

CALDER HIGHWAY STRATEGY



October, 1995

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 **victoria** *ON THE MOVE*

Photographs Front Cover.

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"Central Business District, Melbourne"

CALDER HIGHWAY STRATEGY

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CALDER HIGHWAY STRATEGY STUDY
Melbourne to Bendigo & Bendigo to Murray River

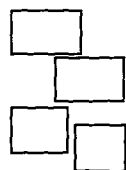
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Technical Supplements (Separate Report)

Technical Supplement No. 1
Strategic Overview of the Regional Economy

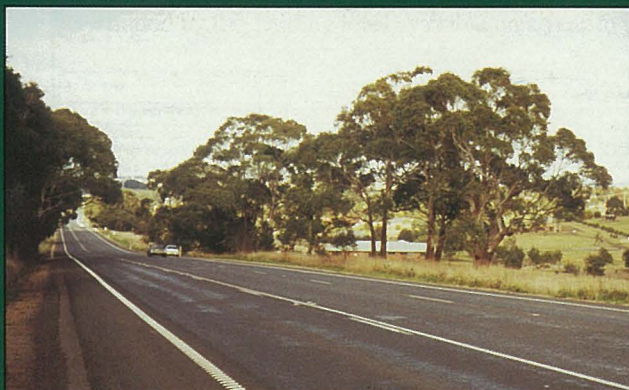
Technical Supplement No. 2
Technical Data and Analyses

Photographs opposite

- 
1. Construction of freeway, Diggers Rest - Gisborne
 2. Kyneton Bypass
 3. Shoulder sealing and tactile line marking
 4. Construction of four lane divided highway, Irymple - Mildura.

Calder Highway Strategy

The Calder Highway is a major State Highway linking the northern cities of Mildura and Bendigo to Melbourne. This strategy is presented in two parts; a southern sector from Melbourne to Bendigo (A) and a northern sector from Bendigo to the Murray River (B).



Executive Summary

Role of Calder Highway

The Calder Highway is a strategic link in Victoria's rural highway network, carrying high volumes of freight transport, business travel, and personal travel between Melbourne and the major provincial centre of Bendigo, and moderate volumes of traffic between Bendigo, Mildura and New South Wales.

The highway provides essential access from New South Wales and central and northern Victoria to domestic and export markets, and in particular to the key intermodal transport terminals at Tullamarine airport, the Port of Melbourne and the Port of Geelong.

Bendigo is a major urban centre in Australia, the second largest regional manufacturing area in Victoria and the only major provincial city not connected to Melbourne by a high standard duplicated highway.

Bendigo, and the surrounding Goldfields Region, Mildura, and other centres along the Calder Highway are also major tourist destinations.

Travel Demand

Average predicted traffic volumes in 15 years time based on 3% growth are:

- 33000 vpd South of Diggers Rest
- 25000 vpd Diggers Rest to Gisborne
- 15000 vpd Gisborne to Kyneton
- 6000-14000 vpd Kyneton to Bendigo
- below 5000 vpd Bendigo to Irymple
- 7000-10000 vpd Irymple to Mildura

Identified Needs

The study identified the following needs

Melbourne to Bendigo:

- travel delays and traffic intrusion in towns which are major weekend tourist destinations and outer metropolitan residential dormitories (eg, Macedon and Woodend)
- inadequate overtaking opportunities between Kyneton and Bendigo
- high accident rates and travel delays on the 2 lane undivided sections of highway and on the 4 lane undivided sections between Gisborne and Woodend
- the high accident rate at the Bulla-Diggers Rest Rd intersection
- bridges which will require remedial work to continue to carry B-Doubles

Bendigo to the Murray River:

- high accident risk at the Bullock Creek North bridge
- frequent flooding on the southern approach to Charlton
- high accident rates between Marong and Inglewood, Red Cliffs and Mildura, and Mildura and the Murray River
- bridges which will require remedial work to continue to carry B-Doubles
- weak and distressed pavements requiring early rehabilitation

Highway Management Objectives

The study established a requirement for development in the medium term to achieve:

- a 4 lane divided freeway between Melbourne and Kyneton;
- a 4 lane divided highway between Kyneton and Bendigo in a reservation suitable for conversion to freeway standard in the longer term;
- a 2 lane highway north of Bendigo with driving conditions appropriate for a major State highway, adequate overtaking opportunities and full access for efficient freight vehicles.

The following strategy would achieve these objectives within 10-15 years at funding levels consistent with current programs.

between Melbourne and Bendigo:

- firstly, link up the existing freeway sections between Melbourne and Kyneton by completing works under construction and in planning, with provision of full access control on the outer urban freeway sections between Keilor and Diggers Rest at a later date with high priority given to grade separation of Bulla -Diggers Rest Road intersection;
- subsequently, provide a four lane divided road progressively north from Kyneton to Bendigo in a form suitable for freeway conversion at a future date;
- in the meantime, ensure that safety and operating conditions between Kyneton and Bendigo are maintained to a reasonable standard consistent with traffic volumes and timing of future works; and
- in the longer term, convert the four lane divided road to a freeway with full access control.

between Bendigo and the Murray River:

- provide a four lane divided road between Irymple and Mildura;
- ensure that safety and operating conditions on the Calder Alternative Highway and the Calder Highway between Bendigo and the Murray River achieve at least the minimum appropriate performance standards by providing:
 - high standards of centre and edge line marking
 - provision of overtaking lanes at selected locations
 - sealed shoulders throughout
 - a high standard of riding surface
 - road safety and access improvements.

Economic Benefits

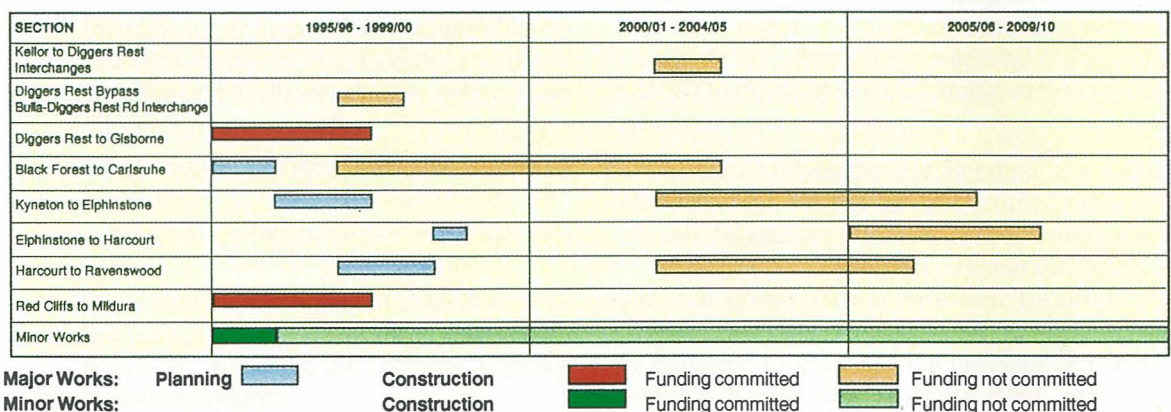
An economic evaluation of the highway improvement strategy between Melbourne and Bendigo showed:

- A Net Present Value of \$330 million and a Benefit Cost Ratio of 2.6, assuming a discount rate of 8%p.a. for future costs and benefits
- The benefits comprised savings in vehicle operating costs of \$30 million, savings in travel time of \$470 million, and savings in accident costs of \$40 million

Additional benefits will flow on to agricultural producers, manufacturers and tourism industry operators.

Duplication works south of Mildura costing \$5.5 million would have a Benefit Cost Ratio of 1.1

Recent expenditure rates on the Calder Highway vary between \$24 and \$34 million per annum, with the bulk of expenditure being south of Bendigo. Achieving the strategy within 10 - 15 years would require a program of funding of approximately \$ 36 million each year from 1997 on. The overall timing of the program will be ultimately determined by the funding level available on a year to year basis.



Calder Highway (Melbourne to Bendigo) - Indicative Program - Planning and Construction

Table 1



A. Melbourne to Bendigo

(southern sector)

A1. Strategic Function of the Highway

The southern sector of the Calder Highway is a key freight corridor of national and State significance, carrying primary produce and manufactured goods for domestic and export markets via Melbourne and its transport hub. It provides access between Melbourne and important agricultural regions in northwestern and north-central Victoria (Mallee and Loddon-Campaspe Regions), south western New South Wales and the Murray River corridor west of Echuca.

Bendigo is a major urban centre in Australia and the second largest regional manufacturing centre in Victoria. The manufacturing industry is a vital element in the economic base of this transport corridor. Tourism is a significant factor in the economic growth of the region with the Calder Highway being a principal route for tourist traffic.

A2. Strategies relevant to the Corridor

The importance of the southern sector of the Calder Highway to the State and the need to upgrade it is reflected in various government policies and initiatives. Specific strategies include:

- Development Framework for Victoria, September 1994. This report draws on other recent government strategies and initiatives. Of particular relevance to the Calder corridor is the focus on:
 - the duplication of the Calder Highway as a critical infrastructure requirement
 - the strategic transport and communications linkages between rural centres such as Bendigo and Melbourne's "key national and international gateways"
 - the development of lifestyle corridors between Melbourne and provincial centres like Bendigo, encouraging a coordinated approach to private and public sector investment
 - the continuing development of Melbourne to the north and west and the forecasted high population growth in the Loddon-Campaspe statistical division.

- The Government's Road and Road Safety Policy, 1992 highlights the need to invest and improve the Calder Highway.

To assist in understanding the strategic function of this corridor, a strategic overview of the regional economy has been prepared by TBA Planners (Trevor Budge and Associates), March 1994 and is included as Technical Supplement 1.

This report supports the Loddon-Campaspe Regional Planning Authority strategy for the development of the corridor proposed in the Final Report of the Bendigo-Melbourne Corridor and Infrastructure Study, March 1994 prepared by TBA Planners, Andrew O'Brien & Associates and Planning Australia Consultants.

The strategic importance of this corridor to the transportation of export freight to Tullamarine Airport and the Ports of Melbourne and Geelong and the need to upgrade to a four lane divided facility to meet future demand was identified in NATROV (1987) and VICROADS 2000 (1990).

A3. Current and Future User Needs

The freight task is expected to grow along the corridor. Export products include wool, sheep, fruit (including table grapes), dairy products, grain, manufactured engineering products and textiles. Other important products of the region include pig, poultry, wine, low and high value added timber products (TBA Planners, 1994).

In addition, tourist destinations within the corridor attract approximately 260,000 visitors annually. About half are from Melbourne and would be likely to use the Calder Highway. Tourist traffic is a significant contributor to weekend traffic which is 25-35% higher than weekday traffic on the southern half of this route.

Between Melbourne and Bendigo, the Calder Highway also serves an important commuter function. Significant numbers of commuters travel to Melbourne from Kyneton, Woodend and Gisborne and to a lesser extent between Bendigo and Castlemaine (TBA Planners, 1994). Commuter trips are expected to grow as infill development occurs between Keilor and Diggers Rest, and high population growth rates continue for many towns.

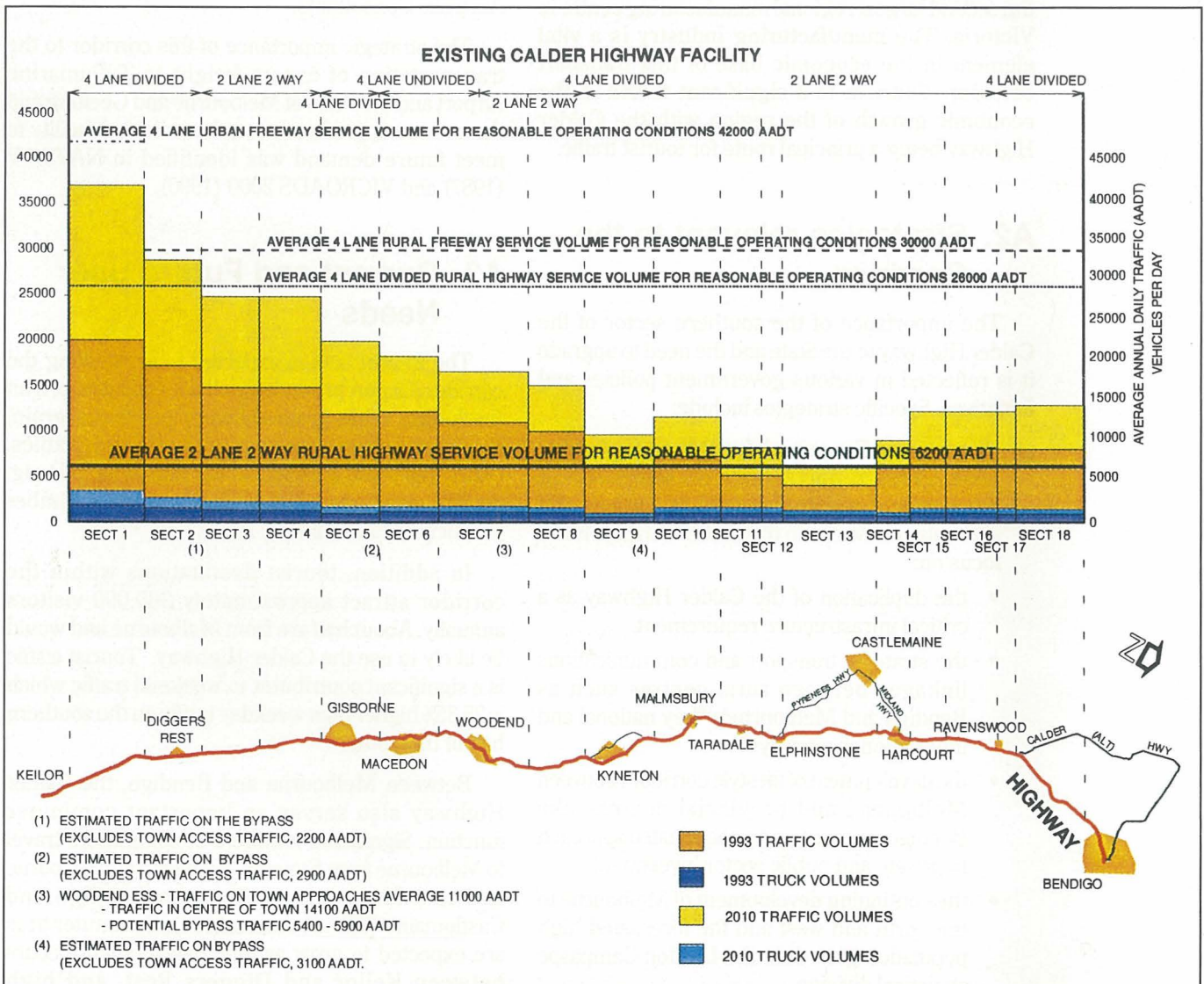
A4. Current and Projected Travel Demand

A picture of the upgrading requirements was obtained by examining existing conditions and estimating future needs along the southern sector of the Calder Highway over 18 Sections. The fold out Locality Plan at the end of this report shows the type of facility existing on each section. The detailed analysis presented in Technical Supplement 2 is summarised below.

A4.1 Traffic Growth

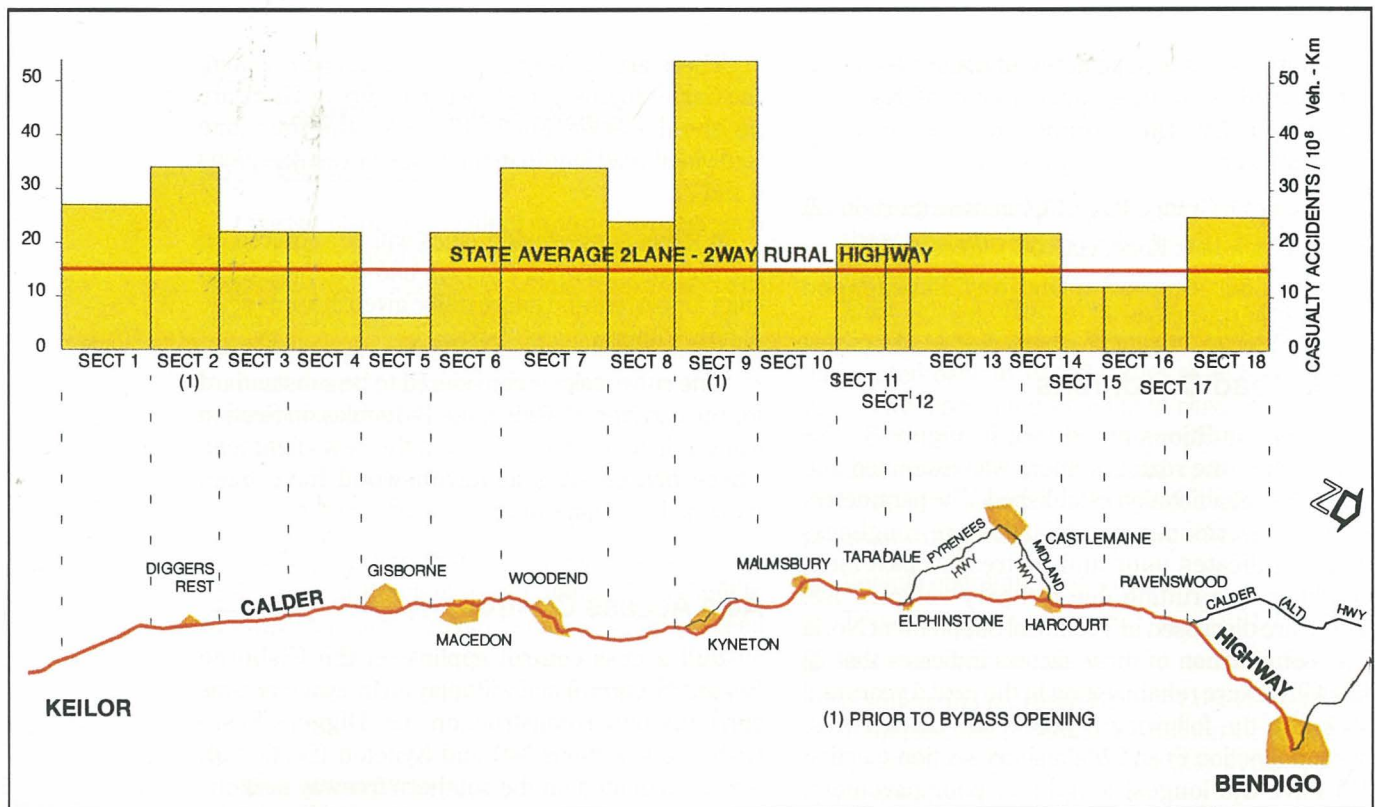
Traffic volumes on the Calder Highway are expected to grow annually by about 3 - 5%. Traffic volumes on the Calder Highway in 1993 are shown in Figure 1.

Traffic analysis indicates that the four lane freeway, four lane divided and four lane undivided sections of the highway would be able to provide reasonable operating conditions for estimated future traffic volumes for the foreseeable future. This assumes urban conditions at Keilor (Section 1) and that total access control is provided between Keilor and Diggers Rest (Sections 1 and 2). However all two-lane, two-way sections would require upgrading to cater for increased traffic volumes over the next 10 years.



TRAFFIC VOLUMES - 1993 & 2010

Figure 1



ACCIDENT RATE (1988-1992)

FIGURE 2

A5. Performance Standards

Because of the strategic importance of the southern sector of this transport corridor it is considered that the standard of facility should be similar to that provided in Victoria for National Highways. Standards are discussed in detail in Technical Supplement 2.

Performance based triggers for intervention along the corridor are based on current VicRoads practice but will reflect the standards set by the Linking Victoria Strategy as they become available.

A6. Deficiencies

A6.1 Travel Delay

Although it has not been quantified, congestion is already being experienced each weekend in the towns through which the highway passes between Melbourne and Bendigo, reducing the amenity for normal residential activity. Cross highway delays of up to seven minutes at weekend peaks have been recorded at Woodend (personal communication TTM Consulting Pty Ltd, July 1993).

A6.2 Road Safety

Accident rates over the 5 year period 1988-1992, shown in Figure 2, generally exceed typical Victorian two-lane, two-way rural highway casualty accident rates (15 casualty accidents / 100 million vehicle - kilometres) on two-lane, two-way sections of the highway with the exception of Malmsbury (Section 10) and Harcourt - Ravenswood (Sections 15, 16 and 17). The four lane undivided section from Macedon to Woodend (Section 6 and part Section 7) has a similar accident rate to the two-lane, two-way sections of the highway. The average accident rate on the Black Forest Section (Section 6) has increased marginally from 22 to 23 casualty accidents / 100 million vehicle - kilometres for the 5 year period 1989 - 1993. These relatively high accident rates are of concern.

Works completed during the 5 year period (1988-1992) are expected to result in a significant reduction in accidents over time (Sections 1, 2 and 17) as are works currently under construction (Sections 3, 4 and 9). This reduction is not yet reflected in the data.

Intersections with an accident history are being monitored including three north of Kyneton identified by the community as problem intersections:

- Sutton Grange Road, Elphinstone (Section 12)
- Black Jack Road, Harcourt (Section 14)
- Calder Alternative Highway, Ravenswood (Section 18)

A6.3 Road Conditions

Road conditions are shown in Figure 3. The condition of the road pavement was examined and needs for rehabilitation established. The parameters used in determining rehabilitation are roughness which indicates poor and distressed pavement condition and rutting due to heavy vehicles use. These are discussed in Technical Supplement No. 2. The combination of these factors indicates that 22 km will require rehabilitation in the next 5 years and 18 km in the following 5 years. The Black Forest section (section 6) and Malmsbury section (section 10) have the longest lengths of poor pavement, however the Black Forest section is more distressed as about 8km of left hand lane also has poor strength.

Sections where the road alignment is substandard (12.4 km) including curves and grade are shown on Figure 3.

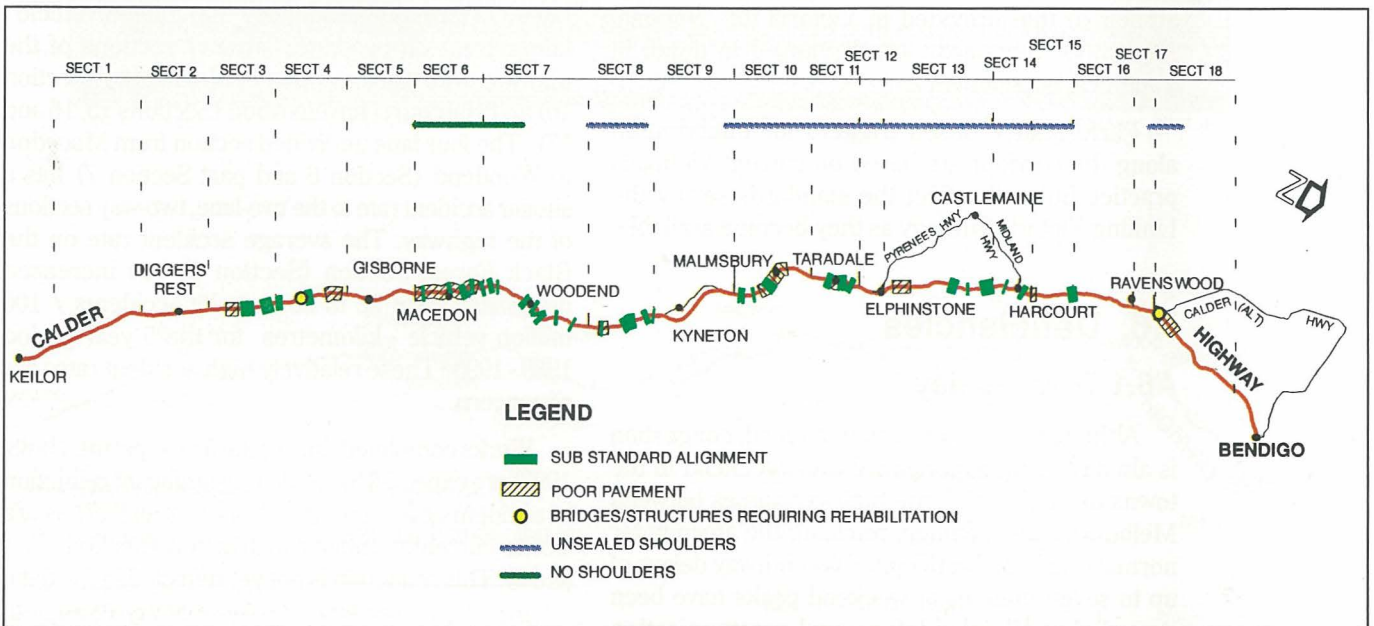
There are 55 km of unsealed shoulders along the Calder highway as shown in Figure 3. There are no shoulders for about 12 km of the four lane undivided road length in the Black Forest (Sections 6 and 7).

Additional overtaking lanes will be required on the highway between Kyneton and Ravenswood to cater for current and future traffic given the time scale of future upgrading proposals.

One culvert site is considered to be substandard for the carriage of 62.5 tonne B-doubles on Section 4 and will be replaced as part of the new alignment. Three bridge sites at Ravenswood have been identified for monitoring.

A6.4 Access Control

Full access control applies on the Gisborne Bypass (Section 5) and will apply on freeway sections currently under construction i.e. Diggers Rest - Gisborne (Sections 3-4) and Kyneton (Section 9). Access is limited on the southern freeway sections between Keilor and Diggers Rest (Sections 1-2). There are no access controls on the rest of the highway.



ROAD CONDITIONS

Figure 3

A7. Management and Development Strategy

A7.1 Objectives

Earlier planning resulted in an ad hoc approach to the development of the highway south of Bendigo. This strategy seeks to consolidate current construction and planning work and present a coherent program for future upgrading. A five year management plan including minor works is presented as part of the strategy.

A7.2 Development Strategy

It is proposed that the Calder Highway from Melbourne to Bendigo would ultimately be built to freeway standard. Planning studies would proceed on this basis to ensure that reservations are made for a freeway in the relevant planning schemes.

The strategy is to:

- firstly, link up the existing freeway sections between Melbourne and Kyneton by completing works under construction and in planning, with provision of full access control on outer urban freeway sections at a later date with high priority given to grade separation of Bulla - Diggers Rest Road intersection;
- subsequently, provide a four lane divided road progressively north from Kyneton to Bendigo in a form suitable for freeway conversion at a future date;
- in the meantime, ensure that safety and operating conditions between Kyneton and Bendigo are maintained to a reasonable standard consistent with traffic volumes and timing of future works; and
- in the longer term, convert the four lane divided road to a freeway with full access control.

The benefits would include:

- reduced transport costs for export orientated goods, originating within Victoria and inland New South Wales, as a result of reduced vehicle costs from improved travel times and reliability, reduced delays and improved pavements
- reduced accidents
- improved safety and amenity in bypassed towns

- improved safety and access to Melbourne and Bendigo for commuter traffic
- improved safety and access for tourist, business and commercial traffic
- high economic returns to the community as shown by the Net Present Value (NPV) of the various projects

The total cost of the program of new construction works would be about \$350 million, or \$205 million discounted back to 1994 \$ values at an 8% discount rate. The discounted benefits to road users of the proposed construction program would be about \$535 million. After taking account of construction and maintenance costs the proposed construction program would have approximate discounted:

- Vehicle operating cost savings of \$30 million
- Travel time cost savings of \$470 million
- Accident cost savings of \$40 million

resulting in an overall Benefit Cost Ratio (BCR) of 2.6 and an NPV of about \$330 million for 8% annual discount rate (assumes all possible bypasses are constructed).

A7.3 Major Works Progress

Completed sections include:

Section 1

Keilor - Diggers Rest Freeway with at grade intersections (1991)

Section 2

Diggers Rest Bypass Freeway with one at grade intersection (1993)

Section 5

Gisborne Bypass Full freeway (1989)

Section 9

Kyneton Bypass Full freeway (1995)

Section 17

Ravenswood 4 - lane divided highway (1992)

Section 18

Ravenswood - Bendigo 4 - lane divided highway (1983)

Works under construction/funding committed include:

Section 3

Diggers Rest - Milletts Rd Full freeway (complete mid 1996)