detailed in Section 8 of this report, feedback from the majority of groups consulted for this report suggests seal width is a concern for road users on the study route.

A safe road corridor should have sufficient width to cater for all expected road users. Given the status of much of the route as a regional arterial some widening should be carried out on the route to provide a sealed shoulder. This will improve safety for all road users, including cyclists. Providing a wider road for vehicles will not necessarily encourage higher travel speeds – current experience suggests traffic is already travelling at high speed along the route.

Seal width can be judged for adequacy by considering the number of loss of control/head on and overtaking type crashes as a proportion of the total. For Broadlands Road in both districts overtaking type crashes are over-represented, while overall on the study route loss-of-control/head on type crashes are generally comparable with or below local and peer group statistics. With the exception of Settlers Road, the mid-block injury crash rate is also comparable with or below typical rates expected for similar roads.

Other factors that should be taken into account regarding seal width include the high volume of heavy vehicles as a proportion of the overall traffic stream, and the popularity of the route for competitive and recreational cyclists, including its use in the NZ Ironman race and as a training route for this event.

Transfund have a budget for subsidising shoulder widening construction as a cycle project. Possible projects have been identified in Section 9.10 of this report.

Seal widening should therefore be carried out:

- in conjunction with rehabilitation/renewal works as funding allows; and
- as cycle lane projects where funding applications are granted.

9.5.2 Consistency

Desirably some consistency should be applied along the study route in terms of seal width. Currently the seal width tends to vary between different sections that have been constructed at different times. If a consistent width is to be adopted it would be desirable to follow RDC and TDC respective guidelines.

9.6 Pavement

9.6.1 Rehabilitation/Renewal

Pavement rehabilitation/renewal work should be carried out in accordance with respective RDC and TDC Road Asset Management Plans. These plans both specify that rehabilitation/renewal works be carried out based on the age and condition of the pavement.

Appendix 2 of this report gives prioritised time frames for rehabilitation of the study route based on these pavement factors. The required level of rehabilitation or renewal will depend on the age, condition and economic lives of the materials in the pavement.

Rehabilitation should be carried out progressively based on the prioritised time frames, as funding allows.

9.6.2 Surfacing

Resurfacing work should also be carried out in accordance with the Road Asset Management Plan of each council. Appendix 2 lists prioritised reseals on the study route based on top surface age and condition.

Methods are available to provide a smoother texture sealed surface on shoulders to present a more comfortable surface for cyclists. However, while providing a desirable situation for cyclists, there is a potential safety issue associated with the differing friction of the surfaces for vehicles that 'hug' the shoulder or cut the inside of curves.

9.7 Intersections

The strategy for the study route should focus on upgrading intersections to consistent, currently accepted standards that drivers are familiar with. Section 4.5 of this report identifies a number of possible intersection improvements. Intersections should be investigated and upgraded, as funding allows, in a prioritised manner based on existing crash history and traffic volumes, as shown in Table 41 and Table 42 below.

Priority	Intersection	Treatment Type
1	Broadlands Road/Strathmore Road	Type A
2	Broadlands Road/Homestead Road	Type A
3	Broadlands Road/East Road	Type A
4	Broadlands Road/Earle Road	Type A
5	Broadlands Road/Allen Road	Type A
6	Broadlands Road/Vaile Road	Type A
7	Broadlands Road/Earle Road	Type A
8	Settlers Road/Wharepapa Road	Type A
9	Settlers Road/Loop Road	Type A - Consider closing

Table 41. RDC prioritised intersection upgrades

Priority	Intersection	Treatment Type
1	Broadlands Road/Centennial Drive	Left turn slip lane
2	Broadlands Road/River Road	Type A
3	Broadlands Road/View Road	Type A; Flaglighting
4	Broadlands Road/White Road	Type A
5	Broadlands Road/Tiverton Downs Road	Type A

Table 42. TDC prioritised intersection upgrades

Flaglighting is complete along the study route except for View Road and Loop Road. View Road should be flaglit as soon as practicable. We do not consider that Loop Road requires flaglighting and recommend that serious consideration be given to closing the Broadlands Road/Loop Road intersection.

9.8 Cyclists

With Taupo's rapidly increasing population, and the active nature of the residents it attracts, the number of cyclists using the study route can be reasonably expected to grow over the next 20 years, especially if Taupo continues to be the venue for the NZ Ironman race. These vulnerable road users are currently not well provided for on the majority of the study route.

TDC are considering an initiative involving provision of temporary educational signage along Broadlands Road highlighting to vehicles that this is a regular cycling route. Similar signs were erected by cycling groups prior to the 2004 NZ Ironman race and appeared to be effective. There would be some merit in RDC carrying out this exercise from the northern end of the study route, so drivers travelling in both directions along Broadlands Road are aware of the likely presence of cyclists.

Another strategy to cater for cyclists involves improving the seal width on the route, which will provide space for cyclists and separation from the traffic stream. Targeting seal widening as cycle projects is an opportunity to broaden the possible funding subsidies available from Transfund. A logical approach to this would be progressively extending the wide shoulders for cyclists from Taupo north, as has already been done on Broadlands Road in the northbound direction between Miro Street and Centennial Drive. These widening projects would be carried out in stages, beginning with the southbound shoulder between Centennial Drive and Miro Street.

Proposed cycle lane/shoulder widening projects are detailed in Section 9.10, and Appendix 8, of this report.

A sustainable strategy to improve cyclist safety on the route will involve a combination of the following measures:

- Providing educational/warning signage in the short term
- Carrying out road widening in conjunction with rehabilitation/renewal works
- Applying for Transfund funding for road widening as cycle projects

9.9 Signage

RDC and TDC recognize that the study route is a significant arterial route used by many as an alternative to SH5 between Rotorua and Taupo. The strategy regarding signage on the route should not necessarily be to encourage this type of use, but rather provide guidance to drivers once they are on the route. Currently there is little or no information signage on the study route to guide inter-regional motorists to their destinations.

One example is the southern end of Broadlands Road near Taupo. Southbound drivers intending to continue east along SH5 could have difficulty recognizing that the best route to take involves a left turn at Miro Street. Providing some signage here will benefit these road users.

Warning signage could be improved at several low-radius curves to better warn drivers of the severity of these curves. Section 9.4 of this report gives a prioritised list of curves that should be investigated and possibly improved.

Achieving consistency along the study route in signage such as warning signs and chevrons is also desirable. This could be done in conjunction with any signage improvements.

9.10 Projects

Projects identified in Rotorua District and Taupo District have been listed separately.

9.10.1 RDC

Project Name/RP	Description	Improvement Type	Cost Estimate (\$K)	BCR
Settlers Road Realignment - RP 2,410-3,155	This project involves realigning the road to avoid two low-radius reverse curves and increasing seal width to 8.5m. There have been three reported loss-of-control crashes at these curves in a five-year period, one of which resulted in minor injuries.	Safety Improvement/ Efficiency	\$545	0.9
Settlers Road Realignment - RP 5,065-5,590	This project involves the realignment of low-radius reverse curves that are a crash black spot. At present the low radius curves, narrow seal width and deficient skid resistance contribute to a number of loss-of-control type crashes. The new alignment will be straighter, with a seal width of 8.5m, and involves some cutting through a low hill. This will also require some land-take. However, the low severity of reported crashes (5 non-injury) results in relatively small benefits from crash savings and subsequently a relatively low BCR.	Safety Improvement/ Efficiency	\$411	0.8

9.10.2 TDC

Project Name/RP	Description	Improvement Type	Cost Estimate (\$K)	BCR
Broadlands Road Curve Easing - RP 5,185-5,420	This project involves easing the low-radius curve, improving the superelevation, and increasing seal width to 9.4m. It also involves a small amount of work to tie the View Road intersection into the realigned curve. There have been three reported loss-of-control crashes at this curve in the five-year period, including two minor-injury crashes.	Safety Improvement	\$121	2.9
Broadlands Road Curve Easing - RP 11,485-11,700	This project involves easing the low-radius curve, improving the superelevation, and increasing seal width to 9.4m. This curve has been the scene of one reported loss-of-control/head on type crash in the five-year period.	Safety Improvement	\$138	1.5
Broadlands Road Curve Easing - RP 23,235-23,470	This project involves the easing of a low-radius curve, improving the superelevation and increasing the seal width to 9.4m. This curve has been the scene of two recent loss-of-control crashes, one fatal and one minor injury. Four power poles would require relocation as part of this project.	Safety Improvement	\$152	1.9
Broadlands Southbound Climbing Lane - RP 6,940-9,240	This project involves the construction of a 3.5m-wide climbing lane in the southbound direction. There is an extended uphill grade for southbound traffic, which can slow heavy vehicles.	Efficiency/Safety Improvement	\$1,472 (includes rehab of existing)	1.4

Broadlands Road Corridor Management Plan

Project Name/RP	Description	Improvement Type	Cost Estimate (\$K)	BCR
	Due to the age of much of the existing adjacent pavement, it would be recommended to carry out rehabilitation in association with construction of the climbing lane. This approach would result in overall cost savings compared to if rehabilitation was carried out separately.		pavement)	
Broadlands Road Cycle Lane / Shoulder Widening - RP 0-3,300	This project involves providing a 2.0m wide sealed shoulder in the southbound direction to provide for safe cyclist movement, to replicate the existing northbound cycle lane between Miro Street and Centennial Drive. Austroads (1999) recommends 2.0m as a minimum width in 100 km/h areas.	Cycle Project	\$327	1.6
Broadlands Road Cycle Lane / Shoulder Widening - RP 3,300-5,300	This project involves extending the cycle lanes northwards, providing a 2.0m wide sealed shoulder in both directions between Centennial Drive and View Road.	Cycle Project	\$459	2.0
Broadlands Road Cycle Lane / Shoulder Widening - RP 5,300-9,700	This project involves providing a 2.0m wide sealed shoulder in both directions between View Road and the southern edge of Broadlands Forest.	Cycle Project	\$952	1.7
Broadlands Road Cycle Lane / Shoulder Widening - RP 9,700-16,100	This project involves providing a 2.0m wide sealed shoulder in both directions between View Road and the southern edge of Broadlands Forest.	Cycle Project	\$1,337	1.8
Broadlands Road Cycle Lane / Shoulder Widening - RP 16,100-19,900	This project involves providing a 2.0m wide sealed shoulder in both directions between the southern edge of Broadlands Forest and White Road.	Cycle Project	\$889	1.5

Broadlands Road Corridor Management Plan

Project Name/RP	Description	Improvement Type	Cost Estimate (\$K)	BCR
Broadlands Road Cycle Lane / Shoulder Widening - RP 19,900-24,500	This project involves providing a 2.0m wide sealed shoulder in both directions between White Road and the district boundary.	Cycle Project	\$979	2.1