LAND ENVIRONMENT & PEOPLE

Environmental Values of the State Highway Corridor:

A West Coast Case Study

Survey of Stakeholders

Jude Wilson
Simon Swaffield

Report No. 16

LEaP
LAND ENVIRONMENT & PEOPLE

Lincoln University
Te Whare Wānaka o Aoraki

Environmental Values of the State Highway Corridor:

A West Coast Case Study Survey of Stakeholders

Jude Wilson

Simon Swaffield

Land Environment and People Research Report No. 16

May 2010

ISSN 1172-0859 (Print)

ISSN 1172-0891 (Online)

ISBN 978-0-86476-232-0

Lincoln University, Canterbury, New Zealand

Reviewed by:

Professor John Fairweather
AERU

Acknowledgements
We are grateful to:

- The key informants who willing gave their time and comments;
- Michelle Collings put the report into the LEaP format; and
- Professor John Fairweather provided a most valuable review.

Series URL: http://hdl.handle.net/10182/580

Contents

List of Tables

List of Figures

Chapter 1
Introduction

> 'the planning, design and maintenance of the highway provides numerous opportunities to positively affect the visual quality, landscape values and urban design of the surrounding environment, in a way that recognises the historical, cultural and community values associated with landscapes' (New Zealand Transport Agency 2006, p.1-1).

This report presents the results of a field investigation into the environmental values and landscape preferences of key stakeholders in relation to the management of the roadside corridor of the State Highway system. It is part of a larger programme of work commissioned by the New Zealand Transport Agency through Landcare Research Ltd to investigate the multiple values of environmental assets of the highway network. This report comprises part of the output of a Lincoln University subcontract within this programme.

1.1 Study Context and Rationale

The New Zealand State Highway network is a critical component of the country's public infrastructure, connecting communities, towns and cities to farms, forests, industry and ports, and region to region. The network crosses the full range of New Zealand's natural and modified environments. In some areas, the highway is the major built asset within a largely unmodified landscape. In other, more intensively developed areas, the highway network is a working part of a cultural landscape mosaic of different land uses, features and other infrastructure.

New Zealand is heavily reliant upon road transport, and the State Highway network is a primary means by which New Zealanders and overseas visitors access the wide diversity of the country's distinctive landscapes. It provides a unique network of routes that shape the way the country is experienced, and in many situations the State Highway frames our most distinctive iconic cultural landscapes. The management of the highway corridors is therefore a vital part of the tourism industry, which over much of the past two decades has been one of New Zealand's largest export sectors. Informed visitors are increasingly sensitive to tourism marketing claims to be '100% pure'(Tourism New Zealand 2009) and the nature and condition of the highway network corridor has influence upon visitors perceptions of the 'clean green' image used to promote many products. As a primary way in which New Zealanders experience their own country, the condition of the highway corridor is also critical in shaping regional and national identity.

The State Highway network is typically constructed within a continuous legal right-of-way that is wider than the carriageway itself. This road corridor can include cut and fill slopes formed for the purpose of road construction, as well as crash barriers, signs, bridges, gutters, drains, underpasses, fences, and unmodified terrain between the carriageway and the boundary of the legal right of way and the surrounding land.

The wider corridor can extend tens or even hundreds of metres from the carriageway, and the land area of the highway network comprises a major public land asset.

The State Highway and its corridor have an effect upon the surrounding landscape in which it is located in a number of ways. In less modified landscapes the highway can place environmental pressure on adjacent ecosystems, as a source of disturbance, exotic weeds and pollutants. On the other hand, in settings that are already highly modified, such as intensive production landscapes, the highway corridor may provide significant, albeit modified biodiversity values, and other ecosystem benefits and services. In both natural and modified landscapes, the highway corridor can be designed and managed in ways that mitigate the impacts of road users upon the surrounding landscape, for example by managing the quality and quantity of storm water entering surrounding catchments. The corridor can also be managed to provide new ecosystem services, for example through indigenous plantings to enhance biodiversity and to better integrate the corridor into the surrounding landscapes.

The New Zealand Transport Agency (NZTA) has a well-developed engineering assets management system for the built infrastructure (roads, bridges, and so on). It has also formulated various policies and strategies to ensure that the environmental effects of new highways upon the surrounding landscapes and ecosystems are considered and mitigated. These include specific guidelines for highway landscaping (New Zealand Transport Agency 2006). There is growing recognition within the agency and beyond of the wider national significance of the environmental assets within the highway, and of the opportunities available from the integration of the management of these assets with other governmental and community goals and strategies for sustainable development.

The government's overall vision for an affordable, integrated, safe, responsive, and sustainable transport system is set out in the *New Zealand Transport Strategy* (NZTS) (2008). This strategy provides the framework within which transport policy is developed (Ministry of Transport 2008). With funding pressures on the transport sector likely to increase, due to competing demands as well as increasing energy costs, it will be increasingly important to gain multiple values from public investment in roads. Improved knowledge and methods are therefore needed to better integrate the existing system of infrastructure management with wider environmental values, and to ensure that all values are protected, rehabilitated or enhanced.

1.2 Research Aims and Approach

This report is part of a larger project that aims to provide, test and demonstrate methods for identification, evaluation, monitoring and enhancement of environmental values and assets along the corridors of the state highway system (TAR 08/49 Multiple Value Management of Environmental Assets of the NZ State

Highway Network). The wider project includes particular consideration of the nature of, and potential for, indigenous vegetation to provide multiple values to the road transport corridor from financial, safety and ecosystem services perspectives.

The specific objective of the work reported here is to investigate the perceptions and values of road user groups, designers and managers that relate to the State Highway Corridor Reserve.

The research design was based on a regional case study, focused upon the West Coast of the South Island. The choice of a regional case study approach reflects both the practical value of undertaking a place-specific pilot study of cultural, social and amenity values associated with the road corridor, and the funding available. The selection of the West Coast reflects NZTA operational considerations and the practicalities of field research. The approach developed here can be extended to other regions around the country.

The report presents the results of questions about preference, identity and management of the non engineering assets in the State Highway reserve, within the context of the wider landscape corridor of the highway. It is structured as follows. The remaining part of the introduction provides a brief overview of relevant themes from the wider research literature. A more detailed review is published under separate cover (Clemens, Swaffield and Wilson 2010, forthcoming). Chapter 2 explains the study method. Chapters 3 to 6 present the results of the different parts of the investigation, and Chapter 7 draws together the main conclusions and suggests possible implications for the wider research programme.

1.3 Current Understanding of Highway Landscape Values

This section presents a brief summary of international literature addressing roadside corridor values, including evolving expectations, multiple values, public perceptions and sensitivities, stakeholder perspectives, and methods to identify landscape values. It draws particularly upon Clemens, Swaffield and Wilson (Clemens et al 2010 forthcoming) and includes cross reference to New Zealand examples.

Landscape values associated with road corridors fall into two broad categories – those associated with landscape as visual and scenic amenity, and those associated with landscape as a functional system (such as biodiversity). Visual landscape approaches have taken three forms: improvement of existing roads by local communities through road beautification projects (especially around towns, cities and industrial areas) (Merriman 2007); consideration of landscape values when constructing new roads (e.g. Crowe 1960); and the creation and design of roads specifically to provide scenic experiences (e.g. Myers 2004).

Road beautification projects have been undertaken in urban areas of New Zealand since the nineteenth century, and have been actively promoted since the 1930s (Skipworth 1939). Landscape considerations have been integrated to some degree

into new highway construction since the 1960s, and the formation of the landscape architecture profession in New Zealand originates in part from the initiatives undertaken within the Ministry of Works at that time. There have also been dedicated roads for scenic drives – an early example being the Summit Road along the Port Hills in Christchurch (Baughan, Cockayne and Speight 1914).

In the early stages of highway landscape improvements, functional landscape considerations focused upon the role of roadside vegetation in relation to slope stabilisation, although its aesthetic potential for framing desirable views or obscuring others was also addressed. Since the 1970s there has been much greater interest in the biological values and conservation potential of the road corridor (Fairbrother 1970). In the United Kingdom, roadside surveys were undertaken to demonstrate the biodiversity values of herb and grasslands maintained by traditional means, despite being subjected to roadside spray and pollutants (Way 1970). In New Zealand, the relative merits of exotic and indigenous species was vigorously debated during beautification projects in the 1980s and 1990s, and the adoption of the NZ Biodiversity Strategy (MfE and DOC 2000) reinforced a shift in emphasis from the use of introduced/exotic plants towards greater use of indigenous plants for biodiversity purposes.

Over time, values associated with roads have developed from the utilitarian (to foster the rapid, safe and comfortable transport between points), through to the aesthetic, to a suite of economic, social and environmental values. There is an increasing commitment on the part of highway authorities to make highways 'better than before' by placing 'conservation and community enhancement on the same plane as functionality and efficiency' (Kassof 2004, p.12). The types of values associated with roadside vegetation can be grouped into: environmental (ecological) values, including relict species, habitat, migration and dispersal, roadsides as islands and diversity in a monoculture context; social values, including aesthetics, recreation, education, heritage, and scientific values; and economic values, including grazing, soil conservation, microclimate control, fire barrier and suppression, road safety, tourism, weed suppression, and noise reduction (Grieves and Lloyd 1984).

Some highway authorities have developed comprehensive strategies, guidance notes and handbooks in response to the changing attitudes and insights into the potential for road corridors to provide the public with multiple, relatively intangible values in addition to safe and efficient transport routes. The focus still tends to be on the more tangible functional role of roadside vegetation, such as the maintenance of ecosystems and reduction of pollutants. In Victoria, Australia, for example, the Biodiversity Guidelines (Vic Roads 2005) noted the aesthetic qualities of indigenous plants, but contained no consideration of the visual or landscape effects of measures to conserve biodiversity.

In the UK, concern for a suite of landscape, amenity and biodiversity conservation values has been translated into the Design Manual for Roads and Bridges (DMRB) which contains sections on environmental objectives, landscape management and nature conservation (Highways Agency (UK) 2009a). Landscape management of

highways includes the provision of a visually interesting journey, drawing on an extensive legacy of professional consideration of the 'view from the road' (Appleyard, Lynch and Meyer 1964); contributions to the national biodiversity (Way 1970); and sympathetic treatment to 'fit the road back into its setting' (Highways Agency (UK) 2009b).

The 'romance' of road journeys has been the subject of numerous literary and cinematic works. Road corridors may become symbols of progress and a way of life for local populations, and feelings of place attachment to road networks or routes may have formed over several generations. Associated and intertwined with these romantic attachments to the road corridor is a sense of cultural historical value attached to the view from the corridor to the surrounding landscape (Merriman 2007). In New Zealand, such values are used to enhance road use and associated tourism opportunities, and the idea of a heritage or scenic highway has been widely used to promote tourism in different regions (Cobb 2005).

The organisational predecessor to NZTA, Transit New Zealand, recognised that many of these types of values associated with roads are descriptive and not readily quantifiable (Harris 1994). Chivers et al (1992) developed a method that assigned scores to a number of intangible costs and benefits – principally a combination of environmental and social values that might be affected by roading construction and operation – and this approach now falls broadly under the concept of 'context sensitive design' (Burley et al 2009). The positive as well as adverse effects of roads, the view from, as well as views to the road, the surrounding landscape context, and the number of people affected, were all identified as new factors for consideration. The work recognised the need for expert assessment, including the development of techniques to assess visual impacts, but also identified need for consideration and/or values and opinions of local people.

Understanding how people respond to landscape is a complex area of study. Research on visual qualities of roadside corridors, including both public and stakeholder preferences and values, has followed one of two paradigms – user independent or user dependent. User independent studies by experts – typically landscape architects – seek to identify values believed to be embedded in the landscape. An example of a New Zealand-based expert study was 'On the Edge' (Moore et al 1991) which presented guidelines for visual management of forests alongside highways based upon established design principles.

User dependent studies use social survey methods to investigate human perceptions. There is no universally accepted methodology. Methods used in landscape perception studies range from ethnographic research using depth interviews, to quasi experimental methods using controlled stimuli and multivariate analysis. Examples of recent studies in relation to highways include the use of questionnaires to elicit perceptions of scenic beauty of roadside vegetation in Northern England (Akbar et al 2003); the use of photograph free sorting and interviews to understand the affects of changing agricultural patterns of land use on sightseeing tourists in Scandinavia (Fyhri et al 2009); and, the use of photographs of

different scenes in Southern Spain, analysed against the variables exhibited by each photograph, in order to elicit public preferences for the view from the road (Arriaza et al 2004).

In New Zealand one of the more widely used techniques used for assessment of landscape preferences has been the approach known as Q sort (Brown 1980; Fairweather and Swaffield 2000). This has been used as a means to elicit values, beliefs, and opinions of participants with respect to land use change and landscape preferences in a range of contexts, including landscape perceptions of tourists (Swaffield and Fairweather 2003). The Q sort technique can be applied to the investigation both of preferences and values of landscapes already in existence, and of responses to possible changes that could take place in the road corridor and surrounding landscape. Q sort was adopted in this study, and is described in more detail in Chapter 2.

1.4 Management of New Zealand Roadside Reserves

This section summarises regulatory provisions and management guidelines regarding landscape management of State Highway reserves in New Zealand where relevant, examples are provided that relate to the West Coast Case Study. A number of statutes guide the legal, social and environmental requirements associated with the New Zealand State Highway network. There are relevant provisions under the Resource Management Act 1991 (RMA), the Land Transport Management Act 2003 (LTMA) the Land Transport Management Amendment Act 2008, and the Local Government Act (LGA) 2002.

The RMA is focused upon sustainable management of natural and physical resources, and places focus upon procedures and actions to avoid, remedy or mitigate adverse environmental effects caused by land use activities, including transport infrastructure. Changes to the existing condition of the corridor through new construction or its extension require assessment under the provisions of the RMA. These are made operational through a range of instruments, the most relevant for highways being Regional Plans and District Plans.

The statutory basis for managing and funding land transport activities is provided by the LTMA, and amongst its purposes are the provisions of an integrated approach that takes into account the views of affected communities, and improvement of social and environmental responsibility in land transport funding, planning and management. The LMTA also defines the roles of regional transport committees and provides for the development of National Land Transport Strategy and regional land transport strategies.

The LGA empowers territorial local authorities to play a broad role in promoting the social, economic, environmental and cultural well being of their communities, taking a sustainable development approach. Public roads that are not part of the State Highway system are managed as local authority assets under the LGA. The Land

Transport Management Amendment Act 2008 took effect on 1 August 2008 giving Regional Transport Committees greater functions and responsibilities. The first Regional Land Transport Programme (RTLP) for the West Coast (prepared in accordance with this Act) highlighted a number of transport priorities, including: improvement of road safety; increased use of active modes (for example walking and cycling); ensuring the security and efficiency of transport corridors, and; support/enable increasing traffic due to the mining, dairy, and tourism industries (West Coast Regional Council 2009).

There are a range of other statutory instruments and strategies that also shape the way the relationship between the highway corridor and the wider landscape is managed. For example, each National Park Management Plan prepared under the National Parks Act includes policies addressing road construction, alignment and maintenance, vegetation and weed control, the rehabilitation of redundant road reserve, and public road use including pedestrian safety and park access. A Memorandum of Understanding (2005) between Transit New Zealand and the Department of Conservation (DOC) addresses issues related to the interface between the State Highway network (including passenger transport, cycling and walking) and any National Parks, Reserves and Conservation Areas managed by DOC. In the case of Arthurs Pass National Park, for example, much of the present road alignment is not legalised and there are no formalised boundaries between the Park and the State Highway. The road through the park, however, allows the park to be a scenic interlude for drivers and gives the public a high degree of accessibility (DOC 2007).

Local and regional government strategies prepared under the LGA, such as the Regional Pest Management Strategy for the West Coast (2005) are also important. This strategy recognises the potential for weed problems as a result of road construction and maintenance and sets out the road verge responsibilities of the managers of adjoining land, including Crown land. The NZTA is bound by the strategy to undertake the control of plant pests in rest areas, motorway reserves, weigh pit and stockpile areas, state highway reserves adjacent to land that is free of plant pests and state highway reserves adjacent to land where the landowner is undertaking plant pest management (West Coast Regional Council 2005).

Another example of a local government strategy prepared under the LGA that is applicable to the roadside reserve is the West Coast Visitor Waste Management Strategy (2006). This was prepared in order to minimise the effects of rubbish dumped along roadsides and in rest areas along the State Highway network of the West Coast, and sought to rationalise roadside stopping places: closing some, and providing signage and services (such as toilets, rubbish bins, water taps) at others (Tourism Resource Consultants 2006).

Environmental and landscape values are explicitly addressed in the current management framework for the New Zealand Highway system at several levels, including Strategic Priorities, Environmental Planning, and Guidelines for Highway Landscaping. The *Strategic Plan* (2004), for example, ‘proposes a programme of

works to improve the visual quality of state highways to reduce adverse social and environmental effects of state highway operations', while the *Environmental Plan* (New Zealand Transport Agency 2005) contains objectives to 'incorporate multi-purpose landscaping as an integral part of all new state highway construction projects' and 'to improve the visual quality of the existing state highway network' (New Zealand Transport Agency 2006, pgs 1-1 & 1-2).

Through the *Guidelines for Highway Landscaping*, the NZTA aims to foster best practice in landscape management by: maintaining and improving safety; promoting biodiversity; improving visual quality; managing stormwater run off; managing pests; improving local air quality; and, improving business practices. The promotion of biodiversity includes helping to halt the decline of New Zealand biodiversity and 'managing its state highway corridors in such as way that protects and enhances ecosystems and habitats, avoids adverse environmental effects and promotes biodiversity' (New Zealand Transport Agency 2006, p. 2-2). This can be achieved through the protection of existing pockets of biodiversity along the highway, and by planting native species that are: appropriate to the environmental context; positively affect ecosystem integrity; protect ecological vales in adjoining land; and by managing pest plants to reduce the bio-security risk to biodiversity.

The *Guidelines* recognise that 'improving visual quality' must take account of the complexity of the interaction between the highway and the wider visual landscape, and the strong feelings this can engender, through 'visual quality' approaches such as planting and earthworks within the state highway corridor to create 'viewing corridors that enable road users to appreciate the surrounding landscape' or 'help integrate the highway into the surrounding landscape'. Taken together, these are intended to minimise the highway's intrusion on the landscape and protect the natural character of an area as well as improving 'visual amenity values, particularly in rest areas, at entrances to towns and cities and along highways in scenic or tourist areas' (New Zealand Transport Agency 2006, p. 2-4).

Assessing these values is complex, however, and involves the identification of significant features, character and value of the existing landscape; identifying the concerns of interest groups and stakeholders; and, identifying how landscape contributes to the local sense of place and community. In natural areas, assessment includes the makeup and complexity of the surrounding vegetation, the integrity and sensitivity of that vegetation, the significance of ecological values that apply on a local, regional or national scale and the scenic qualities of the surroundings. While detailed guidelines outline the assessment process, the actual level of assessment required is based on a matrix describing the environmental setting and type of highway development. The environmental settings represent the wider landscape and there is recognition that it is important to consider how various landscapes might relate to one another, and not just view them in isolation.

The *Guidelines for Highway Landscaping* presents a comprehensive checklist list of landscape quality attributes, including ecological integrity, rarity (within a local or regional context), aesthetic values and heritage and community values. Attributes of

aesthetic values include: degree of modification of the surrounding environment; activity; iconic parts of the landscape; diversity or uniformity; remoteness or close connections to adjacent areas; physical features (such as the variety , patterns, colours, composition and scale of landform, vegetation and water bodies; and, visual attractiveness. Landscape heritage values may result from a combination of natural and cultural features and may provide strong continuing links to the past.

In addition to the identification of landscape qualities, the actual or potential effects of highway development are also considered, alongside possible mitigation strategies. Highway development may, for example, create a range of issues in regard to safety, biodiversity, visual quality, stormwater, pests and business practice (New Zealand Transport Agency 2006).

Landscape sensitivity to development is the combined outcome of landscape quality and visual absorption capability (VAC). VAC is the capacity for the landscape and environment to accommodate change, while retaining its inherent character and quality. Factors considered when determining VAC include vegetation abundance and diversity, visual diversity, slope and topography, exposure and visibility and soil stability/erosion potential.

Visual assessment of landscape involves the determination of the extent of the visual catchment (the main area from which any part of highway development can be viewed), as well as defining the viewing audience. The guidelines recognise that the 'views-in' audience (those with a view of the highway), have different needs and expectations to the 'views-out' audience and take more care with identifying the location, composition and relative numbers of people in the views-in audience (New Zealand Transport Agency 2006). Sensitivity to change appears to only be considered in the case of the 'views-in' audience.

1.5 Summary

The New Zealand state highway system is a critical component of the country's public infrastructure. The state highway and its corridor interact with the surrounding landscape in which it is located in a number of ways, and there is a complex mix of values associated with the road network and the wider landscape. Considerable effort is being made in policy and through management guidelines, both in New Zealand and internationally, to understand and incorporate these values in roading construction and maintenance.

It is difficult to isolate the values associated with each of the three components of the highway corridor: the road, the roadside reserve and the wider landscape. Research into understanding values therefore needs to address all these aspects, including any interactions between them. It is also difficult to measure and quantify many of the values involved, and there is no standardised approach that has been developed.

There are a multitude of key stakeholders involved with the construction and management of the road network, including NZTA, local government, other statutory bodies (e.g. DOC), community members who serve on road planning and road management committees, but there is little empirical research into the values of stakeholders in New Zealand.

Chapter 2
Method and Overview of Results

In this chapter the elements of the method used in this study of values associated with the roadside reserves are described in detail. An exploratory approach using a robust and interpretive technique appears to offer the most effective and efficient research strategy in order to achieve the objectives of this study. The approach adopted was Q method. This chapter describes the Q method and its application, the selection of photographs, the sampling and administration of the survey, and the statistical analysis, including the overall distribution of respondents across different factors.

2.1 Q Method

This section on the use of the Q Method with photographs draws on several earlier publications which describe the application of the method to similar landscape perception research, including understanding views of environmental management (Fairweather, Maslin, Swaffield & Simmons 2003) and perceptions of outstanding natural landscapes (Swaffield and Fairweather 2003). In this current application, the purpose of the research was to identify the environmental and landscape values recognised by stakeholders for the State Highway roadside reserve. Three photograph Q sorts were used as a means to elicit these values and focused in turn upon preference, recognition of identity, and perceptions of existing management regimes. The Q sort was complemented by two open ended questions about preferred roadside conditions and opportunities for roadside landscape improvement.

Q sorting is a technique that asks respondents to evaluate statements or images (in this case photographs) according to an instruction, such as 'Which of these do you prefer?', or 'Which of these illustrates the most appropriate type of management?' Respondents indicate their evaluations by placing the photographs in order within a frame that has been predetermined by the investigator. The Q sort frame is usually a standard normal distribution – with a number of columns that form a 'bell shape' (See Appendix 1). As there are only a few spaces at the extreme ends of the distribution and more in the middle, this process requires participants to clearly discriminate between different photographs – in this case, photographs showing different types and conditions of roadside reserves.

The distribution is analysed quantitatively by allocating scores to each column in the Q sort frame, in such a way that the photographs at the two ends of the distribution receive high positive or negative scores, while the photographs towards the middle receive a low score. The middle column of the distribution is given a zero score, representing neutral judgement. The distribution below shows how the Q sort was structured and the scores assigned to each column of photographs:

No. in column:	1	2	3	4	5	4	3	2	1
Score:	-4	-3	-2	-1	0	1	2	3	4

Each respondent makes their selections, which creates a distribution of photographs, each identified by their unique number. The distributions from each respondent are compared with all other responses using a multiple correlation technique called factor analysis. This identifies distinctive ways of sorting, known as factors.

The purpose of the factor analysis is to identify the distinctive ways that the photographs are sorted by the participants. The number of factors identified is chosen in order to maximise the levels of explanation and to ensure each factor has enough people loading upon it to be stable (see below). Typically, this produces between two and six factors. Each factor thus expresses the distinctive features of the sorting patterns of those people who are associated with it, and identifies a single order of items that is characteristic of the factor. Each 'factor' expresses a value perspective. The values themselves are then identified by analysis of the images selected, and through analysis of explanations offered by the respondents for their choices.

Samples in Q sort are theoretical samples, and typically smaller than those in public opinion surveys which use random samples. The Q method aims to describe the range of distinctive ways (factors) of assessing a landscape, as well as identifying where there is overlap or consensus between the factors. As a consequence, sampling is designed to tap into varied viewpoints, and the sample needs to be diverse rather than strictly random or totally representative. Fairweather (2002) has shown that the profiles of particular 'factors' stabilise when 10-12 respondents load upon them. The key consideration in deciding upon the number of respondents is therefore to try to ensure that the distinctive factors identified in the analysis all display a measure of stability. Not all respondents 'load' on a factor, hence for a 2, 3 or 4 factor solution a sample of between 25 and 60 respondents is desirable.

The 60 participants in this research were selected as professional key informants because they were in some way involved with the State Highway network on the West Coast. They included people who were professionally involved with road building and maintenance; people with an institutional or regulatory interest in road safety and management; and professional road users (a significant part of their work involved driving on the West Coast State Highway network). Tangata whenua were consulted through Te Runanga o Ngati Waewae and Te Runanga o Makaawhio, and runanga representatives participated in the survey. Care was taken to include as wide a range of participants with an interest in roadside management as possible.

The power of the Q method is that it provides a means to understand the underlying way that people think and feel about landscapes (in this case those of the roadside reserve) and identifies the distinctive roadside reserve characteristics and management conditions through which those feelings have been expressed. It is important not to confuse Q method with other studies that aim to make inferences about the views held by the population as a whole. For that type of research, the focus is on identifying statistical relationships between expressed preferences and parametric attributes of the landscape measured from photographs, based upon data from a random sample of responses. In Q method, quantitative and interpretive analysis is used to identify the qualitative characteristics of people's responses in relation to the overall landscape settings portrayed in the photographs. It does not address the question of how these responses may be distributed

among the population, nor does it statistically predict relationships between preference and particular attributes.

2.2 Photograph Selection

The research focused on the conditions found in the roadside reserve of a section of the West Coast State Highway network. In Q method an important aspect of the design is to provide respondents with a wide range of possibilities from which to choose. A matrix of possible roadside conditions was devised that included three background landscape types (conservation land, rural/farmland and infrastructure/urban) and a range of roadside vegetation types. The feasibility of these categories as the system for the photograph selection was tested empirically during a scoping day on the West Coast.

This scoping exercise highlighted issues with some of the roadside vegetation categories in respect of their representation in roadside reserves in the case study area (i.e. they were not commonly found, or were not able to be clearly differentiated according to vegetation type). The high incidence of non-vegetation features in the roadside reserve on the West Coast necessitated three additional non-vegetation categories in the matrix: infrastructure areas (mainly gravel stockpiles); heritage objects; and, recreation areas (picnic tables, formal car parking areas, and so on). Some photographs represented both of the latter two categories (e.g. picnic areas with a heritage object or vice versa).

Only those roadside reserves where there appeared to be some scope for environmental development were included in the photographs, and areas where very limited management options were available were omitted. Omissions included roadside reserves that were extremely narrow; roadside reserves where it was difficult to identify land that was under the management regime of NZTA; and roadside reserves from which railway tracks and water bodies were clearly visible (as these had been found distracting to previous Q sort environmental research). Roadsides within urban areas were also omitted, although some photographs were taken of settings when the State Highway system passed through small settlements. Care was taken to avoid roadsides in which power poles and signage were prominent.

The photographs were taken in the central West Coast area on State Highway 7 between Reefton and Greymouth, State Highway 6 between Punakaiki and Ross, and on State Highway 73 as far east as Jacksons. Wherever possible the photographs were taken from a drivers view at a 45 degree angle from the road, and included a small strip of road and the white line. In a number of cases, however, the road configuration made this difficult. Where possible the photographs were taken in neutral weather conditions (i.e. neither raining heavily, nor overly sunny) although this was not always feasible.

The final selections were made from an original set of over 300 photographs and were selected as representative of typical roadside reserves and conditions, not as specific and recognisable locations on the West Coast. For each type of condition in the matrix, a selection of suitable photographs were identified and were piloted on a number of informed research team members, and selections refined. The final matrix and the 25 photographs

used in the research are shown in Figure 1. While not all categories were represented, at least two examples of each of the roadside reserve types were included. The number for each photograph was randomly allocated, along with a description based on the photograph's position in the matrix.

Figure 1
Matrix of Photographs

	Conservation land	Rural/farmland	Infrastructure/urban
Pristine			
Re-vegetated native			
Mixed exotic & native			
Grass & re-vegetated native			
Long grass			
Weed			

Grass only			
Recreation			
Heritage			
Operational area			

2.3 Administering the Survey

Participants for the research were initially identified with the help of an NZTA coordinator, and the sample expanded by snowballing (i.e. participants were asked if they knew of other stakeholders who should be included in the research). An introductory email explaining the research was prepared and forwarded to NZTA to send out to those participants with whom they had direct contact. In the case of independent organisations, contact was made by both telephone and email to identify the most suitable person to involve in the research and their availability. All participants were then contacted by telephone, and the research and their participation were explained verbally. Once a time and place for the Q sort workshops had been arranged, a confirmation email was sent with a research information sheet attached (see Appendix 2). In the case of NZTA staff, and their Greymouth-based consultants and contractors, the workshops were arranged by NZTA on our behalf.

The Q sort method has typically been undertaken in previous studies on a one-to-one basis, with an interviewer noting the rationale for choices through discussion with the respondent. However Kerr and Swaffield (2007) developed a method to undertake individual Q sort surveys in a workshop setting. This creates efficiencies by allowing for multiple respondents to take part at one time, and also allows standardised briefing. Wherever possible the research in this project was undertaken using this workshop structure. Individual appointments were made with participants who were unable to attend workshops. All the Q sort exercises were undertaken during February 2010 with the majority on the West Coast in Greymouth, Hokitika or Westport. One workshop with NZTA staff and several individual Q

Sort exercises with Christchurch-based West Coast representatives were undertaken in Christchurch.

The practical requirements included sufficient table space for participants to lay out the photographs individually and without collusion with others, and in most cases suitable locations for workshops were provided by participants. In Greymouth, a room was hired for a day in order to run three workshop sessions with independent participants. In Westport, one individual Q sort was conducted in a café. Other individual participants either did the Q sort exercises in their offices, or at their homes.

At the beginning of each workshop session a brief verbal explanation of the research was given before participants began the Q sort exercises. Each participant was given a folder with a set of instructions, a copy of the research information sheet and a consent form to sign (Appendix 2), a set of numbered photographs (those shown in Figure 1), colour-coded exercise sheets for the three Q sorts and a page with two extra questions (see later). Instructions on how to do the Q sorting were also given verbally, and the researcher was on hand throughout to help participants when necessary. Participants were asked not to evaluate the quality or composition of the photographs themselves, but to evaluate them according to the type of roadside reserve they depicted.

For each Q sort, participants were asked to arrange the photographs in a predetermined distribution as described above, with the photographs they ranked highest on the right and lowest on the left. They then filled in the photograph numbers in the corresponding boxes on the exercise sheet. After filling in the photograph numbers, participants were asked to record their reasons for liking or disliking their top three and bottom three selections. Space was also provided for any general comments that participants wanted to make about their preferences. After each Q sort participants were asked to dismantle their photograph distribution and to start again according to the new criteria.

The first Q sort was very general and asked participants to examine the photographs and order them in terms of which roadside settings they preferred. Preference has been shown to be a key driver of perception (Kaplan and Kaplan 1989) and is widely used in landscape research as a way to identify respondents' values. Some participants sought a definition of the criteria upon which 'preference' was to be based. In these cases they were told that the way they determined preference was entirely up to them and that we were simply interested in identifying and understanding different viewpoints and evaluations of the roadside reserve.

The second and third Q sorts were more specific. The second asked participants to sort the photographs according to how well they expressed regional identity. This was aimed at better understanding the ways in which the highway reserve contributed to recognition of identity, and whether there were conditions which detracted from identity. The third Q sort asked respondents to evaluate the type of roadside management that was evident in the photographs.

The responses to the Regional Identity Q sort were relatively straightforward; although participants sometimes had to be reminded to make their selections based on the

photographs *they* thought showed the strongest West Coast identity, not on what they thought others' opinions might be. A few participants commented verbally that the photographs did not show any coastal scenes, which were, for them, important regional identifiers of the West Coast.

For the Roadside Management Q sort, participants were asked to consider the *type* of roadside management in place, not how well it was being done. Some participants who were not directly involved with road construction and management had difficulty with this distinction, but were reassured that their 'lay' opinions of roadside management were of interest to the research (and, in fact, the results actually showed very little difference between these participants' Q sorts and those of participants who were more directly involved with roading maintenance).

Some participants commented that there was much greater variation in their top selections than in their bottom selections across the three Q sorts. This is typical in Q sort studies of landscape, where there is usually high agreement on what constitutes the lower quality settings.

To finish the workshop participants were asked the following two questions:

- All the photographs you have been sorting today show different roadside settings and conditions on the West Coast. Which, if any, of these roadside settings and conditions would you like to see more of in the future?
- Do you have any other ideas about the way roadside management could be improved or enhanced?

The individual Q sorts took approximately 20 minutes to complete, with the first one usually taking slightly longer. Most participants completed the entire workshop within an hour.

2.4 Sample Size and Characteristics

The 60 individuals who completed the Q sorts had some professional or organisational involvement with the State Highway network in the West Coast region. No personal data was collected on participants and they are indentified throughout this report by subject number and, in some cases, according to which of four key informant groups they were drawn from:

1. NZTA staff (9 participants)
2. Consultants and Contractors (17 participants)
3. Iwi and Statutory, Institutional and Representative Bodies (22 participants)
4. Professional Road Users (12 participants).

As noted above, the NZTA participants were all based in Christchurch (from where the West Coast State Highways are managed), as were several participants from Group 3. Group 2 were primarily based on the West Coast and represented companies active in road construction and maintenance. Group 3 included runanga representatives, council and governmental staff, people on a variety of road management committees and

representatives of organisations such as the AA and Federated Farmers. The Professional Road User group included West Coast tourism and transport operators.

2.5 Analysing, Interpreting and Presenting the results

On completion of the workshops, all Q sorts were coded (by subject number and informant group) and then factor analysed. In the case of the Preference Q sort, a Centroid factor analysis was undertaken initially to identify those attributes of the roadside reserves that were universally liked and disliked across the entire sample. Following this, each of the three Q sorts was analysed separately using the PQ method, in which principal components factor analysis applied Varimax rotation to identify factors with two or more significant loadings on the unrotated factor matrix.

Each subject completed three Q sorts and the presentation of results reflects this. First the core data is presented for all three Q sorts, followed by three detailed results sections reporting on the factors extracted in each of the three Q sorts. For each section a similar structure is used: a table of key data, which lists the score received by each photograph for each factor in that Q sort, sorted from consensus to disagreement; a table showing the number from each research subject group who loaded on the factors in that Q sort; an interpretation of factors based on the consensus photographs, photographs liked, photographs disliked and distinguishing photographs, and a summary table of distinctive values.

For each individual Q sort, data are interpreted according to the distribution of the photographs with particular focus on the six top and six bottom-ranked photographs, and on the detailed comments about those photographs recorded by participants during the Q sort workshop. These are included as “quotes”. Subjects were only asked to record comments on their three top and three bottom-ranked photographs. However in most instances they provided comments for all six top and six bottom-ranked photographs in the Q sort. In some cases the top (and bottom) six photographs in the individual’s Q sort were not in the top (or bottom) three for the factor, and in these cases no comments were recorded. Any additional comments made about participants’ selections were also incorporated into the analysis. Factors with fewer people loading on them provided fewer comments.

Each factor has been characterised as a distinctive type of experience, and referred to as a person, as it is based on the Q sorts of the subjects who loaded significantly on it. In a sense, this personifies in one voice the common features of the factor. The names assigned to each factor are derived from the analysis.

2.6 Overall results of the Factor Analyses

This section presents a summary overview of the results of the three Q sorts, which are then presented in detail in the following chapters.

Factors were extracted for each of the three Q sorts, based on groups of people who sorted the photographs in a similar way. Each person is associated with a particular factors, or loads on the factor, to a varying degree. For Q sorts with 25 photographs the standard error of a factor loading is 1√*n* = 0.2, and at the 0.01 probability level a loading has to be at least 0.2 x 2.58 = 0.516. Only loadings that were 'pure', that is, for which there was a significant loading on only one factor, were used to define the factors. Table 1 reports the core results for each Q sort. NL indicates the number of subjects who did not load on any factors.

Table 1
Core Results for Each Q sort

Q Sort	No of Q sorts	Factor					Total loading		Correlation between factors		
		Single	1	2	3	NL		%	1 & 2	1 & 3	2 & 3
Preference	60	53	33	23		4	56	93	0.64		
Regional Identity	60	-	21	17	12	10	50	83	0.562	0.383	0.328
Roadside Management	60	-	18	13	18	11	49	82	0.208	0.641	0.521

Table 1 highlights four general features of the results. First, the factors reported express the views of between 82 percent (Roadside Management) and 93 percent (Preference) of the respondents. Relatively few people expressed views or values that did not align closely with at least a dozen other respondents. In the preference Q sort only four people did not load significantly on one or other factor. The factors reported therefore express the values of the large majority of respondents.

Second, all of the factors reported had at least 12 people loading upon them, which according to Fairweather (2002) demonstrates a high level of factor stability – that is, the profile of the factors described here will not change significantly however many more respondents are found to load on that factor.

Third, there was a high level of correlation between several of the factors – particularly between Preference Factors 1 & 2; Identity Factors 1 & 2, and Management Factors 1 & 3, and 2 & 3. In other words, there was much similarity between them. There was a low correlation between Roadside Management Factors 1 & 2, which will be discussed further in Chapter Five.

Finally, the single factor solution for the Preference Q sort had 53 loaders (88 percent) and provides a baseline analysis of shared values. This is the first set of results presented in the following chapter.

Chapter 3
Preference Results

3.1 Preference Q sort – Single Factor Solution

Two analyses were undertaken for the Preference Q sort – a centroid factor analysis which seeks the best fit single solution, and a two factor analysis (seeking the best fit two factor solution). The single factor is presented first. It represents the shared preferences of the whole sample of key informants. Altogether, 53 of the 60 participants (88 percent) loaded on the single factor identified by the centroid factor analysis. It accounted for 45 percent of the explained variance. The distribution of photographs for this factor is shown in Figure 2.

The top six preferred photographs were:

No.	*Photograph*	
25	Grass and re-vegetated native conservation land	+4
19	Mixed exotic and native infrastructure/urban	+3
1	Heritage conservation land	+3
22	Re-vegetated native conservation land	+2
24	Re-vegetated native rural/farmland	+2
10	Re-vegetated native infrastructure/urban	+2

Native vegetation was a prominent feature in all six of these photographs, with three featuring re-vegetated native (against all three landscape backdrops), and the other three featuring combinations of native and re-vegetated native with grassed areas. A selection of comments recorded about each photograph is presented below, beginning with the most preferred roadside reserve. The brackets after the Subject ID number (e.g. F1, F2) indicate which Factor that particular subject loads on in the two factor solution.

Photograph 25: Grass and re-vegetated native conservation land (+4)
This type of roadside setting was liked for the naturalness of the vegetation and the variation in types of planting. In particular, the layered effect of the vegetation was noted as giving the bush colour, texture and a sense of depth, while the grass foreground provides contrast and a spacious feeling, despite the closeness of the bush to the roadside.

> Subject 3 (F1): “Attractive natural environment – increasing height of vegetation from near to far.”
>
> Subject 27 (F2): “Transition between road pavement, road shoulder to mature bush, particularly the layered effect of the lower shrubs in front of the trees.”
>
> Subject 39 (F1): “Very natural and untouched, nice wide well-maintained shoulder, good for road drainage and for parking on if required.”
>
> Subject 46 (F2): “Native vegetation, grass verge is a bit too broad. Low vegetation at edge, with trees behind – sense of depth.”

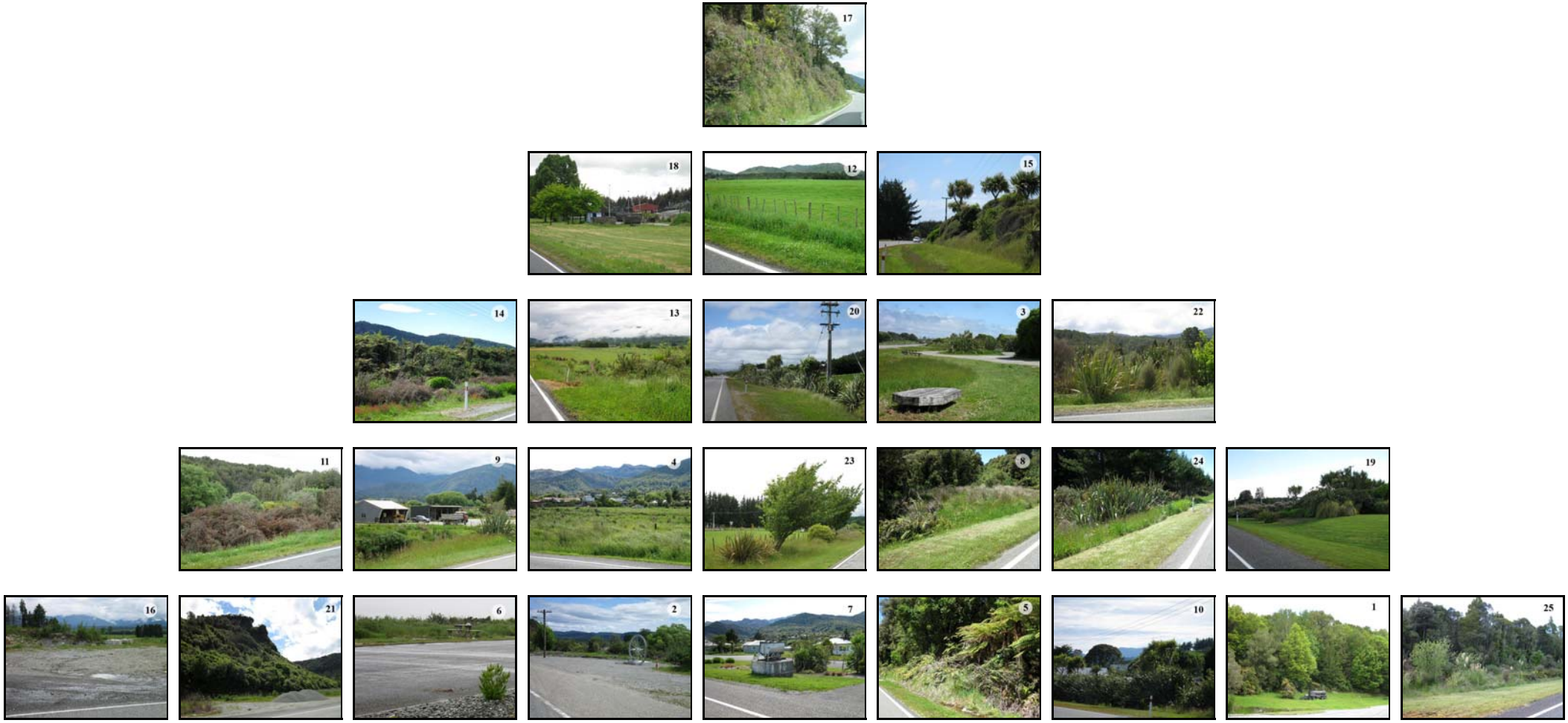
Photograph 19: Mixed exotic and native infrastructure/urban (+3)
Participants liked the variety of planting and the high level of maintenance evident in this roadside reserve. The wide shoulder was also appreciated.

> Subject 4 (F1): "Manufactured native setting appears well-maintained."
>
> Subject 7 (F2): "Used approaching a more urban area giving good definition of highway. Provides for good change of pavement yet still blending into surrounding area."
>
> Subject 14 (F2): "Very well manicured. Inviting for a stop if you wanted. Plenty of room to get off road safely. Attractive setting."
>
> Subject 36 (F1): "Again, neat, tidy, mown, has decent width between white line and side of road for cyclists – needed everywhere. Attractive setting."
>
> Subject 39 (F1): "Well-landscaped, well-maintained, plantings in keeping with area, nice wide shoulder for parking."
>
> Subject 53 (F1): "Very neat, clumped planting, variety of plantings, wide shoulder."
>
> Subject 57 (F2): "Well maintained grassed area, backdrop of natives, good drainage, swale well maintained."

Photograph 1: Heritage conservation land (+3)
The roadside reserve shown in photograph 1 was liked both for its multipurpose facilities, and because of the setting's combination of heritage and nature. It only featured in Factor 1's top six in the two factor solution.

> Subject 10 (F1): "Old steam engine set in front of natural bush – nice tidy setting, like the different shades of green ."
>
> Subject 17 (F1): "Nice little reserve with historic featured and presented with a car park and table. Nice forest backdrop."
>
> Subject 55 (F1): "Interesting heritage item to look at, neatly mowed, picnic table, clearly defined verge, great bush backdrop."

Figure 2
Array of photographs for Preference – Single Factor



Photograph 22: Re-vegetated native conservation land (+2)
This replanted area with flax and other natives was liked for its naturalness and for the way in which it still allowed for a view beyond the roadside reserve. It only featured in Factor 2's top six in the two factor solution.

> Subject 1 (F2): "Good view of local area, gives a great impression of surrounding area. Vegetation near(ish) to road and merges seamlessly into existing/native. Doesn't look too manufactured."
>
> Subject 26 (F2): "Generally all native flora, there are also views available into the distance."
>
> Subject 46 (F2): "Looks natural, shows native plants. Doesn't look like too broad a grass verge."

Photograph 24: Re-vegetated native rural/farmland (+2)
The neatness and attractiveness of the roadside reserve was noted and the transition from the road to the green environment beyond was also appealing. Once again, this roadside reserve only featured in Factor 2's top six in the two factor solution.

> Subject 6 (F2): "Wide and maintained grass verge, natural bush with expected variety but shoulder not as wide as in photograph 25, less diverse and natural vegetation."
>
> Subject 9 (F2): "Good transition from road to 'green' environment beyond. Although the canopy is plantation trees, the setting provides a nice environment. Planted flax in swale area is also attractive."

Photograph 10: Re-vegetated native infrastructure/urban (+2)
Participants liked the fact that the roadside planting in photograph 10 screened the houses from the roadside, while still allowing a view to the landscape beyond. In the two factor solution it was also ranked in Factor 1's top six.

> Subject 16 (F1): "I like that the roadside in this one seems to be more natural than some of the others. I also like that the flax blocks the houses, which would take away from the view."
>
> Subject 17 (F1): "Flax and cabbage trees used to good effect to hide backyards of houses."

The least preferred photographs were:

No.	***Photograph***	
16	Operational area rural/farmland	-4
11	Weed conservation land	-3
21	Operational area conservation land	-3
14	Mixed exotic and native conservation land	-2
9	Weed infrastructure/urban	-2
6	Recreation infrastructure/urban	-2

The roadside reserves in these six photographs all featured either weeds or operational areas. Three of the photographs – photographs 16, 21 and 9 – were disliked by both factors in the two factor solution. Photographs 11 and 14 were also disliked by Factor 1, and photograph 6 was disliked by Factor 2. A selection of comments recorded about each photograph is presented below, beginning with the least preferred roadside reserve. The brackets after the Subject ID number (e.g. F1, F2) indicate which Factor that particular subject loads on in the two factor solution.

Photograph 16: Operational area rural/farmland (-4)
This operational area, with a rural/farmland backdrop, was disliked because of its untidy industrial appearance resulting from its use as a site for stockpiling road maintenance materials and other waste materials. Operational areas such as these detract from scenic appeal of the wider landscape view.

> Subject 9 (F2): "Lay-by area detracts from mountains/hills in the background. The lay-by has been used as a dumping ground, with no visual screening from the roadside. This could get worse as others now see it as a dumping ground."

> Subject 23 (F1): "Ugly. Disturbed area completely detracts for the more scenic surroundings. Stark contrast between foreground of photo and background."

Photograph 11: Weed conservation land (-3)
Comments related to the dead weeds, perceived lack of care and difficulties associated with pulling off the road. In the two factor solution, this photograph only ranked in Factor 1's bottom six.

> Subject 10 (F1): "Dead vegetation – even though gorse – very unsightly for visitors."

> Subject 13 (F1): "Roadside is unkempt with overgrown exotic weeds dominant (gorse, willow, broom). No pullover area."

> Subject 24 (F1): "Roadside poorly maintained detracts from native bush background."

> Subject 55 (F1): "Dead gorse and bracken strip and hard to see the width of verge available to safely pull over due to differing grass lengths."

Photograph 21: Operational area conservation land (-3)
This photograph was disliked because it showed a roadside reserve that was poorly maintained and detracted from the landscape beyond. The gravel expanse of the roadside reserve was not appealing.

> Subject 4 (F1): "Untidy stockpile area, no screening, stark against background."

> Subject 7 (F2): "Poorly maintained and managed area adjacent to road – while stockpile sites are a necessary evil, need to be screened and better managed."

> Subject 17 (F1): "The grit piles seem to pop up in all sorts of places. Sometimes it seems like a permanent feature."
>
> Subject 47 (F2): "Gravel area with chip stockpiles creating blot on otherwise attractive background. Weeds and long grass."

Photograph 14: Mixed exotic and native conservation land (-2)
Bare gravel areas, sprayed weeds, lack of care all contrasted unfavourably with the background landscape. In the two factor solution, this roadside reserve was only ranked in the bottom six by Factor 1.

> Subject 18 (F1): "Rough, unkept looking, doesn't look to be much pull over room."
>
> Subject 24 (F1): "Roadside poorly maintained detracts from native bush background."
>
> Subject 53 (F1): "Weed sprayed gorse out of context and looks very untidy, verges have not been mowed to sufficient width off the highway, bare gravel between the seal and green is unappealing."

Photograph 9: Weed infrastructure/urban (-2)
Industrial activity and highly visible weeds conflicted with scenic backdrop.

> Subject 13 (F1): "View is of an industrial complex, roadside is unkempt with exotic weeds (gorse, foxglove, blackberry and willow) dominating the scene."
>
> Subject 26 (F2): "A not too untidy industrial yard, but it does not offer a very good front to the scenery in the distance."

Photograph 6: Recreation infrastructure/urban (-2)
These comments emphasised the roadside reserve's unnatural appearance and poor maintenance. In the two factor solution this photograph only featured in Factor 2's bottom six.

> Subject 1 (F2): "Looks like it could be a supermarket car park! Holding water not attractive (or draws attention) but no, the whole area lacks a sense of being 'natural'."
>
> Subject 47 (F2): "Unattractive roadside rest area. Poorly maintained, weeds, long grass, rubbish."

The single factor analysis provides the best indication of common or shared, preferences among the 60 stakeholders. The analysis indicates that respondents have a liking for roadsides that are natural looking but well maintained, with a variety of native vegetation that provides a sense of depth and 'layered' transitions to the landscape beyond. They disliked settings that were dominated by weeds or dead sprayed vegetation, and expanses of gravel and grit piles that contrasted with, and detracted from, the wider landscape. Respondents were largely neutral on the presence of long grass, provided it did not look

unkempt, or larger expanses of grass, and upon the presence or otherwise of exotic species. Heritage features were not particularly significant in their evaluations.

Of the seven participants who did not load on the single factor, three were also non-loaders in the principal components analysis (that is, they did not have similarity with any of the factors identified for preference), two loaded on Factor 1 (see below), and two loaded on Factor 2 (one a negative loading). In other words, there was no obvious single reason why these seven people did not load on the single factor – their views just diverged in different ways.

3.2 *Preference Q Sort - Two Factor Solution*

There were a total of 56 participants (93 percent) whose Q sorts were used to define a two factor solution, the others either not having a significant loading or having multiple loadings. These accounted for 55 percent of the variance of the rotated correlation matrix. Thirty three participants loaded on Factor 1; 23 participants loaded on Factor 2. One respondent who loaded on Factor 2 did so negatively, that is their preferences were the reverse of the others who loaded on that factor.

Table 2 shows the photographs listed from consensus to disagreement with the scores assigned to the photographs in each factor. The difference between the two scores for the first nine (shown above the bolded line) are not statistically significant at the 0.05 level, and they are all consensus photographs. The table also shows distinguishing photographs for each factor, whose scores are statistically significant ($p<0.01$), and the bolding shows for which factor the score is significantly different. These are located below the bolded line.

Table 2
List of Photographs, with Preference Q sort Scores, Sorted from Consensus to Disagreement

No.	*Photograph*	*Factor*	
		1	*2*
10#	Re-vegetated native infrastructure/urban	2	1
9#	Weed infrastructure/urban	-2	-2
12	Grass only rural/farmland	0	0
25#	Grass and re-vegetated native conservation land	3	4
24#	Re-vegetated native rural/farmland	1	2
15	Grass and re-vegetated native rural/farmland	2	1
20	Grass and re-vegetated native infrastructure/urban	0	0
23	Mixed exotic and native rural/farmland	0	0
16#	Operational area rural/farmland	-4	-4
21	Operational area conservation land	**-2**	-3
13	Weed rural/farmland	**-1**	-1
17	Steep bank	**-1**	1
18	Grass only infrastructure/urban	**0**	-1
6	Recreation infrastructure/urban	**-1**	-2
19	Mixed exotic and native infrastructure/urban	**3**	2

8	Long grass conservation land	**1**	2
4	Long grass infrastructure/urban	**-2**	0
3	Recreation rural/farmland	**2**	-1
22	Re-vegetated native conservation land	**1**	3
1	Heritage conservation land	**4**	1
5	Pristine conservation land	**-1**	3
11	Weed conservation land	**-3**	-1
7	Heritage infrastructure/urban	**1**	-2
2	Heritage rural/farmland	**0**	-3
14	Mixed exotic and native conservation land	**-3**	0

Note: While Q sort scores (-4 to +4) are presented in this table, the basis of the distinction between factors for the distinguishing photographs is the Z score taken to two decimal places. Thus two similar Q sort scores may in fact be statistically different.

The distribution of respondents in each preference factor is shown in Table 3.

Table 3
Preference Factors by Research Subject Group

Group	Factor 1	Factor 2	Total
NZTA staff	3	5	8*/9
Contractors & consultants	11	6	17
Statutory, representational or institutional body	11	9**	20*/22
Professional user	8	3	11*/12
Total	**33**	**23**	**56/60**

* Some subjects did not load on either factor
** One subject recorded negative loading

3.2.1 Preference Q Sort: Consensus photographs

When two distinct factors were extracted by the Preference Q sort there were nine photographs which demonstrated consensus i.e. they received similar scores which were not significantly different, statistically, for either factor. This is a relatively high number of consensus photographs for this type of research. The consensus photos marked # in Table 2 are those photographs which were in the top or bottom six for the single factor solution that has been described in section 3.1.

In addition to the consensus photographs, a number of other photographs were also common to either, or both of the two preference factors' top and bottom ranked photographs.

The next two sections describe the two preference factors in detail.

3.2.2 Preference Q Sort: Factor 1 'Cultured Nature'

Factor 1, which we have called 'Cultured Nature', accounts for 29 percent of the total variance among the rotated factors and comprises 33 subjects, representing all four research subject groups (see Table 3). The distribution of photographs for this factor is shown in Figure 3.

The six top-ranked photographs and their respective scores were:

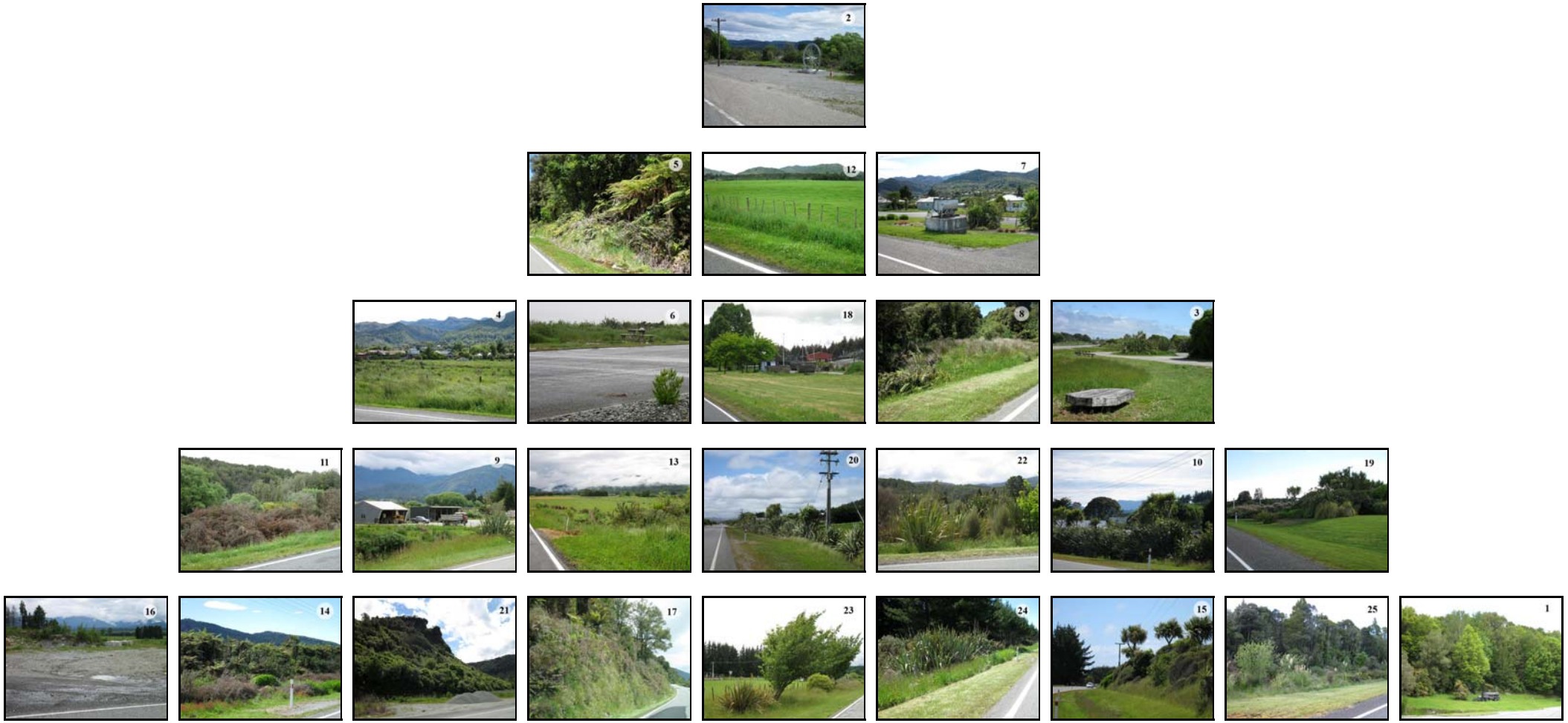
No.	*Photograph*	
1	Heritage conservation land	+4
19	Mixed exotic and native infrastructure/urban	+3
25	Grass and re-vegetated native conservation land *(consensus photograph)*	+3
3	Recreation rural/farmland	+2
15	Grass and re-vegetated native rural/farmland *(consensus photograph)*	+2
10	Re-vegetated native infrastructure/urban *(consensus photograph)*	+2

These six photographs all show native vegetation, in very manicured roadside settings. The roadside reserves are all neatly mowed, with wide grassed areas that provide ample roadside parking. While the mature bush and vegetation is high, it is far enough away from the road to give an impression of openness. In four of the photographs there is some sign of human habitation or influence, although this is screened from the road. Three of the top six were consensus photographs and two of these (photographs 25 and 10), along with two others (photographs 19 and 1) have already been discussed in section 3.1. The following analysis presents a selection of comments made by those people who loaded significantly on Factor 1 for the other two photographs. The comments begin with photographs that were most liked.

Photograph 3: Recreation rural/farmland (+2)
Photograph 3 showed a roadside area with easy access for those wishing to stop or to pull off the road. It was recognised as an attractive stopping place, with good built and natural facilities.

> Subject 13: "Has easy access off the highway. Has space to park, tables to picnic, trees for shelter or shade. Road surface is relatively well maintained but NOT a large, sealed expanse."
>
> Subject 28: "Rest area to cater for travelling motorists. Area relatively well maintained with picnic facility available. Well placed safety off the highway and open for visibility in all directions to and from the highway. Good balance of plant growth to give some wind protection. Easy access in and around area."
>
> Subject 36: "A rest area that is well laid out, large, unobtrusive as well as set out as a good stopping point with shelter, tables etc. Mown regularly (hopefully), would be attractive to stop at."
>
> Subject 54: "Attractive, inviting place to pull off the road – far enough to reduce traffic noise."

Figure 3
Array of photographs for Preference Factor 1 'Cultured Nature'



Photograph 15: Grass and re-vegetated native rural/farmland (+2)
The focus was on the neatness and width of the grass verge, and on the high degree of visibility this offered drivers.

> Subject 25: "Tidy verges, native plants, good visibility."

> Subject 52: "Vegetation tidy and good visibility on corner."

The six bottom-ranked photographs and their respective scores were:

No.	***Photograph***	
16	Operational area rural/farmland *(consensus photograph)*	-4
11	Weed conservation land	-3
14	Mixed exotic and native conservation land	-3
21	Operational area conservation land	-2
4	Long grass infrastructure/urban	-2
9	Weed infrastructure/urban *(consensus photograph)*	-2

Three of these six photographs show highly visible weeds or areas that have been sprayed for weeds and one shows an unmown grass verge. Two of the photographs show roadside stockpile areas and three have conservation land as backdrop. Five of these six photographs featured in the bottom six of the single factor solution and were discussed in section 3.1. A selection of comments made by those people who loaded significantly on Factor 1 for the other photograph is provided here.

Photograph 4: Long grass infrastructure/urban (-2)
While overall, Factor 1 preferred areas of human habitation or activity to be screened from view, when they were visible they expressed a preference for these areas to be looked after and neat.

> Subject 10: "Untended or maintained paddocks – no sense of pride – do the owners care?"

> Subject 23: "Shows a relatively rundown town. Farmland at front of photo shows little maintenance."

The main themes from the comments recorded for Factor 1 'Cultured Nature' are shown in Table 4:

Table 4
Preference Factor 1 'Cultured Nature' Summary

Preference Factor 1 'Cultured Nature' Summary
Positive values o Native vegetation o Neatness, clean, tidy, well-landscaped and maintained o Wide grassy areas at roadside o Juxtaposition of heritage and vegetation o Functional features – place to stop, amenities o Easy access and road visibility o Vegetation serves a role in reducing traffic noise o Human interaction not intrusive
Negative values o Weeds, sprayed dead vegetation o Wild uncut grass o Lack of obvious safe pull off areas o Gravel piles and messy industrial areas o Ugly roadside reserve areas detract from scenic backdrop o Concerns over the view presented for visitors o Uncared for or rundown-looking human habitation

Table 4 shows that Factor 1 'Cultured Nature' likes natural looking indigenous roadside vegetation. They like different types of plantings and colours and textures and prefer the roadside to be neat, tidy and well-maintained. This preference extends to wide grass areas at the roadside that can be used for safe parking and traffic stops. They also like the juxtaposition of nature with human habitation, as long as this is not too obtrusive, and appreciate functional features provided by roadside reserves – rest areas, good visibility, easy access and parking for drivers wishing to pull off the road and both natural and built amenities.

They dislike roadsides that show weeds and grass that is not well mown. The latter can, in particular contribute to a lack of available, or unclear pull off areas and impact on highway safety. Factor 1 is concerned about the impression that messy, uncared for roadside reserves present to visitors, particularly when there is an attractive backdrop or landscape beyond. They are also concerned about the visibility of rundown human habitation features beyond the roadside reserve, and express a desire to have such areas screened from view.

We have labelled Factor 1 'Cultured Nature' because of the strong similarity the values have with previous studies in which this perspective has been identified (Newton, Fairweather and Swaffield 2003).

3.2.3 Preference Q Sort: Factor 2 'Wild Nature'

Factor 2, which we have called 'Wild Nature' accounts for 26 percent of the total variance among the rotated factors and comprises 23 subjects, representing all four stakeholder groups (see Table 3). The distribution of photographs for Factor 2 is shown in Figure 4.

The six top-ranked photographs and their respective scores were:

No.	***Photograph***	
25	Grass and re-vegetated native conservation land *(consensus photograph)*	+4
22	Re-vegetated native conservation land	+3
5	Pristine conservation land	+3
19	Mixed exotic and native infrastructure/urban	+2
8	Long grass conservation land	+2
24	Re-vegetated native rural/farmland *(consensus photograph)*	+2

These six photographs all show clear mown grass strips at the road edge with native vegetation beyond. In all six photographs the vegetation is mixed and in five of them presents a layered effect (of different heights and textures). Only one photograph shows any evidence of human habitation. It is notable that four of the top six photographs have a conservation land backdrop. Although the vegetation was more obviously managed in photograph 19 – one of the two photographs liked by Factor 2 which did not have a conservation land backdrop – than in their other preferred settings, this was acceptable in an urban setting. Two of the top six were consensus photographs and these, along with two others (photographs 22 and 19), featured in the single factor solution and have already been discussed above (section 3.1). The following analysis presents a selection of comments made by those people who loaded significantly on Factor 2 for the other two photographs. The comments begin with photographs that were most liked.

Photograph 5: Pristine conservation land (+3)
Photograph 5 was liked for the naturalness of the replanted native vegetation and the way it blended with the mature vegetation beyond. The closeness of the vegetation to the road was also liked.

> Subject 25: "Tidy verges, native forest, no pest plants/weeds."
>
> Subject 27: "Regrowth along the highway edge blends in with mature bush."
>
> Subject 30: "As for # 22 (Bush and mountains, nice flax near to road edge), native bush close to road."

Figure 4
Array of photographs for Preference Factor 2 'Wild Nature'

Photograph 8: Long grass conservation land (+2)
Photograph 8 was liked by Factor 2 because it was very natural looking.

> Subject 2: "Good transition between the road and the natural environment."
>
> Subject 9: "Appears to me to be the best balance of physical environment and the natural i.e. road, grassed swather and then most natural setting in the background. If I was driving along the road, then the 'naturalness' beyond the road would be attractiveness. I like the transition from road, to wetland, to forest. Grass is mown well in foreground."

The six bottom-ranked photographs and their respective scores were:

No.	***Photograph***	
16	Operational area rural/farmland *(consensus photograph)*	-4
21	Operational area conservation land	-3
2	Heritage rural/farmland	-3
6	Recreation infrastructure/urban	-2
9	Weed infrastructure/urban *(consensus photograph)*	-2
7	Heritage infrastructure/urban	-2

All of these six photographs show some evidence of human habitation: two are operational areas with visible gravel piles; two are heritage sites (one with houses visible in the background); one is a roadside rest area (with visible rubbish); and, one is a working farm/contractors yard situated close to the roadside. Two of these six photographs were consensus photographs and these along with two others (photographs 21 and 6), featured in the single factor solution (section 3.1). A selection of comments made by those people who loaded significantly on Factor 2 for the other two photographs are listed below.

Photograph 2: Heritage rural/farmland (-3)
In photograph 2 the heritage features were badly presented and not inviting to passing motorists.

> Subject 9: "Rough looking lay-by, with no apparent interpretation board/information sign. As a driver there is no incentive to stop. Landscaping could make this area more attractive. Power pole in the way."
>
> Subject 51: "Looks half hearted – plenty of effort to put up this structure, but car park area untidy."
>
> Subject 57: "Area looks unfinished, rough pull over area. Wheel with plaque, while representing heritage, has too modern a look about it by method of construction."

Photograph 7: Heritage infrastructure/urban (-2)
The heritage object shown in photograph 7 was also seen to be out of character with surrounding environment and, because of its location, was perceived by some to be a roadside hazard.

> Subject 6: "Structure (coal wagon) is out of character with surrounding environment – no interpretation value, and is not well maintained."
>
> Subject 7: "Roadside hazard and not appropriate setting. Would be better placed within a rest area of specific site."

The main themes from the comments recorded for Factor 2 'Wild Nature' are listed in Table 5:

Table 5
Preference Factor 2 'Wild Nature' Summary

Preference Factor 2 'Wild Nature' Summary
Positive values o Mixture of native vegetation o Plants of different height, texture and colour which give layered effect o Layers give good transition from road to verge and then to landscape beyond o Tidy verges, no evidence of weeds/pest plants o Narrower grass verges with native bush close to road o Low level bush next to roadside o No litter visible o Not too manicured looking
Negative o Untidy, messy looking industrial areas o Weeds, gorse o Visible rubbish o Potential for more dumping o Gravel piles (although would accept with screening) o Hard surfaces – e.g. unfinished heritage areas, poorly maintained roadside areas, rest areas looking like supermarket car park o Heritage features 'out of place' o No safe roadside areas to pull over o Poorly managed areas o Man-made materials detract from natural landscapes

'Wild Nature' prefers more natural-looking, less manicured native vegetation. They prefer the bush to be closer to the carriageway with narrower grass verges, but with layered

planting so as not to 'crowd' road users. Access to the view beyond the roadside reserve is important, along with a natural transition from the roadway into the landscape beyond. While they dislike manicured settings, they still prefer tidy, well-maintained roadsides with no visible weeds, plants pests or litter. Factor 2 is more accepting (than Factor 1) of the need for gravel piles and operational areas, but would like to see them screened from view. They are also concerned about the impact of poorly maintained operational areas on the roadway and the landscape beyond in respect of weed and gravel spread. They see better management as a solution, and also express a desire to see more comprehensive management in respect of presenting attractive, finished heritage areas. They have some safety concerns with regard to hard objects close to road and poorly maintained roadside reserves that do not allow for vehicles to pull off the road.

As with Factor 1 'Cultured Nature', a most notable feature of the factor is its congruence with other previous factors identified in a range of New Zealand studies, and we have therefore labelled the factor as 'Wild Nature'.

3.2.4 Comparison of Single Factor and Two Factor Solutions for the Preference Q Sort

There is a lot of similarity between the top and bottom ranked photographs of the single overall preference factor, and those in the 'Cultured Nature' and 'Wild Nature' preference factors.

The top and bottom photos of the single factor solution include all but one (photograph 15) of the preference consensus photos from the two factor solution that had positive or negative scores (Table 6, in bold). In the single factor solution, photograph 15 had a +1 score and the remaining consensus photos were all neutral. This suggests that the single factor solution described previously expresses the key active features of preference upon which there was significant agreement across the two factor solution.

Table 6
Comparison of Preference Single and Two Factor Solutions

Scores	Single Factor Photographs	Two Factor	
		Cultured Nature	Wild Nature
+4	**25**	1	**25**
+3	**19**	**19**	22
+3	1	**25**	5
+2	22	3	**19**
+2	24	15	8
+2	10	10	24
-2	6	**9**	7
-2	**9**	4	**9**
-2	14	**21**	6
-3	**21**	14	2
-3	11	11	**21**
-4	**16**	**16**	**16**

Chapter 4
Regional Identity Results

4.1 Overview

In the Regional Identity Q sort, a total of 50 participants' sorts (83 percent) were used to define three factors. These accounted for 55 percent of the variance of the rotated correlation matrix. Altogether, 21 participants loaded on Factor 1, 17 on Factor 2 and 12 on Factor 3. One respondent who loaded on Factor 3 did so negatively, that is their preferences were the reverse of the others who loaded on that factor. While similar photographs featured in the three factors top and bottom-six rankings, only one photograph demonstrated statistical consensus across the three factors. The similarity between the three factors is confirmed by their correlation coefficients which show that Factors 1 and 2 are the most similar (0.562), followed by Factors 1 and 3 (0.383). Factors 2 and 3 demonstrate the most difference (0.328) between each other.

Table 7 shows the photographs listed from consensus to disagreement. The top photograph (above the bolded line) is the consensus photograph.

Table 7
List of Photographs, with Regional Identity Q sort Scores, Sorted from Consensus to Disagreement

No.	***Photograph***	***Factor***		
		1	***2***	***3***
7	Heritage infrastructure/urban	3	4	4
4	Long grass infrastructure/urban	0	1	1
20	Grass and re-vegetated native infrastructure/urban	-1	-1	-2
17	Steep bank	1	-1	0
5	Pristine conservation land	1	2	1
8	Long grass conservation land	1	0	-1
6	Recreation infrastructure/urban	-3	**-4**	-2
22	Re-vegetated native conservation land	2	**3**	1
24	Re-vegetated native rural/farmland	0	0	-1
21	Operational area conservation land	-2	-1	**0**
13	Weed rural/farmland	**-2**	0	1
23	Mixed exotic and native rural/farmland	**-1**	-3	-3
10	Re-vegetated native infrastructure/urban	**0**	**1**	**-1**
1	Heritage conservation land	**4**	2	3
11	Weed conservation land	**-3**	0	0
15	Grass and re-vegetated native rural/farmland	**0**	**1**	**-2**
12	Grass only rural/farmland	**-1**	**0**	**-3**
9	Weed infrastructure/urban	**-1**	1	2
3	Recreation rural/farmland	**1**	**-2**	**-1**
25	Grass and re-vegetated native conservation land	3	3	**0**
14	Mixed exotic and native conservation land	**-2**	**2**	**0**
19	Mixed exotic and native infrastructure/urban	**0**	**-1**	**-4**

2	Heritage rural/farmland	**2**	**-2**	**2**
18	Grass only infrastructure/urban	**2**	**-2**	**3**
16	Operational area rural/farmland	**-4**	**-3**	**2**

Note: While Q sort scores (-4 to +4) are presented in this table, the basis of the distinction between factors for the distinguishing photographs is the Z score taken to two decimal places. Thus two similar Q sort scores may in fact be statistically different.

The remaining photographs (which appear in the list after the bolded line) are photographs with a different score in different factors. In other words they are evaluated differently by the different factors. Importantly, these photograph become statistically distinct from each other on the basis of their Z scores. Photographs appearing at the bottom of the list have the highest degree of difference in Z scores between the factors.

The table also shows in bold photographs whose scores are statistically significant at the 0.01 level. In some cases, the table shows that the photograph received a distinct score for all three factors. That is, it evoked strong and different responses from all these factors.

The distribution of subjects in each regional identity factor is shown in Table 8.

Table 8
Regional Identity Factors by Research Subject Group

Group	**Factor 1**	**Factor 2**	**Factor 3**	**Total**
NZTA staff	1	4	4	9/9
Contractors & consultants	8	4	2	14*/17
Statutory, representational or institutional body	7	6	4**	17*/22
Professional user	5	3	2	10*/12
Total	**21**	**17**	**12**	**50/60**

*Some subjects did not load on any factors
** One subject recorded negative loading

4.2 Regional Identity: Factor 1 'Proud Community'

Factor 1, which we have called 'Proud Community' accounts for 22 percent of the total variance among the rotated factors, and comprises 21 subjects, representing all four stakeholder groups (see Table 8). The distribution of photographs for this factor is shown in Figure 5.

Figure 5
Array of Photographs for Regional Identity Factor 1 'Proud Community'

The six top-ranked photographs and their respective scores were:

No.	*Photograph*	
1	Heritage conservation land	+4
25	Grass and re-vegetated native conservation land	+3
7	Heritage infrastructure/urban *(consensus photograph)*	+3
18	Grass only infrastructure/urban	+2
2	Heritage rural/farmland	+2
22	Re-vegetated native conservation land	+2

These six photographs show a mixture (sometimes in the same photograph) of natural vegetation, heritage and current habitation and industry. Three of the photographs show heritage objects, three clearly show native bush while two have views of current habitation. Many subjects recognised and were familiar with the locations shown in the photographs. There was one consensus photograph (photograph 7) in Factor 1's top six and photograph 1 was also ranked in the top six of the both of the other regional identity factors. Factor 1's other four top six photographs were also ranked in the top six of at least one of the other factors. The following analysis presents a selection of comments made by those people who loaded significantly on Factor 1. The comments begin with the photographs which showed the strongest expressions of West Coast regional identity.

Photograph 1: Heritage conservation land (+4)
Photograph 1 was ranked highly in respect of West Coast regional identity for its depiction of both human and natural elements. From the human perspective it shows commitment to work and to human endeavour and, in particular, the ways in which people have overcome the harsh physical environment of the coast. Links between past and present day life on the coast are also in evidence.

> Subject 16: "Another good representation of the coast. A salute to our working history yet over shadowed by the impressive forest behind it."
>
> Subject 23: "Photo shows how early settlers came to the region and worked in a harsh untamed environment to harvest resources from the earth. Shows their innovation and commitment to this work."
>
> Subject 36: "Links both natural and economic history of West Coast together. Beautiful bush setting showcases what West Coast looks like and the historical element of the train to illustrate what grew and is still important to the West Coast today."

Photograph 25: Grass and re-vegetated native conservation land (+3)
The strong identification of the West Coast with lush bush and rainforest is evident in photograph 25.

> Subject 13: "Again, the dominance of the native bush setting, set back from the road, with obvious rainforest as the major feature."
>
> Subject 33: "West Coast is rainforest."

> Subject 38: "West Coast at its best – green bushes as everyone knows it as."

Photograph 7: Heritage infrastructure/urban (+3) (consensus photograph)
Although photograph 7 shows the human face of the West Coast, the natural features are ever-present. There is a strong sense of pride associated with the West Coast's human history.

> Subject 16: "This really sums up the West Coast for me – a small town framed by bush clad mountains. Proud of its history and showing it to everyone."

> Subject 33: "Communities set within the bush epitomises the West Coast."

> Subject 50: "Small rural towns scattered along highway – each with a 'story' to tell."

Photograph 18: Grass only infrastructure/urban (+2)
Photograph 18 also shows links between the past and present human activity of the West Coast.

> Subject 30: "History/industrial now and past."

> Subject 52: "Roadside buildings and industrial areas often relate to the extractive industries which is the major industry on the West Coast."

> Subject 57: "Heritage and working industrial site – region is recognised by its industrial past and present, this area represents coal and gold mining."

Photograph 2: Heritage rural/farmland (+2)
Photograph 2 is another photograph liked for its depiction of human history – which is considered to be unique – on the West Coast.

> Subject 44: "Monument at Brunner shows the strong ties with coal mining."

> Subject 51: "Piece of local history tells a story for people to learn about coast and its unique history."

Photograph 22: Re-vegetated native conservation land (+2)
The natural environment shown in Photograph 22 is strongly representative of the West Coast, especially when it is found close to the road and is relatively unmodified.

> Subject 16: "This represents the West Coast to me, mountains, forests, the flax looking like it wants to reclaim the road."

> Subject 23: "Shows an unmodified, natural West Coast landscape."

The six bottom-ranked photographs and their respective scores were:

No.	*Photograph*	
16	Operational area rural/farmland	-4
6	Recreation infrastructure/urban	-3
11	Weed conservation land	-3
21	Operational area conservation land	-2
13	Weed rural/farmland	-2
14	Mixed exotic and native conservation land	-2

These six photographs showed less well cared for areas, with two having either gravelled surfaces or large areas of sealed ground, three with predominant roadside weeds and one with a gravel stockpile marring an otherwise attractive bush view. None of these six photographs were consensus photographs, although photograph 6 also ranked in the bottom six of the other two regional identity factors and photograph 16 also ranked in Factor 2's bottom six photographs.

Photograph 16: Operational area rural/farmland (-4)
In this instance, photograph 16 is ranked badly because of the lack of green vegetation and environmental care shown at the roadside. This is seen as not fitting with the identity of the West Coast.

> Subject 16: "Pine trees, gravel, farmland, and no care for the environment – not what I think of as the West Coast."

> Subject 30: "No bush and looks messy. Coast has a clean and green image."

> Subject 36: "In the forefront of the picture [it] shows nothing of the West Coast – mountains in the back [do], but they are brought down by the gravelled area."

Photograph 6: Recreation infrastructure/urban (-3)
The bland vista presented in photograph 6 was not thought to be indicative of the West Coast.

> Subject 36: "There is nothing in this photo to show any sort of regional identity – plantings, old relics etc."

> Subject 43: "Could be anywhere! Nothing scenic or West Coast about the image. Bland and somewhat untidy looking in the background. Wet day does not help."

Photograph 11: Weed conservation land (-3)
Poor spraying and generic scrub, as shown in photograph 11, do not portray a good image of the West Coast.

> Subject 44: "Terrible image for the West Coast having vegetation dying because of spraying gorse etc."

> Subject 51: "Regenerated 'scrub' could be anywhere."

Photograph 21: Operational area conservation land (-2)
Gravel stockpiles detract from the landscape beyond the roadside, especially when attractive bush is visible.

> Subject 29: "More could be done to lessen the look of the gravel in front of what is a nice bush area."

> Subject 44: "Stockpile sites within the West Coast look unsightly. This photo would be a great landscape photo if the stockpile was not there."

Photograph 13: Weed rural/farmland (-2)
Once again, weed and open cleared areas are not considered to be part of the West Coast identity.

> Subject 16: "Land that's been cleared and now the gorse is taking over. Not a very 'West Coast' feel."

Photograph 14: Mixed exotic and native conservation land (-2)
In photograph 14 the bush is not seen as being distinctive and, again, roadside weeds and gorse detract from the overall image.

> Subject 13: "Bush clad hills are a common New Zealand feature, not just of the West Coast."

> Subject 23: "Invasion of gorse detracts from native vegetation on the coast."

The main themes from the comments recorded for Factor 1 'Proud Community' are listed in Table 9.

Table 9
Regional Identity Factor 1 'Proud Community' Summary

Regional Identity Factor 1 'Proud Community' Summary
Positive values o The combination of nature and human environments o Native bush/rainforest – looking like it wants to take over o Evidence of human struggle against nature o Evidence of human endeavour – pride in history, 'salute to working history' o Displays of heritage and unique history o Past and present industry both in evidence o Communities set within bush – 'small towns with a story to tell' o Tidy, attractive, well mown roadside areas o Image of the West Coast is important

Negative values

- Generic scenes – i.e. could be anywhere in New Zealand
- Poor image being presented by unsightly roadsides with gravel, dumping, rubbish or weeds
- Detractors from 'clean, green' West Coast image
- Detractors from landscape beyond
- Lack of bush/trees is very generic and not what West Coast looks like
- Unsightly areas stand out because the rest is so beautiful

These themes show that Factor 1 'Proud Community' likes the combination of human and natural environments. In particular they appreciate evidence of human endeavour and struggle, which continue to be a feature of life on the West Coast. They see the West Coast to be unique in terms of its both natural and human environments, and do not like roadsides that look generic (i.e. could be found anywhere in New Zealand). They have great pride in the West Coast, and the presence of weeds, gravel piles and rubbish at the roadside are seen to detract from the way in which the West Coast is seen by others. They are quite conscious of the image presented to visitors.

4.3 Regional Identity: Factor 2 'Rugged Bush'

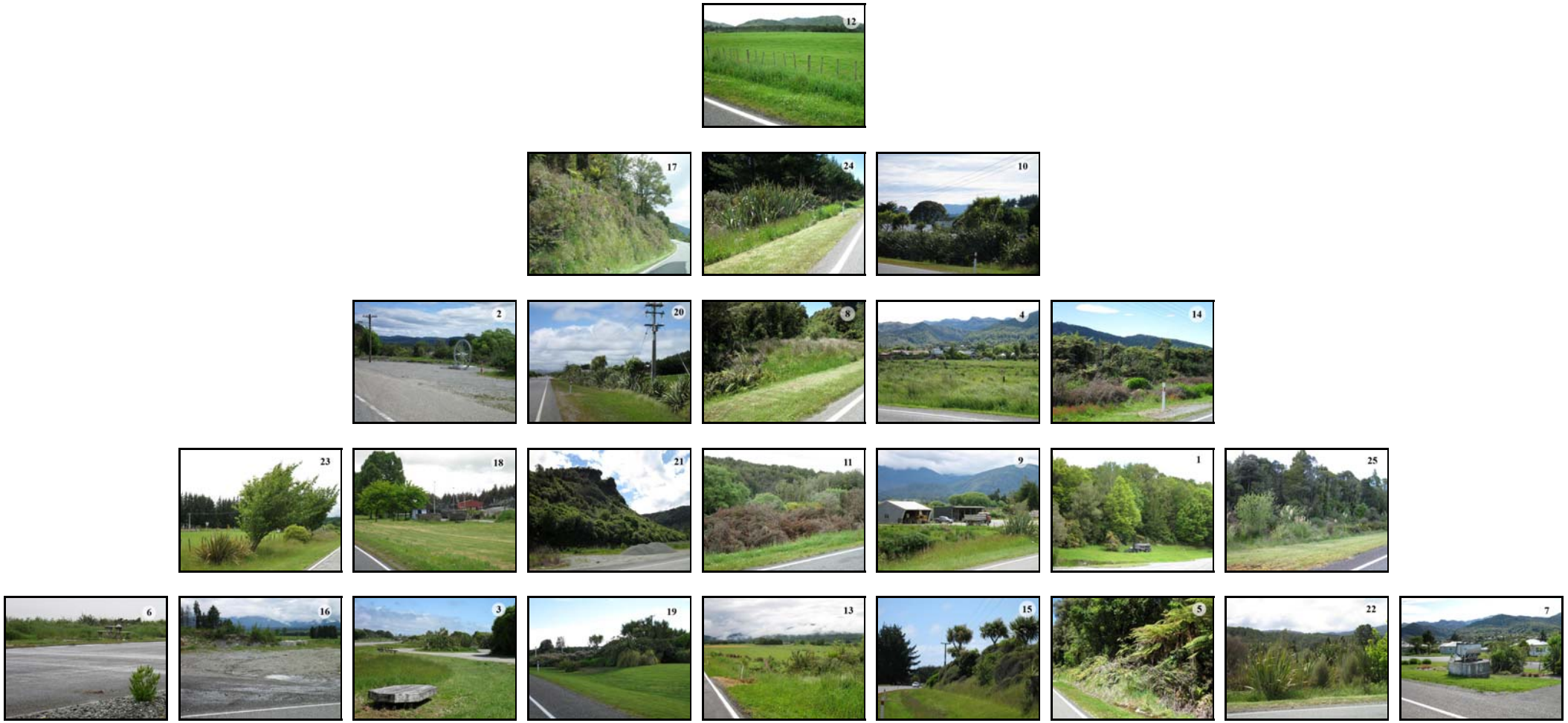
Factor 2, which we have called 'Rugged Bush' accounts for 21 percent of the total variance among the rotated factors and comprises 17 subjects, representing all four research subject groups (see Table 8). The distribution of photographs for this factor is shown in Figure 6.

The six top-ranked photographs and their respective scores were:

No.	***Photograph***	
7	Heritage infrastructure/urban *(consensus photograph)*	+4
25	Grass and re-vegetated native conservation land	+3
22	Re-vegetated native conservation land	+3
14	Mixed exotic and native conservation land	+2
1	Heritage conservation land	+2
5	Pristine conservation land	+2

With exception of the top ranked photograph, these images all show native bush and it is notable that all five have conservation land as the backdrop to the roadside reserve. Two of the top six ranked photographs show heritage objects. There is only one consensus photograph, although Factor 2 shares a liking for photographs 25, 22 and 1 with Factor 1, and a liking for photograph 1 with Factor 3. The following analysis presents a selection of comments made by those people who loaded significantly on Factor 2. The comments begin with the photographs which showed the strongest expressions of West Coast regional identity.

Figure 6
Array of Photographs for Regional Identity Factor 2 'Rugged Bush'



Photograph 7: Heritage infrastructure/urban (+4) (consensus photograph)
Although photograph 7 is the only photograph in Factor 2's top six to show present day human settlement, the comments suggests that it is the combination of the small settlement, natural environment and heritage object that makes this image so indicative of West Coast regional identity.

> Subject 1: "Good link of mining in the communities to the roadside, and set against the backdrop of the untouched bush and hills and yet still within a rural/semi-rural environment, which is how many of the small townships along the coast are."
>
> Subject 19: "Small settlements set in natural environment with heritage around mining."
>
> Subject 55: "Typical West Coast mining town with coal measure, landscape in behind and old coal wagon heritage feature."

Photograph 25: Grass and re-vegetated native conservation land (+3)
For Factor 2, the native bush is strongly associated with West Coast regional identity and the variation in plants – often naming the different types – was a notable feature.

> Subject 45: "Type [of] vegetation along road."
>
> Subject 46: "Combination of flax, toi toi, kahikatea – looks like West Coast."

Photograph 22: Re-vegetated native conservation land (+3)
Once again, the variation in the bush is a highly ranked feature along with the natural look of the vegetation and its close proximity to the road.

> Subject 20: "Bush – different types, variety of fauna – flaxes, trees, rushes etc."
>
> Subject 21: "Fits with the vision of large tracts of forest hills, mountains in a rainforest area. People can almost 'touch' the nature without leaving their cars. Has that wild, untamed look about it."

Photograph 14: Mixed exotic and native conservation land (+2)
For Factor 2, the West Coast 'look' with a variation of vegetation types visible from one spot also included the presence of gorse.

> Subject 5: "Shows a mixture of vegetation in the [West] Coast in one setting."
>
> Subject 46: "Looks like [a West] Coast road – tree ferns, hills in background, dead gorse, orange weeds."

Photograph 1: Heritage conservation land (+2)
Although the roadside reserve in photograph 1 has a heritage object on display, the site itself is not overly developed and the native bush has a strong presence.

> Subject 19: "Heritage displays in natural environment."
>
> Subject 46: "West Coast bush and train. Can see ferns etc. Not very developed site, even though it obviously has a train to stop and look at – not a lot of tarseal."

Photograph 5: Pristine conservation land (+2)
Once again, the close presence of the native bush, and its variety, are strongly indicative of West Coast identity.

> Subject 5: "West Coast feel – when drive over to coast you know you are in the coast environment when you start to get this vegetation."
>
> Subject 14: "Same as #25 (West Coast rugged bush backdrop. Road side well managed, but the bush beyond quite magnificent) just more of the punga look."

The six bottom-ranked photographs and their respective scores were:

No.	***Photograph***	
6	Recreation infrastructure/urban	-4
16	Operational area rural/farmland	-3
23	Mixed exotic and native rural/farmland	-3
3	Recreation rural/farmland	-2
18	Grass only infrastructure/urban	-2
2	Heritage rural/farmland	-2

Three of the six bottom-ranked photographs show large expanses of gravelled or sealed areas with little native vegetation in evidence. The only bottom ranked photographs shared by all three regional identity factors was photograph 6. Photograph 19 was also ranked in the bottom six by both Factor 2 and Factor 1 and Photograph 23 was ranked in the bottom six by both Factor 2 and Factor 3.

Photograph 6: Recreation infrastructure/urban (-4)
The generic roadside scene shown in photograph 6, with a wide expanse of sealed flat roadside reserve and a lack of native vegetation, contributes to its un-West Coast look.

> Subject 1: "Could almost be anywhere – a supermarket car park even! Too obviously created and nothing appears unique to West Coast – no uniqueness?"
>
> Subject 21: "This could be a stop anywhere – there is nothing in this photo that tells me we are on the West Coast. Even has rubbish on the table."

Photograph 16: Operational area rural/farmland (-3)
The site itself was perceived as unsightly and was also seen as being bad for the region's image. Again, the lack of native vegetation and presence of exotics and weeds are not the West Coast 'look'.

> Subject 5: "Vegetation too far away from road to distinguish it is West Coast vegetation."

> Subject 21: "This looks like a tip – unfortunate given the view behind. A reminder of how we have a tendency here not to see the magnificence or our environment. This image spoils our perceived regional identity of being clean and green."

> Subject 55: "Could be anywhere in New Zealand, lots of non-native trees and weeds."

Photograph 23: Mixed exotic and native rural/farmland (-3)
In photograph 23, native vegetation is missing from both the roadside and in the landscape beyond.

> Subject 1: "Not horrible, just not anything that strongly speaks out as being part of the region. Vegetation doesn't all appear native, and fields behind give some feeling of an urban/semi rural location."

> Subject 12: "Mix of pine in the back ground and self grown fruit tree."

Photograph 3: Recreation rural/farmland (-2)
The rest area shown in photograph 3 is too manufactured and generic to be representative of the West Coast.

> Subject 4: "Manufactured."

> Subject 26: "While there is some native flora around the area could be any manicured rest area in many parts of New Zealand at least."

Photograph 18: Grass only infrastructure/urban (-2)
Photograph 18 also has few native plants in evidence and both the exotic plants and buildings visible beyond the roadside reserve are too generic to represent the West Coast.

> Subject 46: "Could be anywhere. Large expanse of mown grass, various nondescript buildings, no native trees."

> Subject 48: "Not depicting natural [West] Coast vegetation."

> Subject 55: "Despite coal wagons(?) looks like anywhere in New Zealand. No native plantings."

Photograph 2: Heritage rural/farmland (-2)
The heritage site in photograph 2 is badly managed and the object itself is too generic to strongly represent the West Coast.

> Subject 4: "West Coaster and it doesn't mean anything to me. Perhaps a history lesson, also an eyesore."
>
> Subject 48: "Not uncommon in other areas>"

The main themes from the comments recorded for Factor 2 'Rugged Bush' are listed in Table 10:

Table 10
Regional Identity Factor 2 'Rugged Bush' Summary

Regional Identity Factor 2 'Rugged Bush' Summary
Positive values o Wilder, less manicured native bush o Vegetation/bush close to road o Mixture of vegetation types o Heritage relating to mining history o Rest areas not overly manicured or developed
Negative values o Lack of defining features when vegetation too far from road o Gravel and extensive paved areas at roadside o Exotic plants o No native vegetation visible o Manufactured rest areas or heritage sites o Generic roadsides/landscapes o Generic heritage sites

These themes show that Factor 2 'Rugged Bush' has a strong preference for roadside reserves with native vegetation, particularly when it is found close to the road itself. They prefer vegetated areas that have a variety of native plants and which look wilder and more natural, rather than those that appear 'manicured'. Although Factor 2 also likes some heritage objects to be on display, they prefer these to be strongly indicative of the West Coast and to be in well-managed, but not overly developed, roadside areas. They appear to give the native vegetation equal ranking in those areas where both heritage and nature are on display.

This strong preference for native vegetation and heritage objects in natural surroundings is also reflected in the roadside reserves that Factor 2 most disliked. For Factor 2, the

photographs demonstrating the weakest West Coast identity were those showing generic roadsides, landscapes and heritage objects and extensively paved or gravel areas at the roadside with little native vegetation visible.

4.4 Regional Identity: Factor 3 'The Working Landscape'

Factor 3, which we have called 'The Working Landscape' accounts for 12 percent of the total variance among the rotated factors and comprises 12 subjects, representing all four stakeholder groups (see Table 8). The distribution of photographs for this factor is shown in Figure 7.

The six top-ranked photographs and their respective scores were:

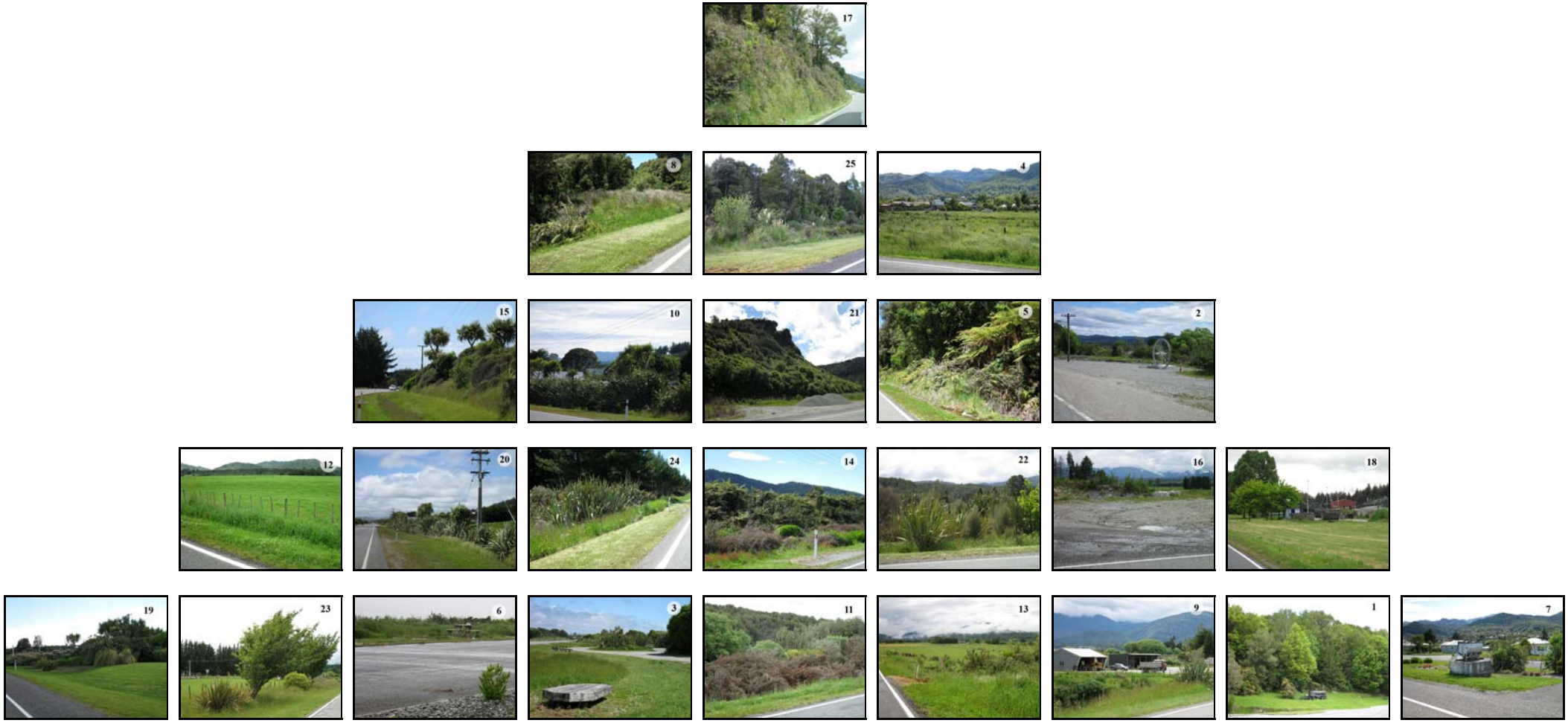
No.	***Photograph***	
7	Heritage infrastructure/urban *(consensus photograph)*	+4
18	Grass only infrastructure/urban	+3
1	Heritage conservation land	+3
2	Heritage rural/farmland	+2
16	Operational area rural/farmland	+2
9	Weed infrastructure/urban	+2

All six top-ranked photographs show some evidence of human activity. Although photograph 7 was the only consensus photograph across all three factors, photograph 1 was also ranked highly by both Factors 1 and 2, and photographs 2 and 18 were also ranked in Factor 1's top six. Photograph 1 was the only one of these photographs to have a conservation land backdrop and Factor 3 had a much stronger preference for photographs showing present day industry and human settlement. Regional Identity Factor 3 was the only factor (across all Q sorts) to rank photograph 16 in their top six. The following analysis presents a selection of comments made by those people who loaded significantly on Factor 3. The comments begin with the photographs which showed the strongest expressions of West Coast regional identity.

Photograph 7: Heritage infrastructure/urban (+4) (consensus photograph)
The image of housing and human settlement shown in photograph 7 is strongly indicative of West Coast identity, especially when combined with the mining industry and natural landscape elements.

> Subject 9: "Multiple elements and connection to mining through the dolly. Hills in the background, vegetated. Bungalow/villa style of housing."
>
> Subject 39: "Reflections on the coal mining industry that was and to a degree still is prevalent on the coast."

Figure 7
Array of Photographs for Regional Identity Factor 3 'The Working Landscape'



Photograph 18: Grass only infrastructure/urban (+3)
Photograph 18 shows the type of industry which makes the West Coast unique, even today.

> Subject 10: "Coal mining is at the heart of West Coast industry – what the region is known domestically best for."

Photograph 1: Heritage conservation land (+3)
Photograph 1 was ranked highly by all three factors and was universally liked for the combination of nature and heritage displayed at the roadside.

> Subject 11: "Iconic feature of the West Coast placed in an accessible, attractive location which offers travellers a lot with the triple offer of safe parking, picnic spot and historical monument. Having the bush so handy and the whole site tidy is very appealing."

> Subject 39: "Beech forest in background. Logging history defined with inclusion of old bush tram."

Photograph 2: Heritage rural/farmland (+2)
Another photograph showing a heritage object associated with both past and present industry that the West Coast is known for.

> Subject 22: "Mining history."

Photograph 16: Operational area rural/farmland (+2)
This photograph, which was ranked very low in most of the Q sort exercises, was liked by this factor because it showed the 'reality' of the West Coast

> Subject 8: "Muddy from heavy rains."

> Subject 22: "No need to improve this site because it's only the West Coast."

Photograph 9: Weed infrastructure/urban (+2)
Photograph 9 also shows a working industrial scene. This type of activity, and the hard work it is evocative of, predominates over any concerns about the tidiness of the roadside reserve.

> Subject 6: "Typical West Coast farm/business scene with bush and hills in background. Low cloud, some native planting in foreground."

> Subject 9: "Industrial/contracting business set in the setting of the West Coast mountains in the background. Hard working types/contracting business set up just off roadside."

The six bottom-ranked photographs and their respective scores were:

No.	*Photograph*	
19	Mixed exotic and native infrastructure/urban	-4
23	Mixed exotic and native rural/farmland	-3
12	Grass only rural/farmland	-3
6	Recreation infrastructure/urban	-2
20	Grass and re-vegetated native infrastructure/urban	-2
15	Grass and re-vegetated native rural/farmland	-2

Three of these six bottom-ranked photographs show highly manicured roadside plantings with wide grass strips. Photograph 6 shows a rest area with a wide expanse of paved surface and this photograph also featured in the bottom six of the other two factors. The other two photographs show a wide grassed strip and grass with exotic trees. Factor 3's low ranking for photograph 23 is shared with Factor 2.

Photograph 19: Mixed exotic and native infrastructure/urban (-4)
The manicured planting evident in this photograph does not represent the rugged nature of the West Coast.

> Subject 6: "Almost too well maintained to be West Coast – a setting that could be anywhere in New Zealand."
>
> Subject 22: "Not the 'rugged look' of the coast."

Photograph 23: Mixed exotic and native rural/farmland (-3)
Once again, similar to Factor 2 the exotic vegetation shown in this photograph is not considered representative of West Coast regional identity and does not fit with the image of the West Coast.

> Subject 6: "Very little native vegetation. Exotic trees rather than typical West Coast bush. Railway present (not too much rail is present on West Coast). Could be anywhere!"
>
> Subject 32: "Not right for the area."

Photograph 12: Grass only rural/farmland (-3)
The farmland shown in photograph 12 is seen as generic around New Zealand, rather than being representative of the West Coast, in particular.

> Subject 10: "Farm paddock – again could be anywhere in New Zealand."
>
> Subject 11: "Could be any farm paddock, anywhere in New Zealand. Much the same reason as photos 6 and 11."
>
> Subject 39: "Could have been taken anywhere dairy industry is prevalent."

Photograph 6: Recreation infrastructure/urban (-2)
The generic nature of the rest area shown in photograph 6, along with its unnatural setting, was disliked by all three of the regional identity factors.

> Subject 6: "No clues as to how it could be West Coast (again, could be anywhere). Not a natural setting that one would expect."

> Subject 39: "Rest area has no character or theme and could be anywhere. Too generic."

Photograph 20: Grass and re-vegetated native infrastructure/urban (-2)
Once again, this photograph shows a generic roadside reserve that could be found elsewhere in New Zealand.

> Subject 17: "Reminds me of North Island, Foxton straight after rain."

Photograph 15: Grass and re-vegetated native rural/farmland (-2)
Similar to photograph 19, this photograph shows a generic highway beautification project that could be found anywhere in New Zealand.

> Subject 37: "Same for all three photos – they could be taken anywhere not just on the coast, particularly where there are highway beautification projects."

The main themes from the comments recorded for Factor 3 'The Working Landscape' are listed in Table 11:

Table 11
Regional Identity Factor 3 'The Working Landscape' Summary

Regional Identity Factor 3 'The Working Landscape' Summary
Positive values o Evidence of human habitation o Mining heritage and current industry o Native vegetation in roadside reserves o Mix of industry and bush
Negative values o Very manicured highway beautification projects o Roadside reserves that look 'urban' and out of character with surrounding areas o Wide grass verges o Exotic vegetation o Generic farm paddocks o Rest areas with no character, or out of character with the surrounding area

Factor 3 ‘The Working Landscape’ has a strong preference for roadside reserves and landscapes that show human activity, especially of a semi-industrial nature. They like to see evidence of both heritage objects and current human habitation. They are less concerned with how well-maintained and tidy the roadside reserve appears, and like the ‘lived in’ look of small West Coast settlements. They share a preference with the other two regional identity factors for heritage objects set within a native bush backdrop, and a dislike for exotic vegetation and for generic rest areas with large expanses of sealed ground.

Chapter 5
Roadside Management Results

5.1 Overview

Three factors were extracted for the Roadside Management Q sort, based on the sorts of 49 participants (82 percent). These accounted for 60 percent of the variance of the rotated correlation matrix. Eighteen participants loaded on Factor 1, 13 on Factor 2 and 18 on Factor 3. One respondent who loaded on Factor 2 did so negatively, that is their preferences were the reverse of the others who loaded on that factor. Of all the Q sorts the Roadside Management Q sort had the lowest correlation coefficient (0.208) between Factors 1 and 2, and the highest correlation coefficient between Factors 1 and 3 (0.641). There was a moderate correlation coefficient between Factors 2 and 3 (0.521).

Table 12 shows the photographs listed from consensus to disagreement. The differences in the Z scores for the top four photographs (above the bolded line) are not statistically significant at the 0.01 level and the photographs marked with an asterisk are not statistically significant at the 0.05 level. The finding that these photographs are not statistically significant indicates that there was consensus across each of the factors for these photographs.

Table 12
List of Photographs, with Roadside Management Q sort Scores, Sorted from Consensus to Disagreement

No.	***Photograph***	***Factor***		
		1	***2***	***3***
25*	Grass and re-vegetated native conservation land	2	2	3
23*	Mixed exotic and native rural/farmland	-2	-1	-1
8	Long grass conservation land	2	0	1
19	Mixed exotic and native infrastructure/urban	4	4	3
9	Weed infrastructure/urban	**-1**	-1	-2
18	Grass only infrastructure/urban	0	**1**	0
4	Long grass infrastructure/urban	-1	-2	-1
12	Grass only rural/farmland	0	**-1**	0
15	Grass and re-vegetated native rural/farmland	**3**	0	1
13	Weed rural/farmland	**0**	-3	-2
14	Mixed exotic and native conservation land	**0**	-2	-3
20	Grass and re-vegetated native infrastructure/urban	**1**	**3**	**0**
22	Re-vegetated native conservation land	1	**-1**	1
24	Re-vegetated native rural/farmland	3	2	**0**
11	Weed conservation land	**-1**	-3	-3
10	Re-vegetated native infrastructure/urban	**2**	**0**	**0**
7	Heritage infrastructure/urban	**-2**	1	2
1	Heritage conservation land	1	1	**4**
3	Recreation rural/farmland	**-1**	3	2
5	Pristine conservation land	**0**	**-2**	**2**

6	Recreation infrastructure/urban	**-2**	**2**	**-1**
2	Heritage rural/farmland	**-3**	0	-1
16	Operational area rural/farmland	-4	**0**	-4
21	Operational area conservation land	-3	**1**	-2
17	Steep bank	1	**-4**	1

Note: While Q sort scores (-4 to +4) are presented in this table, the basis of the distinction between factors for the distinguishing photographs is the Z score taken to two decimal places. Thus two similar Q sort scores may in fact be statistically different.

For all three factors, three of the four consensus photographs were ranked positively (with the exception of a neutral ranking by Factor 2 for photograph 8) and one negatively. Several other photographs were also ranked in the top and bottom six for two of the three factors. These, and the consensus photographs, are discussed within the analysis for each factor.

The remaining photographs (which appear in the list after the bolded line) are photographs with a different score in the different factors. In other words they are evaluated differently by the different factors. Importantly, these photograph become statistically distinct from each other on the basis of their Z scores. Photograph appearing at the bottom of the list have the highest degree of difference in Z scores between the factors.

The table also shows in bold photographs whose scores are statistically significant at the 0.01 level. In some cases, the table shows that the photograph received a distinct score for all three factors. That is, it evoked strong and different responses from all these factors.

The distribution of subjects in each roadside management factor is shown in Table 13.

Table 13
Roadside Management factors by research subject group

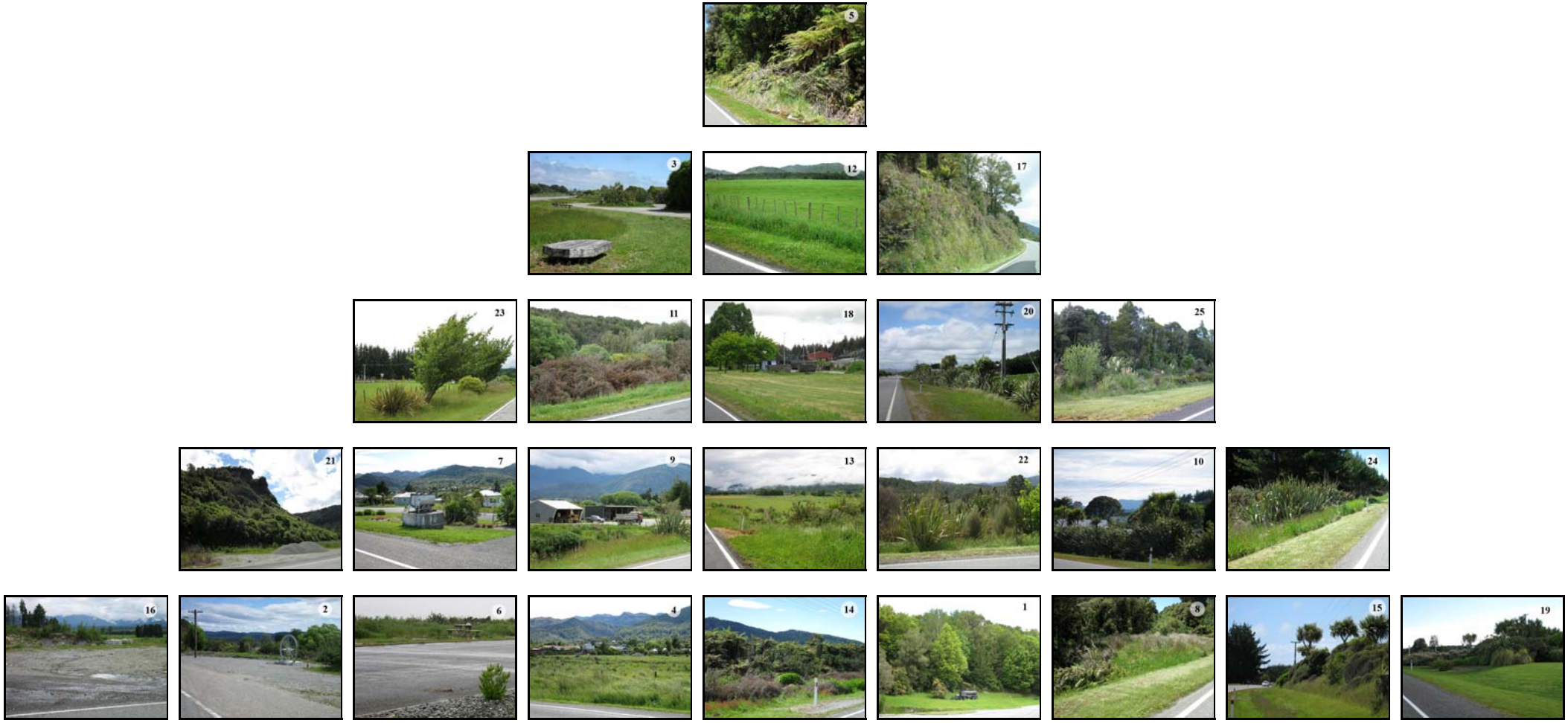
Group	Factor 1	Factor 2	Factor 3	Total
NZTA staff	4	2**	1	7*/9
Contractors & consultants	5	2	6	13*/17
Statutory, representational or institutional body	7	6	6	19*/22
Professional user	2	3	5	10*/12
Total	**18**	**13**	**18**	**49/60**

*Some subjects did not load on any factors
** One subject recorded negative loading

5.2 Roadside Management: Factor 1 'Care'

Factor 1, which we have called 'Care' accounts for 21 percent of the total variance among the rotated factors and comprises 18 subjects, representing all four stakeholder groups (see Table 13). The distribution of photographs for this factor is shown in Figure 8.

Figure 8
Array of Photographs for Roadside Management Factor 1 'Care'



The six top-ranked photographs and their respective scores were:

No.	*Photograph*	
19	Mixed exotic and native infrastructure/urban *(consensus photograph)*	+4
24	Re-vegetated native rural/farmland	+3
15	Grass and re-vegetated native rural/farmland	+3
25	Grass and re-vegetated native conservation land *(consensus photograph)*	+2
10	Re-vegetated native infrastructure/urban	+2
8	Long grass conservation land *(consensus photograph)*	+2

These photographs all show predominantly native vegetation with wide grass verges, although there is some variation in the style of the plantings with two having very manicured plantings, two using native planting as screening (of houses and an exotic plantation forest) and two with conservation land in the background. In all six photographs there is clear delineation between the mowed grass strip and the larger vegetation beyond the roadside. The roadside reserves are all neat and offer surfaces suitable for vehicles to pull off the road if necessary. There are three consensus photographs, but only two of these (photographs 19 and 25) are ranked highly by all three management factors. Factor 1 also shares a liking for photograph 24 with Factor 2.

Photograph 19: Mixed exotic and native infrastructure/urban (+4) (consensus photograph)
This highly manicured roadside reserve shows predominantly native vegetation (although it does include some exotics) and is liked because it is set well back from the road, is neat and tidy and offers space at the road edge for other road users.

> Subject 6: "Neat and tidy and well maintained. Variety of species present giving pleasant contours back from road edge."
>
> Subject 17: "Looks great, well managed, obviously planted out. Posts/signs visible. Good choice of plant."
>
> Subject 47: "Large area of well mowed grass. Good roadside drainage. Wide well-maintained sealed area between edge line and edge of seal for cyclists/walkers. No weeds or rubbish."

Photograph 24: Re-vegetated native rural/farmland (+3)
Photograph 24 has a neatly mown grass strip on a medium-width shoulder.

> Subject 47: "Mown grass berm, well maintained seal edge and edge line."
>
> Subject 52: "Road shoulders are mowed wide enough in rural areas – no need to go wider except in areas where road users pull off road."

Photograph 15: Grass and re-vegetated native rural/farmland (+3)
Photograph 15 shows a variety of species, behind a well-defined area of mown grass and drainage swale.

> Subject 9: "Good wide mown shoulder with drainage swale well defined. Good selection of species off swale."
>
> Subject 52: "Looks tidy and inside of corners are kept mowed etc to improve visibility."

Photograph 25: Grass and re-vegetated native conservation land (+2) (consensus photograph)
The wide clear grass area in photograph 25 has a scenic backdrop and is clear of hazards.

> Subject 6: "Nice rural setting. Safe and wide shoulder and grass verge that is well maintained and a reasonably inviting place to stop for any reason."
>
> Subject 40: "A wide well kept verge, nice forest views, no hazards in the clear zone."

Photograph 10: Re-vegetated native infrastructure/urban (+2)
The native plantings showing in photograph 10 do a good job of screening the housing beyond the roadside.

> Subject 6: "Neat and maintained – flaxes and plantings hide development and mitigate effects of highway being there. Grass is mown, marker post in good order. Does not detract from natural environmental values of the area."
>
> Subject 29: "Nicely cared for area with plants to break the visual impact of the houses."

Photograph 8: Long grass conservation land (+2) (consensus photograph)
Again, a well mown grass berm which blends nicely into the landscape beyond the roadside reserve.

> Subject 9: "Good mown grass on shoulder leading to what appears to be a wetland (that would treat stormwater runoff). Road blends well into surrounding setting."

The six bottom-ranked photographs and their respective scores were:

No.	***Photograph***	
16	Operational area rural/farmland	-4
2	Heritage rural/farmland	-3
21	Operational area conservation land	-3
6	Recreation infrastructure/urban	-2
7	Heritage infrastructure/urban	-2
23	Mixed exotic and native rural/farmland *(consensus photograph)*	-2

The six-bottom ranked photographs show extensive areas of unsealed gravel, gravel stockpiles, visible weeds and rubbish. Factor 1 shared their dislike of the roadside management illustrated by photographs 16 and 21 with Factor 3. Although photograph 23 is a consensus photograph, Factor 1 was the only one to rank it in their bottom six.

Photograph 16: Operational area rural/farmland (-4)
The untidy and unappealing roadside reserve shown in photograph 16 was also perceived to have potential to spread debris onto the roadway.

> Subject 7: "Poorly managed dump/stockpile area. Poorly drained. Unsightly."
>
> Subject 12: "Unkempt look – even freedom campers wouldn't stop there."
>
> Subject 40: "This site is probably causing gravel and mud to be tracked onto the road."
>
> Subject 52: "Looks very untidy. Areas need to be available but should be kept tidy."

Photograph 2: Heritage rural/farmland (-3)
Photograph 2 shows a poorly managed roadside reserve and heritage display, which is not inviting for stopping motorists.

> Subject 7: "Unsealed area with a feature that encourages motorists to pull off the road. Drainage not provided for. Encourages edge break and metal migration onto traffic lanes. Safety issue."
>
> Subject 9: "Rough aggregate area, presumably to direct public to historic/heritage site. No landscaping of sorts, this could make area more attractive to road users. Not exactly inviting."
>
> Subject 22: "Power pole not protected, in clear zone, stone migration again from pull off into road, needs sweeping."

Photograph 21: Operational area conservation land (-3)
While Factor 1 accepts the need for stockpiles, they would like the areas they are in to be well-maintained and set further away from the road, so as not to spoil the vista beyond the roadside reserve, as is the case with photograph 21.

> Subject 6: "Aggregate pile is a blot on the landscape and the area generally has the appearance of not being well maintained as a stopping area."
>
> Subject 29: "Lack of thought, there are many areas set further back from road that are suitable for stockpiles."
>
> Subject 42: "Sealing chip on an area which looks scruffy and spoils vista of the forest in the background."

Photograph 6: Recreation infrastructure/urban (-2)
The rest area in Photograph 6 needs some provision for rubbish collection and is out of character in the wider landscape. Factor 1 was the only one of the three roadside management factors to rank this photograph in their bottom six.

> Subject 5: "Looks out of character."
>
> Subject 52: "Rubbish needs to be kept clean i.e. bins should be provided at known 'hotspots' where road users dump rubbish. Bins will attract rubbish, but it keeps it in selected areas and is easier to pick up and manage."
>
> Subject 57: "Rest area – sealed to provide good pull off area for cars, buses, trucks. Looks a little artificial in setting, extra planting would improve. No refuse collection or toilet facilities."

Photograph 7: Heritage infrastructure/urban (-2)
Photograph 7, which was ranked much more highly by the other two factors, was disliked by Factor 1 because of the hazard presented by the roadside heritage object.

> Subject 12: "Large concrete obstacle, dangerous for vehicles at speed."
>
> Subject 40: "This concrete block is a nasty hazard in the clear zone."

Photograph 23: Mixed exotic and native rural/farmland (-2) (consensus photograph)
Photograph 23 shows a poorly maintained roadside reserve with some large trees that could be hazards.

> Subject 22: "Trees in clear zone, grass needs mowing."

The main themes from the comments recorded for Factor 1 'Care' are listed in Table 14:

Table 14
Roadside Management Factor 1 'Care' Summary

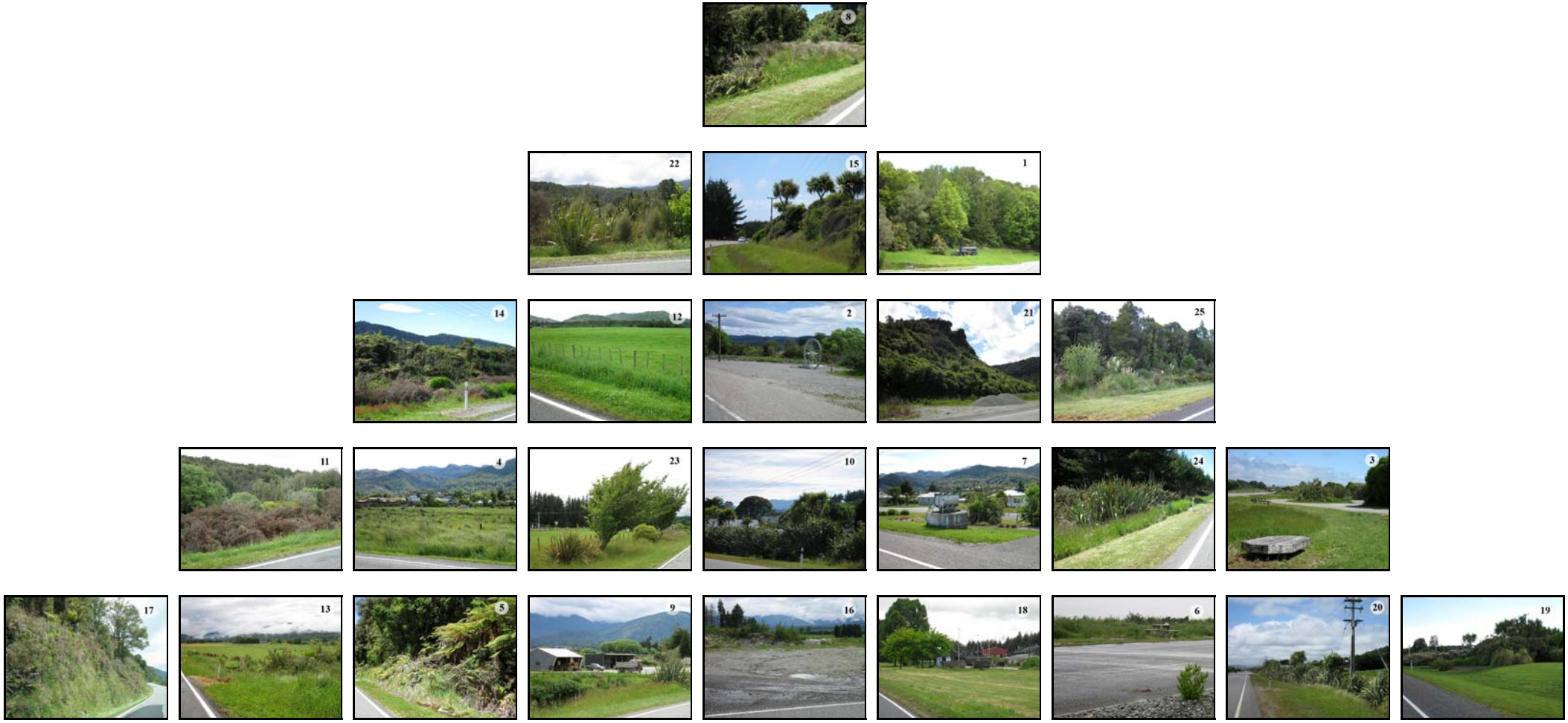
Summary of Roadside Management Factor 1 'Care'
Positive values o Well-maintained seal edges o Neatly mown grass o Native vegetation o Good drainage o Visibility of road and view of forest beyond o Room at seal edge for other road users (e.g. walkers/cyclists) o Clear marker pegs o Clean areas with no visible weeds or rubbish o Well-defined road shoulders
Negative values o Uncleared, sprayed weed areas o Evidence of poor drainage o Power poles/ trees in clear zone o Messy areas that do not look inviting for motorists to stop o Unmown grass o Loose materials that can be tracked onto road o Roadside reserves that detract from view beyond (i.e. with stockpiles, poorly maintained gravel) o Rest areas that are not in 'character' with surrounding area/region

Factor 1 'Care' likes roadside reserves with native vegetation and wide grass berms. The vegetation can either screen or complement the landscape beyond the reserve. They are not overly concerned with how natural looking the vegetation is, but like reserves to be neat, tidy and well-maintained. They have some safety concerns associated with drainage, poorly defined shoulders and hazards in the clear zone.

5.3 Roadside Management: Factor 2 'Safety'

Factor 2, which we have called 'Safety', accounts for 16 percent of the total variance among the rotated factors and comprises 13 subjects, representing all four research subject groups (see Table 13). The distribution of photographs for this factor is shown in Figure 9.

Figure 9
Array of Photographs for Roadside Management Factor 2 'Safety'



The six top-ranked photographs and their respective scores were:

No.	*Photograph*	
19	Mixed exotic and native infrastructure/urban *(consensus photograph)*	+4
3	Recreation rural/farmland	+3
20	Grass and re-vegetated native infrastructure/urban	+3
25	Grass and re-vegetated native conservation land *(consensus photograph)*	+2
24	Re-vegetated native rural/farmland	+2
6	Recreation infrastructure urban	+2

These six photographs show re-vegetated native replanting alongside neat and tidy roadside reserves. Flax is predominant in three of the photographs; four photographs have grass right to road seal edge. The only photograph with a conservation land backdrop has a gravel pile visible. Factor 2 ranked one of the consensus photographs higher than, and one consensus photograph lower than Factor 3. Apart from the consensus photographs Factor 2 shared a liking for photograph 24 with Factor 1 and a liking for photograph 3 with Factor 3.

Photograph 19: Mixed exotic and native infrastructure/urban (+4) (consensus photograph)
A combination of features contributed to photograph 19's high roadside management ranking: the width of the shoulder; good visibility; no roadside hazards; roadside clear of lose gravel; and, a well-presented rest area.

> Subject 8: "Wide shoulders/clear zone with good set up for recovery (steepness wise)."
>
> Subject 21: "Good area for cycling or walking – area inside the white line swept as per the road therefore no loose gravel. Well presented rest area with native trees."
>
> Subject 36: "Nice wide bit dividing road verge and white line, no vegetation near road to obscure vision."
>
> Subject 58: "Good shoulder width, no roadside furniture, good grassed area on verge."

Photograph 3: Recreation rural/farmland (+3)
Again, this photograph shows a roadside reserve with good visibility and space at the roadside.

> Subject 8: "Small road hazard far away from carriageway."
>
> Subject 10: "Very easily navigated rest area – good visibility if exiting the area."

Photograph 20: Grass and re-vegetated native infrastructure/urban (+3)
Photograph 20 shows a roadside reserve with good visibility and is clear of hazards.

> Subject 11: "Plenty of sealed road outside the white line and the grass is kept low so the area can dry out. Good visibility all down the road."

Subject 54: "Pole well clear of road, with wide mown strip'"

Photograph 25: Grass and re-vegetated native conservation land (+2) (consensus photograph)
Photograph 25 offered space for drivers to stop at the roadside and space for other road users.

> Subject 10: "Wide mowed strip – tidy presentation. Easy to stop on side of road safely."

> Subject 21: "Adequate (but only just) area for cycling or walking. Space to stop and nice scenic native bush."

Photograph 24: Re-vegetated native rural/farmland (+2)
Photograph 24 has no obstacles in the roadside reserve.

> Subject 54: "A wide mown road side with nothing hard to run into."

Photograph 6: Recreation infrastructure/urban (+2)
The rest area shown in photograph is liked because it is situated well away from the road.

> Subject 8: "Rest area table far away from carriageway."

> Subject 15: "Large safe area for stopping and having picnic. Appears separation from road to parking/picnic area."

The six bottom-ranked photographs and their respective scores were:

No.	***Photograph***	
17	Steep bank	-4
13	Weed rural/farmland	-3
11	Weed conservation land	-3
5	Pristine conservation land	-2
4	Long grass infrastructure/urban	-2
14	Mixed exotic and native conservation land	-2

Three of the bottom six photographs show roadside weeds, one has a narrow mowed grass verge and one has long grass at the roadside. The other is the steep grassed bank. There are no consensus photographs in Factor 2's bottom six, but the three photographs showing weed (photographs 13, 11 and 14) were also in Factor 3's bottom six. Factor 2 did not share any bottom ranked photographs with Factor 1.

Photograph 17: Steep bank (-4)
Factor 2 was concerned about room to stop and visibility and was the only one to rank the steep bank at the roadside shown in photograph 17 in their bottom six (and, in fact, this roadside reserve was ranked positively by the other two factors).

> Subject 10: "No room on side of road to stop – not wide enough, limited visibility."

> Subject 15: "No verge to stop safely on in emergency e.g. flat tire. Greenery on side of bank could limit visibility."

Photograph 13: Weed rural/farmland (-3)
In photograph 13 the width of the shoulder was a concern, along with possible drainage issues.

> Subject 24: "Maintenance of the road margin is minimal – drainage and sight lines may be compromised as a result."

> Subject 36: "Narrow bit between road and verge, no pavement width for cars even and potential to get caught off side of the road."

> Subject 54: "This looks like a typical muddy road side covered in a little grass. Dangerous to pull off onto."

Photograph 11: Weed conservation land (-3)
The main concern was safety.

> Subject 11: "Again, no roadside to speak of with the same problems as one combined with the upkeep of the roadside vegetation. No idea if there's a boundary fence in there or not."

> Subject 15: "Steep, wet grass verge again unable to be used to stop safely on. Must park out into lane when stopped."

Photograph 5: Pristine conservation land (-2)
This was ranked in Factor 2's bottom six because of the lack of clear space on the shoulder.

> Subject 8: "Thick bushes/trees too close to carriageway with no shoulder."

Photograph 4: Long grass infrastructure/urban (-2)
With photograph 4 there was concern about whether vehicles would be able to stop safely at the roadside.

> Subject 15: "Grass verge appears steep and damp so no vehicle can use it in emergency. Vehicle with flat tire must park out into lane. Tourists see our wonderful sites, but nowhere safe to stop so park into the lane."

Photograph 14: Mixed exotic and native conservation land (-2)
There were no comments recorded for photograph 14 but it looks, again, as if there is limited area available to pull off the road.

The main themes from the comments recorded for Factor 2 'Safety' are listed in Table 15.

Table 15
Roadside Management Factor 2 'Safety' Summary

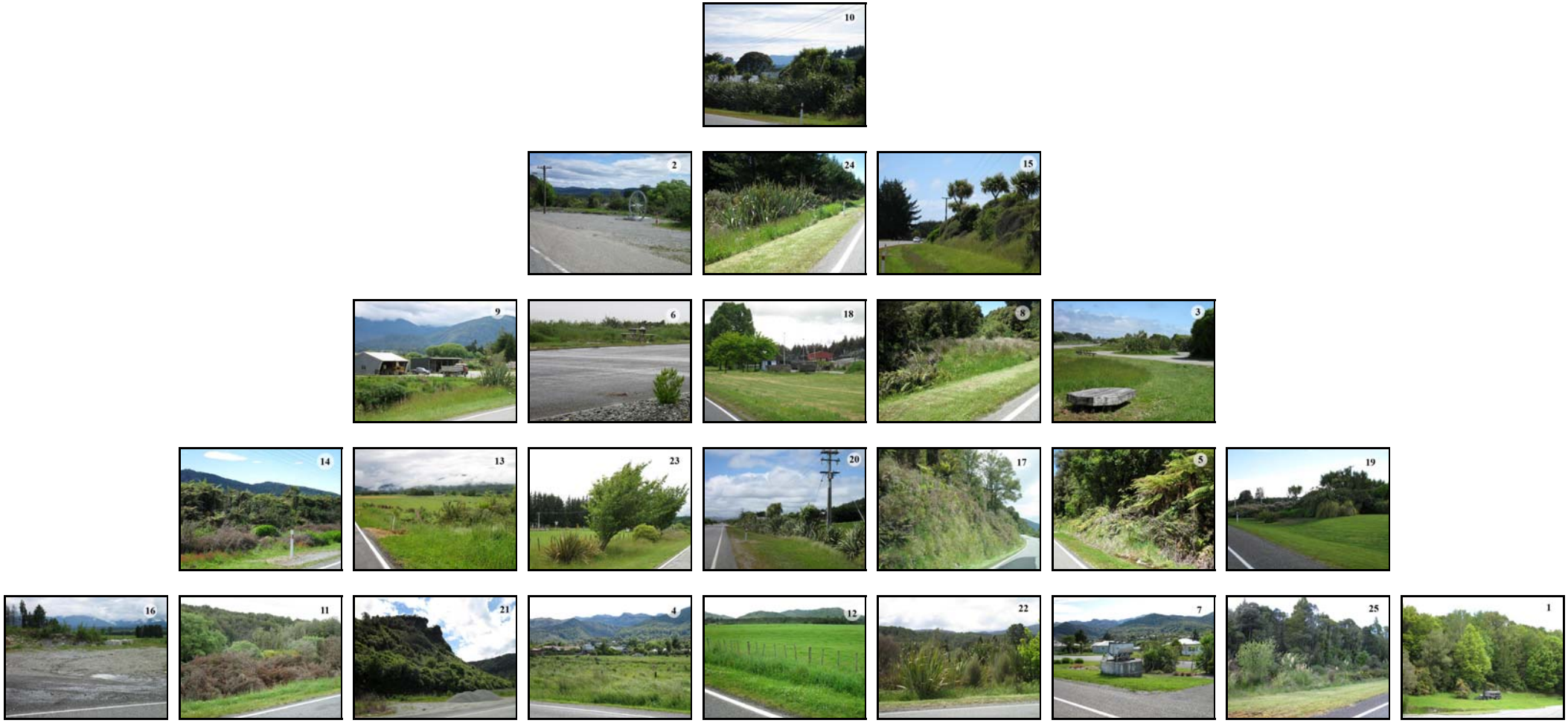
Summary of Roadside Management Factor Two 'Safety'
Positive values o Wide shoulders with obvious roadside stopping areas (i.e. hard, clear surfaces) o Vegetation clear of road o Well designed rest areas o Power poles and other hard objects set well back from road edge o Accept need for maintenance stockpiles o Good visibility along road o Space at roadside for other road users
Negative values o Foliage too close to road o Poor visibility around corners o Narrow shoulders o Poorly maintained road margins o Roadside reserves with unclear drainage and ground surfaces

The major concern for Factor 2 'Safety' was the provision of roadside reserves where motorists could safely pull well off the road if they needed to stop for any reason. Although visibility was a concern, the main issue was with the width and condition of the roadside reserve (with regard to drainage and the provision of hard clear surfaces that could support a stopped vehicle). Factor 2 also liked well-maintained road margins that offer space for other road users. Power poles and other hard objects need to be set well back from the road edge.

5.4 Roadside Management: Factor 3 'Amenity'

Factor 3, which we have called 'Amenity' accounts for 23 percent of the total variance among the rotated factors and comprises 18 subjects, representing all four research subject groups (see Table 13). The distribution of photographs for this factor is shown in Figure 10.

Figure 10
Array of Photographs for Roadside Management Factor 3 'Amenity'



The six top-ranked photographs and their respective scores were:

No.	*Photograph*	
1	Heritage conservation land	+4
19	Mixed exotic and native infrastructure/urban *(consensus photograph)*	+3
25	Grass and re-vegetated native conservation land *(consensus photograph)*	+3
3	Recreation rural/farmland	+2
5	Pristine conservation land	+2
7	Heritage infrastructure/urban	+2

Two of these six photographs show rest areas, one has a heritage object on display, one has very manicured re-vegetated plantings and the other two show more natural native bush, fronted by berms of neatly mown grass. Apart from the two consensus photographs, photograph 3 was also ranked in Factor 2's top six, photograph 5 was ranked in Factor 2's bottom six, and photograph 7 in Factor 1's bottom six.

Photograph 1: Heritage conservation land (+4)
Photograph 1 shows a well-maintained, but not overly manicured, rest area and a well-sited heritage object with an attractive forest backdrop.

> Subject 23: "Feature shows off the area and illustrates its history without becoming intrusive. Site is kept tidy."
>
> Subject 33: "Rest area, plenty of space to provide a safety run out on the corner, appealing contrast between cut grass and tall trees."
>
> Subject 55: "No drop offs or muddy areas. Clearly defined edge and hard surface to pull off on, nicely kept visitor area."

Photograph 19: Mixed exotic and native infrastructure/urban (+3) (consensus photograph)
Although highly manicured, the roadside reserve shown in photograph 19 was seen as appropriate for the location. It has no large hazards and high standards of mowing.

> Subject 13: "This roadside is most appropriate for a semi-urban setting with manicured lawns, formed plantings and managed bush copse."
>
> Subject 23: "Grass verge kept tidy, no weeds. Larger mature trees in background. No trees or features that could become a hazard to motorists as [they are] a long way from [the] live lane."

Photograph 25: Grass and re-vegetated native conservation land (+3) (consensus photograph)
Photograph 25 has a wide safety shoulder, a clear road edge and an attractive bush backdrop.

> Subject 2: "A good transition from the man made road to the bush."

> Subject 43: "Wide area of cut grass then area of smaller growth, followed by taller trees, typical looking but scenic and not too distracting to the eye, good white line and seal."

Photograph 3: Recreation rural/farmland (+2)
The rest area in photograph 3 fits the surrounding environment.

> Subject 23: "Picnic spots are important for motorists to pull over. This site is kept tidy and complements the surrounding landscape."

> Subject 33: "Rest area with places for privacy, good safety run out, curved tracks add interest and invite visitation."

> Subject 34: "Clearly identifiable as a convenient and attractive rest area that is well off the road."

Photograph 5: Pristine conservation land (+2)
Photograph 5 shows appropriate roadside treatment for the area.

> Subject 13: "Clearly defined water channel, native flora has been retained, the immediate road edge has been mown (managed), but beyond the water table it has been left to nature. Very appropriate for remote, rural conservation area. No evidence of sprays – good."

> Subject 30: "If the bush poses no threat to the road safety it is best/nicest to see it close to the road edge."

Photograph 7: Heritage infrastructure/urban (+2)
Again, the clearly defined roadside with a point of interest shown in photograph 7 is liked.

> Subject 44: "Grass berms are easy maintenance in conjunction with monument."

> Subject 55: "Good visibility and hard areas to pull over on that are clearly defined."

The six bottom-ranked photographs and their respective scores were:

No.	***Photograph***	
16	Operational area rural/farmland	-4
11	Weed conservation land	-3
14	Mixed exotic and native conservation land	-3
21	Operational area conservation land	-2
13	Weed rural/farmland	-2
9	Weed infrastructure/urban	-2

These six photographs show weeds, extensive gravel areas and untidy roadside reserves. Three have conservation land backdrops. Factor 3 shares a dislike for photographs 16 and 21 with Factor 1 and a dislike for photographs 11, 13 and 14 with Factor 2.

Photograph 16: Operational area rural/farmland (-4)
The roadside reserve in photograph 16 looks unappealing with weed, poor seal edge and drainage issues.

> Subject 2: "An industrial type site that spoils the landscape."
>
> Subject 13: "Clearly not appealing. Area is roughly surfaced, is being used as a maintenance or farmers dump, contours are uneven, vegetation has a strong weed dominance (broom, pine, gorse etc.)."
>
> Subject 43: "Untidy area – open banks, bit like rubbish dump! Poor surface, no drains, concrete blocks stored in sight, poor edge to seal, visually untidy."

Photograph 11: Weed conservation land (-3)
Both safety and aesthetic issues were identified in the roadside reserve shown in photograph 11. These were associated with poor weed control and potentially hazardous ground conditions.

> Subject 44: "I don't think spraying of gorse etc. is a good look on the side of the State Highways. Does not seem to fit in with the clean green image of the West Coast."
>
> Subject 55: "Dead vegetation that looks like a fire hazard. Edge is hard to discern and it looks like there might be a slope or drop off, but it's hard to tell due to grass length."

Photograph 14: Mixed exotic and native conservation land (-3)
Again, a combination of safety and aesthetic issues are identified in photograph 14.

> Subject 19: "Little roadside maintenance visible."
>
> Subject 33: "Vista not appealing, no space to pull off road, no contrasting elements."
>
> Subject 50: "Again, use of herbicide as a maintenance tool grates with New Zealand's promotion of 'clean and green'."

Photograph 21: Operational area conservation land (-2)
In photograph 21, the unsightly gravel stockpile detracts from the landscape beyond and should be hidden from view. There was also potential for rubbish dumping and for the area to worsen.

> Subject 13: "Roadsides used as dumps are not attractive. Weed infestations soon follow, surface becomes rough and unattractive, no picnic or rest facilities."
>
> Subject 28: "Chip stockpiling visible to the highway within visual scenic areas."

Photograph 13: Weed rural/farmland (-2)
In photograph 13, dominant weeds and the narrow/unclear road verge were issues.

> Subject 13: "Gorse, foxglove, rushes and blackberry are dominating. No clear water channel. Spraying is evident. No suitable 'pull over' area. Narrow road verge."
>
> Subject 30: "Scruffy standard weeds and no nice natives and poor mowing accessibility."
>
> Subject 55: "Gorse growing and flowering. Edge looks muddy and it's hard to tell where the slope changes and whether you could pull over without getting stuck."

Photograph 9: Weed infrastructure/urban (-2)
Weeds, potential for poor drainage and an uncared roadside were the main features of the roadside reserve shown in photograph 9.

> Subject 28: "Contractors workshop building visible to highway."
>
> Subject 30: "Industry closer to road is OK and reality for the coast. Weeds and bad fencing is not."
>
> Subject 43: "The yard in the foreground disrupts the view, edge not cut, drainage looks poor, untidy look."

The main themes from the comments recorded for Factor 3 'Amenity' are listed in Table 15.

Table 16
Roadside Management Factor 3 'Amenity' Summary

Summary of Roadside Management Factor 3 'Amenity'
Positive o Tidy well-defined rest areas o Rest areas offering privacy and distance from road o Roadside reserves and rest areas appropriate to wider landscape setting o Attractive well managed bush margins with contrasting vegetation o Safe stopping areas o Tidy road verges
Negatives o Visible weeds o Sprayed and uncleared weeds o Unmown roadsides o Untidy areas o Narrow road verge o Gravel areas o Roadside reserves that detract from landscape beyond

Although Factor 3 ‘Amenity’ has some safety issues (similar to Factor 2) their main concern was with aesthetics and amenity features of the roadside reserve. They particularly like rest areas to be well-defined, neat and tidy and to fit well with the surrounding landscapes. They value picnic spots and heritage items. While their preference is for natural looking vegetation – three of their top six photographs had conservation land backdrops and they like the views of native bush, particularly the contrasts of plant species and colour – they accept highly manicured vegetation when it fits with the wider environment. Factor 3 shares a dislike for weeds, unsightly gravel stockpiles, poorly drained roadsides and roadside hazards with the other two roadside management factors.

Chapter 6
Roadside Types Results

6.1 Introduction

This chapter presents two sets of cross-cutting data. First, it considers responses from the various Q sorts in terms of the roadside conditions expressed in each of the photographs – for example, roadsides that had pristine vegetation, or that were predominantly weedy, etc. Second, it summarises the responses to two general open ended-questions asked in the surveys, about preferences for particular types of settings and opportunities for improvement of management.

6.2 Scores Assigned to Different Categories of Roadsides

The matrix of photographs used in this research represented three categories of background landscape and ten categories of roadside reserve (seven differentiated by vegetation type, and three by non-vegetation features) (As shown in Figure 1, section 2.2). At least two photographs representing each type of roadside reserve were used in the Q sort exercises. This section summarises the responses to each of these types of situation.

Each of the following tables list the scores given to each photograph, by each of the eight Q sort factors. The feature of interest in the table is the pattern of scores across the factors, as these show where there is agreement between factors, and indicate the relative value assigned to each of the photographs, in terms of the evaluation question (preference, identity, management). Following each set of data there is a short discussion of the values expressed in the comments made upon three photographs, and a summary statement of the main findings (in bold).

Table 17
Scores for Pristine Roadside Conditions (Photographs 5 & 17)

Photograph	Preference 'Cultured Nature'	Preference 'Wild Nature'	Identity 'Proud Community'	Identity 'Rugged Bush'	Identity 'The Working Landscape'	Management 'Care'	Management 'Safety'	Management 'Amenity'
Pristine conservation land (5)	-1	+3	+1	+2	+1	0	-2	+2
Pristine rural/farmland (17)	-1	+1	+1	-1	0	+1	-4	+1

The lush native bush shown in photograph 5 'looks' like the West Coast. This roadside reserve is liked for the closeness of the natural bush to the road, particularly by Preference Factor 2 (Wild Nature). The inconspicuous maintenance of the roadside reserve was seen as being appropriate for a remote rural conservation area. Some participants, however, had concerns about the narrowness of the road shoulder, as expressed in the negative scores for the 'safety' factor.

The steep bank shown in photograph 17 was ranked in the neutral or weakly positive/ negative columns (i.e. -1, 0, or +1) by all Factors, with the exception of roadside management 'Safety' (who ranked it worst, i.e. -4). While some appreciated the scenic aspects of this roadside reserve (and thought it well-maintained, with tidy plantings), there were safety concerns (for drivers who would not be able to pull over or pull off the road, and for other road users such as cyclists) along with visibility issues associated with both the slope and the vegetation.

Pristine roadside reserves are highly valued by stakeholders but do not always satisfy safety and amenity requirements.

Table 18
Scores for Re-vegetated native conditions (Photographs 22, 24 & 10)

Photograph	Preference 'Cultured Nature'	Preference 'Wild Nature'	Identity 'Proud Community'	Identity 'Rugged Bush'	Identity 'The Working Landscape'	Management 'Care'	Management 'Safety'	Management 'Amenity'
Re-vegetated native conservation land (22)	+1	+3	+2	+2	+1	+1	-1	+1
Re-vegetated native rural/farmland (24)	+1	+2	0	0	-1	+3	+2	0
Re-vegetated native infrastructure/urban (10)	+2	+1	0	+1	-1	+2	0	0

The re-vegetated native vegetation shown in these three photographs was liked overall, with some variation dependent on the backdrop landscape: re-vegetated native with a conservation land backdrop was liked the most (by all factors except 'Safety'), followed by rural/farmland and to a lesser extent, infrastructure/urban ('The Working Landscape' disliked both of these). Negative rankings were associated with the view of exotic plantation in the backdrop, which was perceived to be generic across New Zealand and not very 'West Coast'. Positive rankings were associated with the native vegetation, especially flaxes and cabbage trees which were mentioned by name and were seen as strongly representative of the West Coast. The amenity value of this type of planting – screening the houses beyond

the roadside, mitigating the presence of the highway and as a noise reduction measure for the houses – was also liked.

Re-vegetated native vegetation, if well planted and maintained, is visually appealing and serves multiple purposes. The transition from the road into the natural environment and the neatness of the roadside reserve were particularly valued.

Table 19
Scores for Mixed Exotic and Native conditions (Photographs 14, 19 & 25)

Photograph	Preference 'Cultured Nature'	Preference 'Wild Nature'	Identity 'Proud Community'	Identity 'Rugged Bush'	Identity 'The Working Landscape'	Management 'Care'	Management 'Safety'	Management 'Amenity'
Mixed exotic & native conservation land (14)	-3	0	-2	+2	0	0	-2	-3
Mixed exotic & native rural/farmland (23)	0	0	-1	-3	-3	-2	-1	-1
Mixed exotic & native infrastructure/urban (19)	+3	+2	0	-1	-4	+4	+4	+3

While all three photographs showed a mixture of exotic and re-vegetated native vegetation in the roadside reserve, there was considerable variation in the conditions. The 'messy' roadside reserve fronting conservation land in photograph 14, and the neat planting with an expanse of mown grass fronting an infrastructure/urban backdrop in photograph 19, were at the two extremes of wild versus controlled vegetation. In both of these roadside reserves, exotic plants were not immediately obvious. For many people the roadside reserve in photograph 14 was unattractive, and their attention was drawn to the visible weeds in the foreground; the only positive ranking for photograph 14 was from regional identity Factor 2 'Rugged Bush', who thought the weeds 'looked' West Coast. Roadside management 'Amenity' disliked the lack of space to pull off the road.

In contrast, the roadside reserve shown in photograph 19 was liked the most by both roadside 'Care' and 'Safety', and was also liked (but to a lesser degree) by 'Amenity' and all the preference factors. Many subjects mentioned the attractiveness of the planting and high standards of maintenance. It was not liked in respect of regional identity, however, particularly by 'The Working Landscape' who found it too well maintained and generic looking for the West Coast.

The other mixed exotic and re-vegetated native roadside reserve (photograph 23) featured a poorly mown grass strip, with widely spaced trees and plants (some native) backed by a

paddock and pine plantation. This was most strongly disliked by regional identity 'Rugged Bush' and 'The Working Landscape' because of its generic nature and lack of native plants. It was also somewhat disliked by the three management factors, because of the positioning of the trees and the lack of a clear shoulder (both safety issues) and the poorly mown grass (a maintenance issue). In terms of general preference, however, this roadside reserve was ranked neutrally.

Where exotic species are visible alongside natives in roadside reserves, the issues of most concern are the degree of care and maintenance, safety, and lack of local identity.

Table 20
Scores for Grass and Re-vegetated Native Conditions
(Photographs 15, 20 & 25)

Photograph	Preference 'Cultured Nature'	Preference 'Wild Nature'	Identity 'Proud Community'	Identity 'Rugged Bush'	Identity 'The Working Landscape'	Management 'Care'	Management 'Safety'	Management 'Amenity'
Grass & re-vegetated native conservation land (25)	+3	+4	+3	+3	0	+2	+2	+3
Grass & re-vegetated native rural/farmland (15)	+2	+1	0	+1	-2	+3	0	+1
Grass & re-vegetated native infrastructure/urban (20)	0	0	-1	-1	-2	+1	+3	0

Of the three roadside reserves featuring grass and re-vegetated native vegetation, the one with the conservation land backdrop was the most liked (it was ranked positively by all factors except 'The Working Landscape'). The quality and variation of the bush (in type, colour, and plant height) was noted, along with the well mown, well drained and wide shoulder. These provided a good transition from the road into the landscape beyond and were recognised as good safety and amenity features.

In contrast, the roadside reserve shown in photograph 15 did not generate a strong sense of regional identity. It was most appreciated for its well-mown, wide shoulder which provided a clear line of sight around the corner and for the tidy planting. The grass and re-vegetated native reserve shown in photograph 20 was ranked either negatively or neutrally by all but roadside management 'Care' and 'Safety', who liked the wide shoulder and the location of the power pole well off the road, and the natural looking planting. In terms of general preference, however, the power pole was seen as being visibly intrusive and in terms of regional identity, there were no distinguishing features.

Roadside reserves with wide grass verges and re-vegetated native are generally appreciated for the high degree of maintenance they display as well as for safety reasons. In some landscape settings, however, they are seen as being too artificial and generic in character.

Table 21
Scores for Long Grass Conditions (Photographs 4 & 8)

Photograph	Preference 'Cultured Nature'	Preference 'Wild Nature'	Identity 'Proud Community'	Identity 'Rugged Bush'	Identity 'The Working Landscape'	Management 'Care'	Management 'Safety'	Management 'Amenity'
Long grass conservation land (8)	+1	+2	+1	0	-1	+2	0	+1
Long grass infrastructure/urban (4)	-2	0	0	+1	+1	-1	-2	-1

Although photograph 8 was selected for the long grass shown in the mid-ground of the roadside reserve, for most participants the positive features of this reserve were the well-mown foreground grass and the overall naturalness of the roadside reserve. In contrast, the long grass in photograph 4 was criticised for the rough paddocks beyond the roadside reserve and the rundown looking town in the landscape beyond. The scruffy and unkempt verge was disliked by the 'Cultured Nature' factor and by all three roadside maintenance factors. Both 'Rugged Bush' and 'The Working Landscape' factor thought the overall rundown appearance typified the West Coast.

When there are no features of note in the roadside reserve, the attention of participants was particularly influenced by the condition of the wider setting, even though the land was beyond the road reserve.

There is a close interrelationship between evaluations of the road reserve, and evaluations of adjacent land.

Table 22
Scores for Weedy Conditions (Photographs 9, 11 & 13)

Photograph	Preference 'Cultured Nature'	Preference 'Wild Nature'	Identity 'Proud Community'	Identity 'Rugged Bush'	Identity 'The Working Landscape'	Management 'Care'	Management 'Safety'	Management 'Amenity'
Weed conservation land (11)	-3	-1	-3	0	0	-1	-3	-3
Weed rural/farmland (13)	-1	-1	-3	0	+1	0	-3	-2
Weed infrastructure/urban (9)	-2	-2	-1	+1	+2	-1	-1	-2

All three 'weedy' photographs attracted mostly negative rankings. For conservation settings the way the weed had been dealt with was an issue: in terms of roadside management it should have been sprayed when the weed was smaller and then cleared; in terms of overall preference and regional identity the weed was seen as unsightly in itself, detracting from the landscape beyond and presenting a poor image of the West Coast. The presence of roadside weed was slightly more tolerated in the case of the roadside reserves with rural/farmland or infrastructure/urban backdrops.

The main concerns with regard to photograph 13 were the untidy nature of the roadside reserve, the poor definition and narrowness of the shoulder and its overall lack of maintenance. Photograph 9 generated more diverse opinions, with the berm not providing a safe run off and poor roadside maintenance issues (drainage and sight lines) in respect of roadside management. There was a general preference for screening backdrop scenes such as this contractor's yard, although 'The Working Landscape' factor liked the view of the yard. Locating industrial buildings such as this contractor's yard further away from the highway could improve safety, and minimise dust and gravel migration onto the road.

The way in which weed species is managed had a significant influence on evaluations of the roadside. The management regime is more likely to attract comment if the visual condition of the roadside contrasts with the character of the wider landscape.

Table 23
Scores for Grass Only Conditions (Photographs 12 & 18)

Photograph	Preference 'Cultured Nature'	Preference 'Wild Nature'	Identity 'Proud Community'	Identity 'Rugged Bush'	Identity 'The Working Landscape'	Management 'Care'	Management 'Safety'	Management 'Amenity'
Grass only rural/farmland (12)	0	0	-1	0	-3	0	-1	0
Grass only infrastructure/urban (18)	0	-1	+2	-2	+3	0	+1	0

Photograph 12 generated few specific comments about the treatment and condition of the roadside reserve, and the rankings for the grass only rural/farmland roadside reserve were mostly neutral. In terms of overall preference, the wide clear open zone on the flat showing a well-maintained farm in the background was acceptable. The exception to this was 'The Working Landscape' factor who ranked it poorly because of the generic nature of the farmland (i.e. it could be found anywhere in New Zealand) visible in the backdrop.

In contrast, 'The Working Landscape' and 'Proud Community' factors liked the view of coal mining wagons visible beyond the wide grass roadside reserve in photograph 18. Others, however, found the buildings non-descript and visibly distracting. In respect of the roadside reserve itself, the wide expanse of mown grass attracted mixed views. Some participants liked the wide clear spacious roadside and considered it to be well maintained, while others found it untidy looking, boring and a waste of space. This latter group expressed a desire to see some amenity provision (e.g. picnic tables and rubbish facilities) along with plantings (particularly of natives) to break the area up.

For a significant number of stakeholders the large expanses of grass at the roadside are regarded as a waste of space. For others, it is important that it is well maintained – which demands resources.

Table 24
Scores for Recreation Conditions (Photographs 3 & 6)

Photograph	Preference 'Cultured Nature'	Preference 'Wild Nature'	Identity 'Proud Community'	Identity 'Rugged Bush'	Identity 'The Working Landscape'	Management 'Care'	Management 'Safety'	Management 'Amenity'
Recreation rural/farmland (3)	+2	-1	+1	-2	-1	-1	+3	+2
Recreation infrastructure/urban (6)	-1	-2	-3	-4	-2	-2	+2	-1

Of the two rest areas, the one shown in photograph 3 was preferred, although it was ranked negatively by 'Wild Nature', 'Rugged Bush' (for whom it was too manufactured and generic), 'The Working Landscape' and 'Care' factors. This rest area was liked for safety and amenity reasons and its favourable characteristics included: being clearly identifiable as a stopping place, places for privacy, curved tracks adding interest, good entrance and exit visibility, fit with the surrounding environment, well-maintained, sited well away from the road, some shelter (shade and wind protection) provision, tables provided, not a large sealed expanse and an attractive, inviting place to pull off the road.

In contrast, the newly constructed rest area shown in photograph 6 was ranked negatively by all factors except roadside management 'Safety' (for whom separation and distance from the road were important). The unfavourable characteristics of this rest area included: grey and ugly expanse of tarseal, lack of rubbish collection, unattractive landscaping, artificial in setting, flat area very bland, boring and not conducive to enjoyment of the area, scruffy maintenance, no large trees, no natives in evidence, nothing unique to the West Coast and not a natural looking area.

Rest areas need to be both inviting and interesting, and to be constructed and managed in a way that is congruent with the setting. The newly sealed area represented one of the only 'dedicated' facilities in the set of photographs, yet was universally disliked.

Table 25
Scores for Heritage Conditions (Photographs 1, 2 & 7)

Photograph	Preference 'Cultured Nature'	Preference 'Wild Nature'	Identity 'Proud Community'	Identity 'Rugged Bush'	Identity 'The Working Landscape'	Management 'Care'	Management 'Safety'	Management 'Amenity'
Heritage conservation land (1)	+4	+1	+4	+2	+3	+1	+1	+4
Heritage rural/farmland (2)	0	-3	+2	-2	+2	-3	0	-1
Heritage infrastructure/urban (7)	+1	-2	+3	+4	+4	-2	+1	+2

Overall, the display of heritage objects in the roadside reserve was popular. The heritage object in photograph 1 was ranked positively by all factors and was liked because it combined the amenity of a nicely maintained and located rest area, with attractive bush (it was liked the most by 'Cultured Nature', 'Proud Community' and 'Amenity' factors). The heritage object with an infrastructure/urban landscape backdrop (photograph 7) was also popular, especially with the three regional identity factors, for whom this display of West Coast coal mining heritage was set in an appropriate and easily accessible location, with an equally evocative landscape backdrop of a small West Coast settlement and bush clad hills.

However, the 'Wild Nature' and roadside management 'Care' factors considered this heritage object to be a roadside hazard; these two factors also expressed the most dislike for the presentation of the heritage object in the roadside reserve in photograph 2. They disliked the absence of landscaping, the unfinished look and apparent lack of effort to landscape the site, distracting positioning of the object, and the presentation of the object not in keeping with its age and not in context with the wider landscape. There were also safety issues associated with an undefined edge line, lack of proper parking, the power pole hazard and potential for gravel migration from the unsealed surface.

Heritage objects need to be both appropriately and well presented and are most popular in combination with other amenity features.

Table 26
Scores for Operational Areas (Photographs 16 & 21)

Photograph	Preference 'Cultured Nature'	Preference 'Wild Nature'	Identity 'Proud Community'	Identity 'Rugged Bush'	Identity 'The Working Landscape'	Management 'Care'	Management 'Safety'	Management 'Amenity'
Operational area conservation land (21)	-2	-3	-2	-1	0	-3	+1	-2
Operational area rural/farmland (16)	-4	-4	-4	-3	+2	-4	0	-4

The operational areas shown in these two photographs were almost universally disliked (the only exceptions being 'Safety' and 'The Working Landscape'). Photograph 16, in particular, was ranked the worst roadside reserve by six of the nine factors because of general untidiness and lack of roadside management; lack of drainage; potential for weed growth and for use as a dump site; and, safety issues associated with stone and gravel migration onto road. For 'The Working Landscape', however, this roadside reserve was seen as a good example of the West Coast 'identity', while 'Safety' ranked it neutrally, but appreciated the value of a place to stop.

The conservation land backdrop of photograph 21 was slightly more appealing overall, although the gravel pile detracted from the scenic landscape beyond the roadside reserve. Again, 'Safety' ranked it positively (as it provided a place to pull off the road) while, for 'The Working Landscape' it was ranked neutrally (rather than negatively).

Roadside operational areas, while seen as a necessary feature, nonetheless need to be carefully managed. If screening is not possible, some effort should be made keep these areas tidy, especially as they are seen to have considerable potential to worsen over time.

6.3 Open Questions

After completing the three Q sort exercises, respondents were asked two additional, open, questions:

- All the photographs you have been sorting today show different roadside settings and conditions on the West Coast. Which, if any, of these roadside settings and conditions would you like to see more of in the future?

- Do you have any other ideas about the way roadside management could be improved or enhanced?

These two questions were designed to capture any other ideas, comments and opinions subjects had with regard to roadside management. A summary of the answers given to each question is presented below. Because of time constraints not all subjects answered these two questions.

6.3.1 Most liked roadside settings and conditions

While a number of subjects reiterated their preference for natural-looking roadside settings, and for native vegetation, most of the comments recorded in response to this question related to the maintenance of the roadside reserve and the amenity needs of drivers (particularly through the provision of rest areas). Within both maintenance and amenity needs, driver 'safety' was a key concern.

For most subjects, a well-maintained roadside reserve was one that was kept tidy, with well-mown grass verges allowing for good runoff and drainage. For some, freshly cut berms not only looked attractive, but also offered a defined road corridor that was both safer and visually appealing to drivers. Roadside reserves should be free of weeds, scrub-cutting should be discrete and any dead vegetation should be cleared away. Amenity areas and waste sites should be properly managed and screened with vegetation.

Keeping roadside reserves clear of hazards (such as trees, power poles etc.) and scrub also improved safety. Roadside reserves also need to be of sufficient width to allow good visibility for drivers, as well as for passing vehicles, stopping vehicles and for other road users, such as cyclists and pedestrians. The width of surfaced areas beyond the white line was a safety issue for cyclists while, for drivers wishing to pull off the road, the type of surface (e.g. hard or soft) and the width of the roadside reserve can present safety issues. This was especially the case for heavier and larger vehicles such as buses and trucks. There was also a safety issue associated with loose gravel on roadsides.

The provision of more formalised rest areas, and clear signage alerting drivers to these was suggested by a number of subjects. 'Good' rest areas were those located in scenic areas, looked like interesting places to stop (through the provision of heritage objects or attractive vegetation) and provided a good range of amenities (such as rubbish facilities, picnic tables, shade and shelter). The provision of picnic tables encourages drivers to 'get out from behind the wheel and have a break' while well-maintained rest areas (e.g. with grass mown) and adequate parking are more likely to be used. There were some suggestions that rest areas be located well off the road, and that they are screened from the road by vegetation. Specific safety concerns relating to the entrances and exits of rest areas were mentioned by several subjects. There was one suggestion that signs indicating cell phone cover would encourage safer driving behaviour.

The high cost of developing and maintaining rest areas was recognised, and there was a suggestion that it might be better to 'put energy into a select number of sites and do them well, rather than having many of a poor standard'. Care should be taken to locate rest areas in scenic areas, where tourists might want to rest, or to stop and take photographs. Rest

areas can also be made more appealing by the placement of heritage or cultural objects of interest. These, however, need to be well presented and relevant to the area where they are displayed. It was also important that rest areas (and the type of street furniture used in these) fitted well with their surrounding environments; in natural areas (such as those with native bush/forest backdrops) fewer facilities were acceptable.

While there was support for more historical features located along the highway it was important that this did not become 'over the top', as many subjects also appreciated areas with little obvious roadside development and maintenance, particularly where native vegetation was predominant. In these instances, having a good balance between the road and the natural environment beyond the roadside was important. Overall, the roadside reserve needs to be in keeping with the surrounding area which may change significantly as one travels along the highway corridor. Spatial variations in the surrounding landscape and in the treatment of the roadside reserves are enjoyed by many and the presentation of a diversity of roadside settings serves both to maintain driver interest in their surroundings and their driving alertness.

6.3.2 Improving and enhancing the road corridor

The responses to this question were similar to those given to the general question on preferred types of roadside. There was, for example, support for provision of a mixture of roadside reserve types including well-maintained verges with native vegetation and rest areas. There was opportunity recognised to more actively manage the view from the road, keeping scenic views open wherever possible and either hiding or better integrating development into the surrounding environment. The road corridor can also be enhanced through the creation of inviting rest areas and by addressing the needs of a wide variety of road users including local communities, tourists and cyclists. Specific areas of concern noted were the need to improve road areas used by cyclists (along with more emphasis on the 'share the road' message for motorists), and the provision of wide hard roadside reserve surfaces for road users who need to stop frequently, such as those travelling with children.

Appropriate signage is felt to be important and can play a key safety role by directing road users to suitable stopping places. Signage could also be introduced to identify what facilities are available at specific rest areas. One suggestion, for example, was for a three category classification of rest areas, based on the facilities provided. The highest category would have refuse collection, toilets and picnic tables, while the lowest would have no facilities but would be designed so that tourists could stop and take photographs.

There was some recognition that good roadside management was not just about how things are done, but also includes on-going maintenance and, in particular, managing the cost of this. Many respondents thought that weed control could be improved by better timing (e.g. by spraying earlier), more cautious use of spraying (to reduce bare vegetation patches) and by the removal of sprayed gorse. Other vegetation should be trimmed on a regular basis, while manual scrub cutting in native bush areas would reduce hedge effects and more areas could be trimmed to enable views of lakes and rivers. Overall, roadside reserves should be tidied up through: better removal of rubbish and roadside litter (with perhaps a roadside litter campaign); the screening of stockpiles; and, on-going maintenance of rest areas.

6.3.3 Summary of Responses to Questions

Many of the responses to these two questions reflect roadside maintenance issues of particular relevance and importance to the West Coast region. They highlighted safety issues, and the need to prioritise management so as to ensure high quality conditions throughout. Opportunities included more active management of the 'view from the road', categorising rest areas to clarify the level of facilities and management that can be expected; and improved weed management, to reduce the prominence of mature dead weedy shrubs.

Two topical issues associated with tourist traffic on the West Coast were the increasing numbers of cycle tourists, and their need for safe routes, and increases in the number and impact of freedom campers (particularly with regard to littering in rest areas). While sparsely populated in comparison to much of the rest of New Zealand, the region attracts a significant amount of tourist traffic and is well-known for its scenic beauty and unique history, of which the local community is very proud. The road corridor is a fundamental tool that not only provides access to and transport throughout the region, but which also can be used to show it at its best. As one participant noted, 'Roading should enhance our regional identity'.

Chapter 7
Summary of Findings

7.1 Overview

This concluding chapter summarises the findings of the West Coast case study investigation into stakeholder vales relating to the state highway reserve, and briefly considers implications for the wider research project investigating opportunities for enhanced environmental asset management of the state highway corridor.

It is presented in four sections. First, the key findings on stakeholder preferences, regional identity and roadside management are presented, emphasising the areas of shared values across all the stakeholders, and points of particular difference. Next, responses from the different stakeholder groups are compared. Then, common values relating to particular roadside conditions are noted. Finally, possible implications for enhanced asset management are addressed.

7.2 Overall Preferences

The single factor description captures the common or shared views of 88 percent of the stakeholders involved, and accounts for 45 percent of the variation in the responses. The results are consistent with the 'consensus' photographs identified in the two factor solution (below), which adds confidence in their validity.

Stakeholders prefer roadsides that are natural looking but well-maintained, with a variety of native vegetation that provides a sense of depth and 'layered' transitions to the landscape beyond. There was a desire for the immediate road edge to be well-maintained.

They disliked roadsides and larger areas of reserve that were dominated by weeds or dead sprayed vegetation, and expanses of gravel and grit piles that contrasted with, and detracted from, the wider landscape, were disliked.

Stakeholders were largely neutral on the presence of long grass in the roadside reserve, provided it did not look unkempt, and were largely neutral on larger expanses of grass, and upon the presence or otherwise of exotic species. Heritage features were not particularly significant in their evaluations of preference.

7.3 'Cultured Nature' and 'Wild Nature' Preferences

The general preferences encompass two distinct ways of valuing the roadsides, which have been characterised as 'Cultured Nature' and 'Wild Nature'. Together these characterisations accounted for over 90 percent of stakeholder responses, and 55 percent of the variance in the response.

A 'Cultured Nature' orientation prefers roadside conditions that feature a variety of types of native vegetation, but place a high value on the reserve being neat, tidy and well cared for. They appreciate provision of roadside facilities, and safe pull offs, and are quite comfortable with the signs of human activity and habitation along the road corridor, provided that the surrounding landscape is well managed and looked after. Where there are poorly maintained or unattractive features or artefacts, they would prefer screening.

A 'Wild Nature' orientation prefers more natural looking native vegetation, with a bush edge closer to the road, but nonetheless value views through to the wider landscape, and particularly seek a 'layered' transition. They dislike obvious signs of neglect, but are more accepting of operational facilities, and also dislike the more highly manicured appearance of some roadsides.

In both cases, evaluation of the roadside reserve was influenced by its relationship to the wider landscape – that is, both orientations were sensitive to the context of roadside management, and looked for congruence with the landscape setting.

7.4 Regional Identity

Stakeholders expressed three distinct understandings of regional identity – which have been characterised in this study as 'Proud Community', Rugged Bush' and 'The Working Landscape'. These factors expressed the views of 83 percent of respondents, and accounted for 55 percent of the variance in the responses.

Stakeholders who emphasised a 'Proud Community' valued features that indicated evidence of a proud human history of endeavour within a distinctive and vigorous natural environment. They appreciated the human stories represented by heritage features and communities within the landscape. They disliked roadsides which were generic in character, without evidence of their regional setting (for example expanses of grass), and disliked those which were unsightly and gave a poor impression of the West Coast.

The 'Rugged Bush' orientation was more focused upon the identity created by the West Coast bush. They favoured situations where the unmanaged bush came closer to the road, with a variety of vegetation types, and also appreciated evidence of mining history. They disliked roadsides without native vegetation or other evidence of locality, and disliked manicured grassed areas and pull offs with extensive hard surfaces.

The 'Working Landscape' orientation favoured roadsides that provided evidence of the distinctive types of human activity on the West Coast, particularly extractive industries and their supporting infrastructure. They were less concerned about the neatness of the roadside, and valued an unpretentious character of small settlements and roadside. They disliked manicured 'beautification' projects, wide grass verges, exotic vegetation and generic styled infrastructure.

Common features across all three regional identity factors were that they valued evidence of the distinctive regional way of life – characterised by hard work, including mining, within a

predominantly bush setting. They did not value roadsides that were constructed and managed in standardised ways that did not relate to the West Coast.

7.5 Roadside Management

The question on roadside management highlighted values associated with more pragmatic considerations. Three distinctive value orientations were identified, based upon the responses of 82 percent of the stakeholders, accounting for 60 percent of the variance, which were characterised as 'Care', 'Safety', and 'Amenity'.

The 'Care' orientation emphasised the importance of neat, tidy and well-maintained roadsides. They responded positively to evidence of clearly defined management regimes, good drainage and visibility, neatly mown grass, and absence of weeds and rubbish. Conversely they responded negatively to evidence of neglect, weeds, and operational areas and pull offs that were not in character with the wider setting.

The 'Safety' orientation is focused upon minimisation of hazards associated with the highway. It favours wide road shoulders, clearly marked pull offs, vegetation kept well back to ensure good visibility, lack of potentially dangerous obstructions, and space for different users. It responds negatively to narrow, cluttered and poorly maintained road margins.

The 'Amenity' factor focused upon the provision of well managed and attractive rest areas and roadside facilities, which related well to the wider landscape and allowed travellers to pull off safely and then stop at some distance back from the highway. It disliked narrow, poorly maintained, untidy verges and operational areas.

There was considerable consensus between the 'Care' and 'Amenity' factors, but significant contrast between the 'Care' and 'Safety' factors.

7.6 Comparison of Stakeholder Groups

Overall there was only modest variation between the different stakeholder groups in the way they loaded onto the different factors. In other words, the stakeholder group from which a participant was drawn had limited effect upon the values they expressed. The factors each included stakeholders from a range of backgrounds. The loadings on each factor and the number who did not load on any factors are summarised in Table 27.

Table 27
Research Participants Loading on Factors

	Preference 'Cultured Nature'	Preference 'Wild Nature'	Preference NL	Identity 'Proud Community'	Identity 'Rugged Bush'	Identity 'The Working Landscape'	Regional Identity NL	Management 'Care'	Management 'Safety'	Management 'Amenity'	Roadside Management NL
NZTA	3	5	1	1	4	4	-	4	2	1	2
Contractors & Consultants	11	6	-	8	4	2	3	5	2	6	4
Statutory Bodies	11	9	2	7	6	4	5	7	6	6	3
Professional Users	8	3	1	5	3	2	2	2	3	5	2
TOTAL	33	23	4	21	17	12	10	18	13	18	11

7.7 Values of Different Types of Roadside Condition

This section summarises the analysis of each type of roadside setting:

- Pristine roadside reserves are highly valued by all stakeholders but do not always satisfy safety and amenity requirements.
- Re-vegetated native vegetation, if well planted and maintained, is visually appealing and serves multiple purposes. The transition from the road into the natural environment and the neatness of the roadside reserve were particularly valued.
- Roadside reserves with wide grass verges and re-vegetated native are generally appreciated for the high degree of maintenance they display as well as for safety reasons. In some landscape settings, however, they are seen as being too artificial and generic in character.
- Where exotic species are visible alongside natives in roadside reserves, the issues of most concern are the degree of care and maintenance, safety, and lack of local identity.
- The way in which weed species is managed had a significant influence on evaluations of the roadside. The management regime is more likely to attract comment if the visual condition of the roadside contrasts with the character of the wider landscape.
- For a significant number of stakeholders large expanses of grass at the roadside are regarded as a waste of space. For others, it is important that these grass expanses are well-maintained.
- Rest areas need to be both inviting and interesting, and to be constructed and managed in a way that is congruent with the setting. 'Generic' designs were disliked.
- Heritage objects need to be both appropriately and well presented and are most popular in combination with other amenity features.
- Roadside operational areas, while seen as a necessary feature, nonetheless need to be carefully managed. If screening is not possible, some effort should be made keep these areas tidy, especially as they are seen to have considerable potential to worsen over time.
- There is a close interrelationship between evaluations of the road reserve, and evaluations of adjacent land.

7.8 Implications

Validity

The overall results are very consistent with similar previous studies of landscape perceptions in New Zealand. A high number of participants loaded on the factors in each Q sort, the level of variation explained was high in terms of the method, and there was good factor stability. Combined, these features give confidence in the validity of the findings.

Management priorities

Stakeholder values indicate particular support for context-sensitive management:

- Sensitivity to the context (i.e., use design and management styles and materials that relate to the specific landscapes through which the road corridor passes, rather than using standardised solutions);

- Retention and re-establishment of native vegetation, limiting grass to those areas needed for safety;
- Layered or gradual transitions from the carriageway to the landscape, both functional zones, and to provide a transitional view through to the surrounding landscape (i.e. to avoid a sense of being confined);
- Minimising the visual impact of operational areas, and where possible to screen unattractive land uses adjoining the road;
- Managing weed species in a way that reduces their visual impact as well as their biological impact;
- Minimising use of exotic species (other than grass); and
- Providing stopping areas that feature views to the surrounding landscape and that feature local heritage and history in a subtle way.

These findings are consistent with the existing *Guidelines for Highway Landscaping*, and give support to many of the principles that are expressed in the guidelines. The findings also encourage further development of the management dimensions of the guidelines to ensure that regimes are adapted to the specific regional characteristics.

Opportunities for Enhanced Management

Stakeholders identified opportunities for:

- Improved safety through better vegetation management;
- Categorising recreation areas to ensure consistent management;
- Active management of the view from the road;
- Weed management that reduced the visibility of dead weeds;
- Improved facilities for cyclists;
- Improved legibility of roadside conditions and facilities.

There was little attention paid by stakeholders to other opportunities for enhanced environmental management in the road corridor. This suggests that development of a more comprehensive, strategic asset management approach for environmental values needs to include active methods of scenario generation, and should not rely only upon expressed preferences and values.

Implications for an Environmental Asset Management System

There are several conclusions that can be drawn regarding the nature of an improved environmental asset management *system*:

1. The system needs to be *context sensitive*, and able to differentiate categories of condition and management regime that are sensitive to:
    - Regional character;
    - Landscape context – particularly level of modification;
    - Functional relationships to the carriageway.

2. The area of the reserve should be determined by functional needs, and the requirement to provide managed *transition* to adjoining land uses.

3. There needs to be improved *legibility* of the roadside reserve conditions, so that the surface clearly expresses the stability of the verge for vehicles that pull off, or there is some form of signage that indicates its stability. Signage is also needed to signal the facilities offered at rest areas.

4. Vegetation management needs to be appropriate to the wider landscape context.

5. Weed management is problematic and requires further consideration.

Future Research

The emphasis upon regionally specific factors in the Q sort responses indicates that stakeholder values need to be investigated at a regional level.

There would be value in investigating tourist perceptions, to test the extent to which they are consistent with the responses of stakeholders.

References

Akbar, K.F., Hale, W.H.G., & Headley, A.D. (2003). Assessment of scenic beauty of the roadside vegetation in northern England. *Landscape and Urban Planning* 63: 139-144

Appleyard, D., Lynch, K., & Myer, J.R. (1964). *The view from the road*. Cambridge: Massachusetts Institute of Technology.

Arriaza, M., Cañas-Ortega, J.F., Cañas-Madueño, J.A., & Ruiz-Aviles, P. (2004). Assessing the visual quality of rural landscapes. *Landscape and Urban Planning* 69: 115-125.

Baughan, B.E., Cockayne L., & Speight R. (1914). *The Summit Road: Its Scenery, Botany and Geology*. Christchurch, Smith and Anthony.

Brown, S. R. (1980). *Political subjectivity. Applications of Q method in political science*. New Haven, Yale University Press.

Burley, J.B., Singhal, V.B.P., Burley, C.J., Fasser, D., Churchward, C., Hellekson, D., & Raharizafy, I. (2009). 'Citation analysis of transportation research literature: A multi-dimensional map of the roadside universe', *Landscape Research*, 34(4): 481-495

Chivers, J., Allan, S., & Hunt, M. (1992). *Quantification of intangibles*. Transit New Zealand Research Report No. 12. Wellington: Transit New Zealand.

Clemens, J., Swaffield, S.R. & Wilson, J. (2010, forthcoming). Landscape and associated environmental values in the State Highway Roadside Corridor: A literature review

Cobb, J. (2005). *Explore New Zealand: over 60 scenic driving tours*. Auckland: New Holland.

Crowe, S. (1960). *The landscape of roads*. London: Architectural Press.

Fairbrother, N. (1970). *New Lives, New Landscapes*. London: Architectural Press.

Department of Conservation (DOC) (2007), *Arthur's Pass National Park Management Plan 2007*, Christchurch, Department of Conservation.

Fairweather, J.R. (2002) 'Factor stability, number of significant loadings and interpretation: results from three case studies and suggested guidelines'. *Operant Subjectivity* 25(1): 37-58

Fairweather, J.R., Maslin, C., Swaffield, S.R., & Simmons, D.G. (2003). *Visitors' and locals' views of environmental management in Christchurch, New Zealand*, TRREC Report No 33/2003, Lincoln University (http://hdl.handle.net/10182/250).

Fairweather, J. & Swaffield, S. (2000). 'Q method using photographs to study perceptions of the environments in New Zealand'. Chapter 7, pp 131-158 in H. Addams & J. Proops (eds.) *Social Discourses and Environmental Policy: Application of Q Methodology*. Cheltenham, UK, Edward Elgar.

Fyhri, A., Jacobsen, J.K.S., & Tømmervik, H. (2009). Tourists' landscape perceptions and preferences in a Scandinavian coastal region. *Landscape and Urban Planning 91*: 202-211.

Grieves, C., & Lloyd, D.J. (1984). *Conservation of roadsides and roadside vegetation*. Melbourne: Monash University.

Harris, S.M. (1994). A method for intangibles analysis and priority ranking of road projects. In *Proceedings of the New Zealand Land Transport Symposium 1994, Volume 1* (pp. 31-36). Wellington: Transit New Zealand.

Highways Agency (UK) (2009a). *Design manual for roads and bridges*. http://www.standardsforhighways.co.uk/dmrb/index.htm (11 Jun 2009)

Highways Agency (UK) (2009b). *Design manual for roads and bridges*. Volume 10, Section 3, Part 2, Chapter 1 Introduction to Landscape Management Handbook (1/1).

Kaplan, R. & Kaplan, S. (1989). *The experience of nature: A psychological perspective*, Cambridge: Cambridge University Press

Kassoff, H. (2004). Sustainable highways – oxymoron or opportunity? Abstract book (p. 12) to the *Towards Sustainable Land Transport Conference*, Wellington 21-24 November

Kerr, G.N. & Swaffield, S.R. (2007) *Amenity values of spring fed streams and rivers in Canterbury, New Zealand: A methodological exploration.* AERU Research Report No. 298, Lincoln University. (http://hdl.handle.net/10182/287).

Merriman, P. (2007). *Driving spaces*. Malden, MA, USA: Blackwell

Ministry for the Environment (MfE) & Department of Conservation (DOC) (2000). *The New Zealand Biodiversity Strategy*, http://www.biodiversity.govt.nz/pdfs/picture/nzbs-whole.pdf

Ministry of Transport (2007). *Transport Research Strategy*, http://www.transport.govt.nz/about/publications/Documents/Transport-Research-Strategy-small.pdf

Ministry of Transport (2008) *New Zealand Transport Strategy 2008*, http://www.transport.govt.nz/ourwork/Documents/NZTS2008.pdf

Moore, J, Orwin, J. & Weston, J. (1991). *On the edge: Management options for plantation edges*, Christchurch, New Zealand, Ministry of Forestry

Myers, M.E. (2004). The line of grace: Principles of road aesthetics in the design of the Blue Ridge Parkway, *Landscape Journal* 23(2): 121-140

New Zealand Transport Agency (2005). *Environmental policy manual* SP/M/023, http://www.nzta.govt.nz/resources/environmental-policy-manual/index.html

New Zealand Transport Agency (2006). *Guidelines for Highway Landscaping* (Version 2) SP/M/020 http://www.nzta.govt.nz/resources/guidelines-highway-landscaping/docs/highway-landscaping-contents.pdf, Wellington, Transit New Zealand

Newton, B., Fairweather, J.R., & Swaffield, S.R. (2002). Public perceptions of natural character in New Zealand: Wild nature versus cultured nature, *New Zealand Geographer*, 58(2): 17-29

Skipworth, M.R. (1939). Roadside beautification in New Zealand. *Bulletin of the Royal New Zealand Institute of Horticulture 6*: 1-36.

Swaffield, S.R., & Fairweather, J.R. (2003). Contemporary public attitudes to landscape: Reclaiming our heritage, Environmental Defence Society/New Zealand Institute of Landscape Architects Conference, Bruce Mason Centre, Takapuna, 25-26 July 2003.

Tourism New Zealand (2009). *100% Pure New Zealand*, http://www.tourismnewzealand.com/campaigns

Tourism Resource Consultants (2006). *West Coast Visitor Waste Management Strategy*, http://www.envirolink.govt.nz/PageFiles/128/78-Wcrc8WcrcVisitorWasteStrategy.pdf

VicRoads (2005). *Biodiversity guidelines*. http://www.vicroads.vic.gov.au/NR/rdonlyres/74B81894-1900-49D2-B0B5-8C4C09110D61/0/BiodiversityGuidelines.pdf (11 Jun 2009).

Way, J.M. (1970). Wildlife on the motorway. *New Scientist 47*: 536-537.

West Coast Regional Council (2005). *Regional Pest Management Strategy for the West Coast* http://www.wcrc.govt.nz/NR/rdonlyres/5068BBD8-AFD3-4E2E-80B2-F47EEB1168F6/31044/PestPlantManagementStrategy1.pdf

West Coast Regional Council (2009). *West Coast Regional Land Transport Programme 2009-2012,* http://www.wcrc.govt.nz/plans/land_transport/rltp.htm

Appendix 1
Q sort Instructions and Answer Sheet

Exercise instructions

You have been given a set of photos that show a range of roadside settings on the West Coast which we would like you to sort according to three different criteria. For each sorting exercise please take the following steps:

Step One:

Sort the photos into three groups, according to the research question being asked. For example, in exercise one, sort into:

- **Group One** with six roadside settings that you most prefer
- **Group Two** with six roadside settings that you least prefer
- **Group Three** with the remaining roadside settings for which you have neutral feelings

Step Two:

Now, sort the settings that you placed in **Group One** [most preferred] into three columns, placing the setting that you most preferred overall in the right hand column, the two settings you prefer next in the second column from the right, and the three remaining settings in the third column from the right.

Next, sort the settings in **Group Two** [least preferred] in the same way, in reverse (so that your least preferred setting is in the far left hand column, the next two lowest are in the second column from the left, and the remainder are in the third column from the left).

Finally, sort the remaining settings in **Group Three** into three columns – a neutral column in the centre with five settings, and columns on either side with four each: the right hand column containing the four settings you prefer slightly more and the left hand column the four you prefer slightly less.

The final distribution should look like this:

				1				
			2	3	4			
		5	6	7	8	9		
	10	11	12	13	14	15	16	
17	18	19	20	21	22	23	24	25
Least preferred			'Neutral' preference			Most preferred		
Group Two			Group Three			Group One		

Step Three:

Now, please copy the numbers that are on the photos you have sorted into the corresponding boxes.

Step Four:
For each of the three sorting exercises look carefully at the three settings you most preferred, and the three you least preferred, and in the corresponding boxes on your exercise sheets please note what it is about these settings that leads you to rate them so high, or so low.

Exercise One: Roadside setting preference

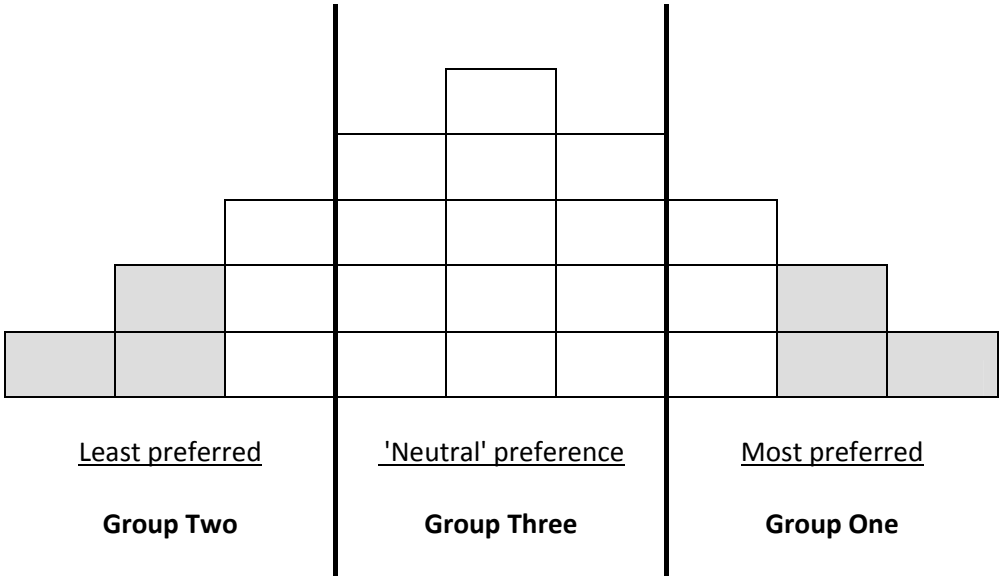
Step One:
Please examine the photos and order them in terms of which roadside settings that you prefer.

First, sort the photos into three groups:

Group One with six roadside settings that you most prefer
Group Two with six roadside settings that you least prefer
Group Three with the remaining roadside settings to which you have neutral feelings

Step Two:
Now, sort each group of photos according to the instructions on the cover sheet so that they are arranged in the pattern shown in the diagram below.

Step Three:
Copy the numbers that are on the photos you have sorted into the corresponding boxes in the diagram below. (This gives us a summary record of your preferences).



Step Four:

Please look carefully at the roadside settings you most preferred (the three slightly shaded boxes of **Group One** at the far right hand end of the distribution).

In the corresponding boxes below, please write in the number of the photo and note what it is about these settings that leads you to rate them so highly. If you have any general comments about your preferences please use the box at the bottom.

Next two most preferred roadside settings	Most preferred roadside setting
Photo #	**Photo #**
Photo #	
Are there any other comments you want to make about your preferences?	

Now please look at the roadside settings you least preferred (the three slightly shaded boxes of **Group Two** at the far left hand end of the distribution).

In the corresponding boxes below, please write in the number of the photo and note what it is about these settings that leads you to rate them so low. If you have any general comments about your preferences please use the box at the bottom.

Least preferred roadside setting	Next two least preferred roadside settings
Photo #	**Photo #**
	Photo #
Are there any other comments you want to make about your preferences?	

Appendix 2
Information Sheet and Consent Form

Lincoln University

Perceptions and values of road user groups, designers and managers:
Research information sheet for key informant participants

Introduction
The New Zealand Transport Agency (NZTA) has engaged Landcare Research and Lincoln University to develop a method to integrate an environmental component in its Asset Management Plan for State Highways. This will help them better consider the multiple values associated with roads and how to manage them for greatest benefit. The overall aim of our research is to help NZTA develop a robust and effective environmental component to its asset management plan for national highway corridors, focused upon non structural assets, such as vegetation beyond the pavement.

Research
You have been identified as a person with some professional involvement or organisational association with the State Highway network in the West Coast region and we would like to get your views on the environmental values, issues and opportunities arising through the asset management of state highway corridors. Your contribution and concerns might relate to particular values that need to be considered in managing the corridor, such as ecological integrity and biodiversity, hydrology, landscape character and amenity, recreation, heritage and culture, or it might focus upon site specific examples of good or bad practices and opportunities for improvement.

Your participation in the project is voluntary and will involve taking part in a workshop in which you will be asked to look at, sort and comment on a set of photos we have prepared that illustrate different roadside settings. There may be up to ten people at each workshop, but if you prefer to take part individually we can arrange a time and place that suits you. In the case of the multi-person workshops, individual participants will not be able to see other participants' responses.

We expect that the total time needed for you to complete these exercises will be approximately one hour. We will be available to help you with any questions you have regarding the workshop or the research in general.

The results of the project will be published, but you may be assured of complete anonymity in relation to the information you provide and such information will be reported anonymously and will only be used in aggregate form. (The consent form we will ask you to sign asks you to record your name and position but this information is only for us to ensure that we have included a wide range of key informants in the research sample and the form will be kept in secure storage at Lincoln University.)

The project has been reviewed and approved by the Lincoln University Human Ethics Committee.

If you require any further information about this project you can contact either:

Professor Simon Swaffield
Phone: 03 325 3838 ext 8442
Email: Simon.Swaffield@lincoln.ac.nz

or

Dr Jude Wilson
Phone: 03 325 3838 ext 8611
Email: Jude.Wilson@lincoln.ac.nz

The NZTA representative coordinating this project is:

Georgina Cranswick
Phone: 04 894 6662
Email: Georgina.Cranswick@nzta.co.nz

Environmental Asset Management of the State Highway System:
Perceptions and values of road user groups, designers and managers

Consent Form

I have read and understood the description of the above named project. On this basis I agree to participate as a subject in the project, and I consent to publication of the results of the project with the understanding that anonymity will be preserved. I understand also that I may withdraw from the project, including withdrawal of any information I have provided up until the completion of this workshop.

Name: _____

Position/role: _____

Signed: _____ Date: _____