

**Traffic standards and guidelines
2002/2003 survey**

**RSS 20
Vehicle entrances
Stock-crossing facilities
Amenity carriageway surfacings**

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transportsafety

Survey of traffic standards and guidelines

The Land Transport Safety Authority (LTSA) is the government agency responsible for promoting safety in land transport at reasonable cost. Part of its function is to 'monitor adherence to safety standards within the land transport system'.

To support this objective, the regional engineering sections of the LTSA undertake a survey programme that assesses the effectiveness of the implementation of various safety standards by road-controlling authorities.

The purpose of these surveys is to:

- assist and advise road controlling authorities on the implementation of selected traffic standards and guidelines that affect traffic safety
- measure the uptake of standards and guidelines by road controlling authorities
- provide a national summary of the uptake and compliance with standards and guidelines, and report findings to road controlling authorities and other interested parties
- identify changes to improve standards, guidelines or traffic rules.

The surveys are usually carried out in two parts:

- Part 1 uses a questionnaire to look at the systems and procedures a road controlling authority has in place to deliver on the standard.
- Part 2 uses a field survey to measure, where possible, the actual delivery from the user's viewpoint. It essentially provides a snapshot of road safety delivery at the date of the survey.

This report presents the national results of the latest of these surveys.

I believe you will find the information of value and will be able to use it to improve road safety in New Zealand.

Please contact the nearest regional office of the LTSA if you would like further information or assistance with implementing traffic standards or guidelines.



John Kay
General Manager, Operations

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Executive summary

Introduction

- Surveys were conducted jointly with Transfund New Zealand during 2002 to investigate policies and practices for four safety areas – vehicle entrances, stock-crossing facilities, amenity surfacings and traffic signs.
- This report describes the procedures and presents the results for vehicle entrances, stock-crossing facilities, and amenity surfacings. A companion report (RSS 19) details the results of the survey on traffic signs.

Methodology

- Staff in 30 road controlling authorities (RCAs) were interviewed about their policies and practices by LTSA and Transfund staff, after receiving a questionnaire in advance to prepare their responses.
- There were no field surveys conducted for the topics covered in this report.

Interview results

Vehicle entrances

- Responsibility for approving new vehicle entrances rested variously with asset management staff, planning and regulatory staff, administration staff or professional services business units in the RCAs surveyed.
- Asset management staff in slightly more than half the 30 RCAs were formally included in procedures for approving new vehicle entrances.
- There were wide variations in the professional disciplines to which the staff responsible for overseeing the construction of new vehicle entrances belonged.
- Nearly all RCAs required the property owner to correct any entrances not constructed to an adequate standard.
- No RCA had a policy or programme for systematically upgrading old, sub-standard vehicle entrances.
- Only half the RCAs surveyed had any form of inventory for vehicle entrances, and there was wide variation in the types of database held by the others.

At-grade stock crossings

- About one-third of the RCAs had no policy on at-grade stock crossings, one-third had a formal policy, and the other third had either by-laws, a permit system, or informal policies.
- Nine RCAs had inventories of at-grade stock crossings and stock underpasses, 13 had them for stock underpasses only, and the remaining eight had no inventory.

- Just under half the RCAs had policies or procedures on the warning devices to be used at stock crossings.
- There was a variety of warning devices preferred by RCA staff for use at stock crossings, with the most common being folding temporary warning signs and flashing yellow/orange beacons used together.
- RCAs reported the most common warning devices preferred by farmers were vehicle-mounted or post-mounted flashing yellow/orange beacons on their own.
- In a majority of RCAs, staff interviewed thought the use made of warning devices at stock crossings was less than acceptable.

Stock underpasses

- While two-thirds of the RCAs had requirements on the construction and maintenance of stock underpasses, only half had policies for their provision.
- There was a large variation in the minimum acceptable lengths for stock underpasses, ranging from the road formation width to more than five metres greater than formation width. Three RCAs seemed to have dimensions that were not linked to formation width at all.
- Only five RCAs required steel guardrails to be installed at stock underpasses, with most of the remainder requiring white sight-rails, with or without bridge end markers or hazard markers.

Amenity carriageway surfacings

- In half the RCAs, the roading asset manager was responsible for planning and decision making on surfacings used for amenity reasons.
- Slightly more than half thought they had adequate processes for ensuring appropriate surfacings were used, with the remaining RCAs reporting they had not had to use any processes.
- The most common types of amenity surfacings reported to be in use were paver blocks, cobblestones, asphaltic concrete and slurry seals.
- Only one RCA had attempted to evaluate the safety effects of installing amenity surfacings and the results were inconclusive.

Discussion

- While all RCAs were satisfied with their procedures for internal liaison on new vehicle entrances, the instances of new, substandard entrances observed by the surveyors suggested that many RCAs, especially larger ones, could benefit from putting formal procedures in place.
- The Road Controlling Authorities' Forum booklet *Guidelines for Stock Crossings* has encouraged many RCAs to formulate their own policies, although there is little standardisation, especially on the recommended warning devices.

Best practice for vehicle entrances

Recommended elements of best practice recorded during the surveys were:

- Roding asset staff must be formally involved in the processes for approval of both building and resource consents in each RCA.
- Follow-up inspection procedures must also have input from roding asset staff, to ensure new and existing entrances are acceptable.
- Remedial work for newly installed substandard entrances should be at the expense of the property owner.
- RCAs should hold a reimbursable bond from property owners that is sufficient to cover the cost of any remedial works if an entrance is not constructed or reconstructed to an acceptable standard.
- Existing substandard vehicle entrances should be reconstructed to an acceptable standard when any road or footpath reconstruction is completed by the road controlling authority.
- RCAs should maintain an inventory of approved vehicle entrances.

Best practice for at-grade stock crossings

Recommended elements of best practice recorded during the surveys were:

- Maintain an inventory of at-grade stock crossings and any operating conditions pertaining to them.
- Have consistent policies for the control of at-grade stock crossings.
- Adopt the Road Controlling Authorities' Forum publication *Guidelines for stock crossings* as the policy on at-grade stock crossings.
- Require the cleaning of at-grade stock crossings after each use.
- Educate and assist farmers to get their installations correctly set up for good management in accordance with the guidelines.
- Audit or inspect at-grade stock crossings to ensure compliance with operating conditions and correct use of warning devices.

Best practice for stock underpasses

Recommended elements of best practice recorded during the surveys were:

- Legal agreements covering construction, maintenance and removal of structures should include placing an encumbrance on the titles of the relevant land.
- Farmers should own and maintain structures to council requirements.
- Include stock underpasses in bridge inventories and inspect them periodically when doing structural inspections of other bridges.

- Relate the minimum acceptable length of underpasses to specific clearances from the road formation width.
- Require the same practice for protection of road users (guardrailing) as are applied to bridges elsewhere on the network.

Recommendations

Road controlling authorities should adopt and implement any of the elements of best practice that they do not already have in place.

The RCA Forum should finalise the *Guidelines for stock crossings* and include within them a national guideline on the desirable minimum length of stock underpasses relative to the width of the vehicle carriageway.

1. Introduction

From October to December 2002, the regional offices of the Land Transport Safety Authority (LTSA), jointly with Transfund New Zealand (Transfund), conducted surveys of four roading or road safety issues in a sample of road controlling authorities (RCAs).

The four areas surveyed were:

- vehicle entrances
- stock-crossing facilities
- amenity carriageway surfacings
- traffic signs.

This report describes the procedures and presents the results for the surveys of vehicle entrances, stock-crossing facilities and amenity carriageway surfacings. A companion publication (*RSS 19 Traffic signs*, LTSA, 2003) reports on the results of the traffic sign surveys.

2. Purposes of the survey

The purposes of the survey were to:

- identify the policies used by RCAs for the provision of vehicle entrances, stock-crossing facilities and amenity carriageway surfacings
- establish what standards and guidelines are being used by RCAs for installing these features
- determine what procedures are used to ensure these features are installed in accordance with the policies, standards and guidelines
- identify and report on ‘best practice’ for the management of each of these issues.

3. Methodology

3.1 Sample selection

A sample of 30 RCAs was chosen for the survey, all of them territorial local authorities (TLAs.) The sample was weighted towards RCAs not included in the 2001/2002 LTSA surveys.

The Table in Appendix 1 lists the 30 RCAs included in the survey.

3.2 Interview surveys

Interview surveys were conducted with representatives of each of the 30 RCAs. Survey forms were sent in advance, to allow time for the RCA to research answers where

necessary. Questions were centred on the policies, standards, guidelines and procedures used for the provision of each of the three roading features.

The questionnaire used for the interview surveys is shown in Appendix 2.

3.3 Field surveys

There were no formal field surveys conducted for these topics. However, observations of these features while completing field surveys for traffic signs have been used for some of the comments in this report.

4. Results of the interview surveys

4.1 Vehicle entrances

4.1.1 Responsibility for approval of new vehicle entrances

RCAs were asked which part of their organisation was responsible for approving new vehicle entrances to private property. The responses showed that:

- 9 (30%) RCAs used solely planning/regulatory staff
- 8 (27%) used asset management staff
- 5 (17%) used their professional services business unit
- 2 (7%) used planning staff for new developments and asset management staff for changes to existing properties
- 2 (7%) used planning staff for new developments and their professional services business unit for changes to existing properties
- 2 (7%) used planning and asset management staff jointly
- 1 (3%) used solely administration staff
- in 1 RCA (3%) new developments were handled jointly while asset management staff were used for existing properties solely.

4.1.2 Internal liaison for approval of new vehicle entrances

RCAs were asked what type of liaison occurred between different parts of their organisations when approving new vehicle entrances. The asset management staff in:

- 16 RCAs (53%) said they were formally included in the process for all applications
- 6 (20%) said they were 'informally' included in the process for all applications
- 4 (13%) said they were formally included for applications through planning/regulatory procedures but not in building consents
- 2 (7%) reported no internal liaison with asset management staff
- 1 (3%) said they were included at their request

- 1 (3%) said they were informally included for applications through planning/regulatory procedures but not in building consents.

4.1.3 Supervision of construction of new vehicle entrances

The placement of responsibility for ensuring new vehicle entrances were built according to plan varied widely from one RCA to another. In the 20 RCAs (67%) where the responsibility for **all** new entrances rested in one division of the organisation, it was held by:

- asset management staff – 11 RCAs (37% of all RCAs)
- the professional services business unit – 6 (20%)
- the planning/regulatory department – 3 (10%).

In a further four RCAs (14%), the planning/regulatory department and the professional services business unit shared responsibility. In two RCAs (7%) responsibility rested with the asset manager or the planning/regulatory department, and the building inspector or the professional services business unit was responsible in a further two.

Of the two remaining RCAs (7%), one relied on the property owner to get the construction right and one had no defined responsibility, but relied on a bond system.

4.1.4 Correction of wrongly constructed new vehicle entrances

RCAs were asked what action they took if new vehicle entrances were not built according to the approved plans. Twenty-four of the RCAs (80%) stated the owners were required to take corrective action at their own expense. Three of these stated they also held a bond from the owner against the cost of remedial work. Of the remaining six RCAs:

- 2 retained a bond for the council to do corrective work
- 2 tried to persuade the owner to rectify or helped them to rectify the situation
- 2 were unclear what action they would take.

4.1.5 Upgrading policies for old vehicle entrances

No RCAs had a specific programme in place for systematically upgrading old, substandard vehicle entrances. However:

- 13 RCAs (43%) stated they had no policy
- 8 RCAs (27%) stated they had an informal policy of upgrading
- 5 RCAs (17%) stated they **would** upgrade when a road or footpath was upgraded for other reasons
- 3 RCAs (10%) stated they **might** upgrade when a road or footpath was upgraded for other reasons
- 1 RCA (3%) was planning a programme.

4.1.6 Inventories of vehicle entrances

The types of inventory of vehicle entrances held by RCAs were:

- 15 RCAs (50%) had no inventory
- 3 (10%) recorded urban entrances in their Road Assessment and Maintenance Management (RAMM) databases and rural entrances in the RAPID system
- 3 (10%) recorded only urban entrances in their Road Assessment and Maintenance Management (RAMM) databases
- 2 (7%) held their inventory on their property files
- 2 (7%) recorded only rural entrances in their RAPID systems
- 2 (7%) had a separate specific inventory for entrances
- 2 (7%) only recorded entrances on limited access roads
- 1 (3%) only kept an inventory of dairy tanker entrances.

4.1.7 Method of updating inventories of vehicle entrances

Methods reported for updating inventories of vehicle entrances were:

- 15 RCAs (50%) had no inventory to update
- 8 (26%) updated when their databases (RAMM, RAPID or limited access road) were updated
- 6 (20%) updated their inventory as new applications were received or new entrances constructed
- 1 (3%) updated when the Asset Manager observed a new crossing.

4.1.8 Responsibility for updating inventories of vehicle entrances

The person responsible for updating the inventory in each RCA was:

- no specific person (no inventory to update) – 15 RCAs (50%)
- roading asset manager – 8 (27%)
- professional services provider – 4 (13%)
- regulatory staff – 1 (3%)
- customer services staff – 1 (3%).

The other RCA did not answer the question.

4.2 Management of stock-crossing facilities

4.2.1 Policies for at-grade stock crossings

RCAs were asked if they had a formal council policy on the construction and management of at-grade stock crossings on their roads. Responses showed:

- 11 RCAs (37%) had no policy at all

- 10 (33%) had a formal policy
- 3 (10%) used a by-law
- 3 (10%) had informal policies
- 2 (7%) were preparing a draft policy
- 1 (3%) used a permit system.

4.2.2 Policies for stock underpasses

RCAs were asked if they had a formal council policy on the construction and management of stock underpasses on their roads. Responses showed:

- 15 RCAs (50%) had no policy at all
- 12 (40%) had a formal policy
- 2 (7%) were preparing draft policies
- 1 (3%) used a by-law.

4.2.3 Major requirements of policies for stock underpasses

Although only 15 RCAs stated they had a policy on the construction and maintenance of stock underpasses, 19 of the RCAs actually identified specific requirements for underpasses. The requirements were of three main types – legal or licensing requirements, ownership issues and technical requirements. Stated legal requirements were:

- 4 RCAs (13%) required the owner to obtain a building consent
- 4 (13%) required the owner to obtain a licence
- 1 (3%) required a deed of grant to be placed on the land's title.

Specified ownership requirements were:

- 4 RCAs (13%) required the owner to maintain the underpass
- 3 (10%) owned and maintained the underpass themselves after completion.

Stated technical requirements were:

- 9 RCAs (30%) specified design and construction standards
- 7 (23%) had requirements based on the amount of traffic using the road
- 1 (3%) had a preferred design
- 1 (3%) specified underpasses must be designed by an engineer.

4.2.4 Inventories of stock-crossing facilities

RCAs were asked if they maintained an inventory of stock crossings and/or stock underpasses.

- 13 RCAs (43%) stated they had an inventory of stock underpasses but not of at-grade stock crossings
- 9 (30%) stated they had inventories of both stock crossings and underpasses
- 8 (27%) stated they had no inventory of either stock crossings or underpasses.

Almost all RCAs with an inventory of stock underpasses stated the inventory was part of their bridge inventory.

4.2.5 Method of updating inventories of stock-crossing facilities

When asked how their inventories of stock crossings or stock underpasses were updated:

- 17 RCAs (57%) stated they had no inventory or did not systematically update their inventory
- 6 (20%) updated their inventory as applications were received
- 3 (10%) updated when they updated their bridge inventory
- 1 (3%) updated when they updated their RAMM inventory
- 1 (3%) updated the inventory annually
- 1 (3%) updated in alternate years after inspections of culverts
- 1 (3%) conducted a specific survey to update the inventory.

4.2.6 Responsibility for updating inventories of stock-crossing facilities

When asked who was responsible for updating inventories in each RCA:

- 15 RCAs (50%) said they had no inventory or no specific person
- 10 (33%) said the roading asset manager
- 5 (17%) said the professional services provider.

4.2.7 Policies on warning devices for at-grade stock crossings

RCAs were asked if they had a policy on the provision of warning devices at at-grade stock crossings. Responses were:

- 16 RCAs (53%) had no stated policy
- 10 (33%) had a stated policy
- 2 (7%) had a policy as part of a by-law
- 1 (3%) required an approved traffic management plan for each crossing
- 1 (3%) required temporary warning signs and a vehicle-mounted or post-mounted flashing orange beacon to be used at each crossing.

4.2.8 Warning devices preferred by RCAs for at-grade stock crossings

RCAs were asked what warning devices they encouraged farmers to use for at-grade stock crossings. Responses were a combination of formal requirements and staff preferences:

- 11 RCAs (37%) encouraged both (folding) temporary warning signs and flashing orange beacons together
- 4 (13%) encouraged permanent warning signs
- 4 (13%) encouraged temporary warning signs (folding or otherwise)
- 4 (13%) encouraged any warning sign and flashing orange beacons together
- 3 (10%) did not encourage the use of any warning devices
- 1 (3%) encouraged either permanent or temporary warning signs
- 1 (3%) encouraged temporary warning signs and high-visibility jackets together
- 1 (3%) encouraged temporary warning signs, flashing orange beacons and cones together
- 1 (3%) encouraged permanent warning signs, flashing orange beacons and cones together.

4.2.9 Warning devices preferred by farmers for at-grade stock crossings

RCAs were asked what warning devices they thought farmers preferred to use for at-grade stock crossings. Responses were therefore rather subjective.

- 12 RCAs (40%) said flashing orange beacons alone
- 7 (23%) said flashing orange beacons with temporary warning signs
- 2 (7%) said permanent warning signs
- 2 (7%) said vehicle hazard lights
- 1 (3%) said cones
- 1 (3%) said temporary warning signs
- 1 (3%) said temporary warning signs, flashing orange beacons and cones together
- 1 (3%) said flashing orange beacons and cones together.

Three RCAs did not respond to the question.

4.2.10 Compliance with intended use of warning devices

RCAs were asked to rate how well they thought warning devices were used by farmers as intended. Some RCAs chose intermediate points on the scale but the responses were:

- Excellent – 1 RCA (3%)
- Good – 3 RCAs (10%)
- Acceptable – 8 RCAs (27%)

- Poor to acceptable – 3 RCAs (10%)
- Poor – 8 RCAs (27%)
- Very poor – 4 RCAs (13%)

Three RCAs had no known stock crossings on their roads.

4.2.11 Effectiveness of use of warning devices by farmers

RCAs were asked to rate how effectively they thought warning devices were used by farmers. Some RCAs chose intermediate points on the scale, but the responses were:

- Excellent – 2 RCAs (7%)
- Good – 3 RCAs (10%)
- Acceptable – 12 RCAs (40%)
- Poor to acceptable – 2 RCAs (7%)
- Poor – 5 RCAs (17%)
- Very poor – 3 RCAs (10%)

Three RCAs had no known stock crossings on their roads.

4.2.12 Minimum acceptable length of stock underpasses

A large range of values was stated when RCAs were asked what minimum length of a stock underpass (relative to the roadway width) was acceptable to them. These were:

- formation width plus more than 5 metres – 3 RCAs (10%)
- formation width plus 5 metres – 2 RCAs (7%)
- formation width plus 4 metres – 1 RCA (3%)
- formation width plus 3 metres – 3 RCAs (10%)
- formation width plus 2 metres – 5 RCAs (17%)
- formation width plus 1 metre – 1 RCA (3%)
- formation width – 2 RCAs (7%)
- no policy – 10 RCAs (33%)
- 12 metres – 1 RCA (3%)
- 11 metres – 1 RCA (3%)
- 9 metres – 1 RCA (3%).

4.2.13 Protection for road users at stock underpasses

RCAs were asked what standard of protection they would require at road level if stock underpasses were not constructed from boundary to boundary of the road reserve. The minimum requirements were:

- 9 RCAs (30%) required white sight-rail with bridge end markers or hazard markers
- 9 (30%) required white sight-rail alone
- 5 (17%) required steel guardrail with bridge end markers
- 7 (23%) had no specific policy.

4.3 Use of amenity surfacings for urban carriageways

Sixteen of the 30 RCAs (53%) had not used any amenity surfacings, while some had used a range of different surfacings.

4.3.1 Responsibility for planning and decisions on amenity surfacings

RCAs were asked who in their organisation was responsible for planning and decision making when carriageway surfacings in urban areas were chosen for amenity rather than technical reasons. Responses were:

- roading asset manager – 15 RCAs (50%)
- network consultant and asset manager jointly – 2 RCAs (7%)
- council – 2 RCAs (7%)
- planning department – 2 RCAs (7%)
- planning department and asset manager jointly – 1 RCA (3%)
- no policy or not applicable – 8 RCAs (27%)

4.3.2 Liaison process for decisions on amenity surfacings

RCAs were asked to describe the types of internal liaison procedure in place to decide on which carriageway surfacing was to be used. The responses can be grouped as:

- close working relationship or documented procedure – 7 RCAs (23%)
- informal liaison only – 6 RCAs (20%)
- asset manager has control – 3 RCAs (10%)
- no procedure or not applicable – 14 RCAs (47%).

4.3.3 Dispute resolution procedure for decisions on amenity surfacings

The final decision on which carriageway surfacing to use in cases where there was an internal dispute rested with:

- roading asset manager – 3 RCAs (10%)
- other senior council officer – 3 RCAs (10%)
- council or council sub-committee – 2 RCAs (7%)
- an agreement by consensus – 6 RCAs (20%).

The remaining 16 RCAs (53%) had no specified responsibility or had not encountered the situation.

4.3.4 Types of amenity surfacings used on urban carriageways

The types of amenity surfacings reported by the RCAs in the survey and the number of RCAs using each were:

- 9 RCAs had used paver blocks
- 7 had used cobblestones
- 7 had used asphaltic concrete
- 5 had used slurry seals
- 2 had used concrete
- 1 had used interlocking paving blocks
- 1 had used coloured chip.

4.3.5 Changes in safety as a result of amenity surfacings

Of the 14 RCAs using amenity surfacings, only one had done any objective evaluation of the safety effects of the surfacing. This showed there had been a small reduction in the number of pedestrian crashes as a result of amenity surfacing in the central business area.

Of the other RCAs, three noted subjectively that speeds had reduced, and one thought subjectively that safety had improved.

One RCA noted a benefit of its amenity surfacing was a reduced need to spread grit for ice in the winter.

5. Discussion

5.1 Vehicle entrances

5.1.1 Internal liaison on approval of new vehicle entrances

Despite the surveyors' informal observations, and variations between RCAs in responsibilities and practices, RCAs reported no real problems regarding unsafe or inadequate construction of vehicle entrances. Where formal procedures for internal liaison did not exist, this was generally in RCAs small enough for informal liaison to occur easily. Other RCAs, in which there was no systematic liaison between asset management staff and other staff responsible for approving new entrances, could benefit from putting formal procedures in place.

5.1.2 Upgrading or correcting sub-standard vehicle entrances

No RCAs reported a programme specifically for upgrading existing vehicle entrances, although many upgraded them when doing other work. The responsibility for correcting new vehicle entrances not constructed to specifications rested squarely with property owners, sometimes reinforced with a bond held by the council.

5.2 Stock-crossing facilities

5.2.1 Policies on at-grade stock crossings

Only about half the RCAs surveyed had policies on the provision of at-grade stock crossings or the warning devices to be used at such crossings. Partly encouraged by the draft guidelines produced by the Road Controlling Authorities' Forum, a growing number were adopting such policies.

Policies varied on the types of warning device that should be used for at-grade crossings, and more standardisation is recommended on this issue. Again, the Road Controlling Authorities' Forum guidelines will assist.

Farmers' use of warning devices at stock crossings tended to be less than acceptable to most RCAs.

5.2.2 Policies on stock underpasses

Approximately half the RCAs interviewed had policies on the provision of stock underpasses, and their requirements varied widely. On-road practices also varied widely. This variation was most apparent in the minimum required lengths for underpasses relative to the road formation width.

5.3 Amenity surfacings

Sixteen of the 30 RCAs (53%) had not used any amenity surfacings, while some had used a range of different surfacings.

Asset management staff from all of the RCAs surveyed felt they had insufficient control over the types of road surfacings used in their urban areas. In instances where they did

not have the final decision on the matter, they considered they had an influence on the final decision.

Examples of inappropriate surfacing that the surveyors were aware of before undertaking the surveys appeared to be isolated cases.

Only one RCA had attempted an evaluation of the safety effects of amenity surfacing. This analysis showed a reduction in pedestrian crashes as a result of installing distinctive paving at pedestrian crossing facilities, but the results were not conclusive.

6. Best practice

6.1 Best practice for vehicle entrances

Recommended elements of best practice recorded during the surveys were:

- Roading asset managers must be formally involved in the processes for approval of both building consents and resource consents in each RCA.
- Follow-up inspection procedures must also have input from roading asset managers to ensure new and existing vehicle entrances are acceptable.
- Remedial work for sub-standard entrances should be at the expense of the property owner.
- RCAs should hold a reimbursable bond from property owners, sufficient to cover the cost of remedial works should an entrance not be constructed or reconstructed to an acceptable standard.
- Existing substandard vehicle entrances should be reconstructed to an acceptable standard when any road or footpath reconstruction is completed by the road controlling authority.
- RCAs should maintain an inventory of approved vehicle entrances.

6.2 Best practice for at-grade stock crossings

Recommended elements of best practice recorded during the surveys were:

- Maintain an inventory of at-grade stock crossings and any operating conditions pertaining to them.
- Have consistent policies for the control of at-grade stock crossings,
- Adopt the Road Controlling Authorities' Forum publication *Guidelines for stock crossings* as the policy on at-grade stock crossings.
- Require the cleaning of stock crossings after each use.
- Educate and assist farmers to get their installations correctly set up for good management in accordance with the guidelines.
- Audit or inspect at-grade stock crossings to ensure compliance with operating conditions and correct use of warning devices.

6.3 Best practice for stock underpasses

Recommended elements of best practice recorded during the surveys were:

- Legal agreements covering construction, maintenance and removal of structures should include an encumbrance on relevant land titles.
- Farmers should own and maintain structures according to council requirements.
- Include stock underpasses in bridge inventories and inspect them periodically when doing structural inspections of other bridges.
- Relate the minimum acceptable length of underpasses to specific clearances from road formations.
- Require the same practice for protection of road users (guardrailing) as is applied to bridges elsewhere on the network.

7. Recommendations

Road controlling authorities should adopt and implement any of the elements of best practice in Section 6 that they do not already follow.

A national guideline should be established for the desirable minimum length of stock underpasses relative to the width of the vehicle carriageway.

2. Appendix 1 Road controlling authorities in the survey

Buller District	Rangitikei District
Central Otago District	Rodney District
Central Hawke's Bay District	South Taranaki District
Dunedin City	South Waikato District
Franklin District	South Wairarapa District
Gore District	Tararua District
Grey District	Tasman District
Horowhenua District	Upper Hutt City
Invercargill City	Waikato District
Kaipara District	Waimate District
Mackenzie District	Waitakere City
Marlborough District	Wanganui District
Matamata-Piako District	Western Bay of Plenty District
Papakura District	Westland District
Queenstown-Lakes District	Whakatane District

Appendix 2 Audit of road environment – Questionnaire

Road controlling authority _____

Person(s) replying to questionnaire _____

Position in organisation _____

Contact phone number _____

Contact email _____

Interviewer _____ Date _____

Council policy, design and control of externals

	Questions	Prompts
1	What form of inventory or database of traffic signs do you maintain? (State.)	RAMM? Database? What database?
2	What policies have you for the provision of traffic signs on your network? (State.)	Has Council a formal policy? What documentation is there of it? What informal policy is there?
3	What procedures do you have to check that drivers' sightline to traffic signs are in accordance with the <i>Manual of traffic signs and markings</i> ? (State.)	Has Council a formal policy? What documentation is there of it? What informal policy is there?
4	What policy have you for the replacement of existing traffic signs? (State.)	Has Council a formal policy? What documentation is there of it? What informal policy is there?

5	<p>What procedures do you have to check conspicuousness of traffic signs in relation to advertising signs? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>
6	<p>What controls have you on roadside advertising signs? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>
7	<p>How effective are the controls you have on roadside advertising signs? (Assess on scale 1-> 5)</p>	<p>Scale: 1=very poor. 3=acceptable. 5=excellent.</p>
8	<p>Are there any locations where you think advertising signs create a hazard? (State.)</p>	
9	<p>Which part of Council's organisation is responsible for approving new vehicle entrances to private property? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>
10	<p>What liaison (formal and informal) is there between the different parts of Council's organisation in planning and approving new vehicle entrances to private property? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>

11	<p>Who is responsible to see new vehicle entrances are built according to the approved plan? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>
12	<p>What do you do when new entrances are not built according to the approved plan? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>
13	<p>Does Council have a policy of encouraging or requiring old standard vehicle entrances to be upgraded? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>
14	<p>Does Council maintain an inventory of vehicle entrances to private property? (State.)</p>	<p>Yes/No</p>
15	<p>If there is an inventory of vehicle entrances to private property, how is this updated? (State.)</p>	
16	<p>If there is an inventory of vehicle entrances to private property, who is responsible for updating it? (State.)</p>	
17	<p>Does Council have a formal policy for the construction and management of stock crossings at road level (eg dairy herds, deer)? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>

18	<p>Does Council have a formal policy for the construction and management of stock underpasses? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>
19	<p>What are the major requirements of Council's policy? (State.)</p>	
20	<p>Does Council maintain an inventory of stock crossings and/or underpasses of roads? (State.)</p>	Yes/No
21	<p>If there is an inventory of stock crossings of roads, how is this updated? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>
22	<p>If there is an inventory of stock crossings of roads, who is responsible for updating it? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>
23	<p>Does Council have a policy on what warning devices farmers should use in conjunction with stock crossings? (State.)</p>	Yes/No
24	<p>What warning devices that stock crossings are in use does Council encourage farmers to use? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>

25	<p>What warning devices that stock crossings are in use do farmers prefer to use? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>
26	<p>To what extent are warning devices used as intended? (Assess on scale 1-> 5)</p>	<p>Scale: 1=very poor. 3=acceptable. 5=excellent.</p>
27	<p>How effectively are stock warning devices used by farmers? (Assess on scale 1-> 5)</p>	<p>Scale: 1=very poor. 3=acceptable. 5=excellent.</p>
28	<p>What is the minimum length relative to the width of carriageways that Council will accept for a stock underpass? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>
29	<p>Where stock underpasses are narrower than the road boundary to boundary, what standard of protection does Council require to be built and maintained at the road level? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>
30	<p>When carriageway surfacings are chosen for amenity reasons rather than for technical reasons, what part of Council's organisation is responsible for planning and decision-making on amenity surfacings? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>

31	<p>When carriageway surfacings are chosen for amenity reasons rather than for technical reasons, what liaison (formal and informal) is there between the different parts of Council's organisation in planning, installing and maintaining amenity surfacings? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>
32	<p>In the event of disagreements between the different parts of Council's organisation over amenity surfacings, how are these resolved? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>
33	<p>What types of amenity surfacings does your Council apply to carriageways? (State.)</p>	<p>Has Council a formal policy? What documentation is there of it? What informal policy is there?</p>
34	<p>What changes in the local safety environment have occurred as a result of the use of amenity surfacings on carriageways? (<i>Note: Statistical evidence of actual change is sought in the answer to this question.</i>) (State.)</p>	

Road safety survey series

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RSS 2	<i>Street lighting</i>	1995/96
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RSS 4	<i>Stop and give way controls at intersections</i>	1996/97
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RSS 12	<i>Floodlighting pedestrian crossings</i>	1999
RSS 13	<i>No passing lines</i>	2000
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These reports are available on the LTSA website at www.ltasa.govt.nz or may be purchased from the Land Transport Safety Authority in Auckland (Private Bag 92–515), Hamilton (Private Bag 3081), Napier (PO Box 972), Palmerston North (PO Box 1947), Wellington (PO Box 27–249), Christchurch (PO Box 13–364) or Dunedin (PO Box 5245), at a cost of \$10 each including GST.