WAIHEKE ISLAND

PERCEPTIONS OF THE ENVIRONMENT

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ABSTRACT

The need for the sustainable management of resources has been recognised since the early 1980s. However, the concept that the physical landscape is also a resource which needs to be managed and quantified is more recent. New Zealand is one country where sustainable management is paramount, as the natural landscape has become the country's greatest asset. Mechanisms to quantify the aesthetic quality of the landscape are now regarded as essential management tools. Research, however, has shown that it is peoples' perception of the landscape which truly reflects its value.

The focus of this research was therefore to quantify the residents' and visitors' perception of the Waiheke Island environment. The diversity of landscapes and stunning natural beauty of Waiheke made it the ideal choice for a study on visual perception. Part of the research design included identifying the differences in perception between Waiheke residents, New Zealand domestic visitors and international visitors. Previous research had confirmed that there were differences between locals and visitors; however the individual groups were not clearly defined.

The research design was a combination of quantitative and qualitative research methods which generated data with both richness and depth. The Q sort method with photographs was well suited for this type of research, with visual stimuli allowing for subjective judgements to be made. Participants' personal values and opinions were also sought as part of the interview process, to add depth to the Q sort data. The scale of the research was larger than similar studies, with a total of 82 interviews undertaken, of which a significant number where residents of the Island.

The results of this study confirmed that the environment was perceived differently by the population groups. International visitors in particular showed a high preference for the natural landscape. The inclusion of public preferences in the planning process was also supported by this research. A higher level of community involvement will ensure the effective implementation of management strategies in the future. This study reinforces the use of Q sort method as a research tool for understanding peoples' perception of the environment, which can be useful in developing planning strategies.

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1.0 INTRODUCTION

New Zealand comprises of a myriad of 'little landscapes', each reflecting a changing natural environment. It is the diversity of the landscapes and New Zealand's 'clean and green' image, which have become the major tourism draw cards for this country. The 'sublime' physical landscape is the country's greatest natural resource and continues to set New Zealand apart as a tourist destination. Bell and Lyall (2002) define 'sublime' as "an abstract quality in which the dominant feature is the presence or idea of transcendental immensity or greatness: power, heroism, or vastness in space or time" (2002, p.4). The physical landscape is therefore not a static arena but dynamic in nature, which makes objective measurement obsolete (Bell & Lyall, 2002). Its value as a natural resource will only increase as global pressures on other wilderness areas in the world, leads to degradation of those resources (Bell, 1996).

Fairweather and Swaffield state that "tourism as a phenomenon is intimately grounded within the experience of landscape" (2002, p.283). However, the perceptions of both international visitors and New Zealanders alike are changing, with the increased global awareness of environmental issues. They now expect to see 'environmentally friendly' tourism operations and sustainable management of resources, as part of New Zealand's 'clean and green' image. This need to understand visitor's expectations and perceptions has prompted research into landscape evaluation and assessment. It is only through understanding what motivates both visitors and New Zealanders that proper management of resources can be achieved (Kearsley, Coughlan & Ritchie, 1998).

The importance of understanding the perceptions of both domestic travellers and local communities within New Zealand has become a crucial part of the overall picture. Many of New Zealand's most scenic locations are also home to thriving communities (Swaffield & O'Conner, 1986). The sublime physical landscape may support a tourism industry in the area, but it is just one part of the picture for local residents. However, the physical attributes of the location, that the community appreciates, can be a double-edged sword. Visualise an island, which boasts ninety-six kilometres of coastline, forty kilometres of beautiful beaches, natural harbours, and an uninterrupted view of the

Pacific Ocean, clear all the way to Chile. Now add to that picture, Auckland, a major destination city, situated a mere twenty kilometres to the east, literally thirty-five minutes away by ferry. The location is Waiheke Island and the paradox between its role as 'Jewel' of the Hauraki Gulf verses 'marine' subdivision of Auckland becomes apparent.

1.1 Background to Waiheke Island

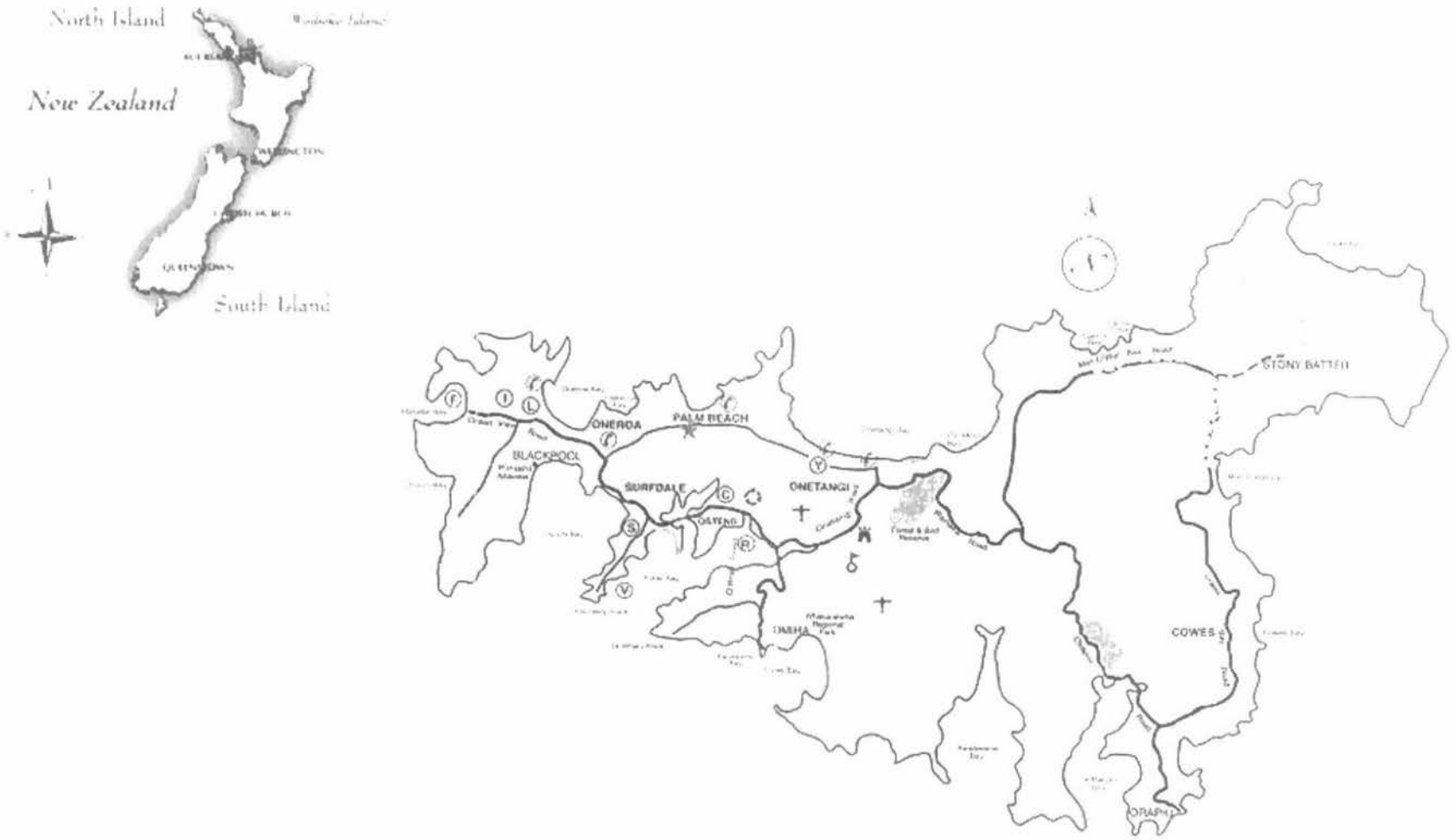
This paradox creates a range of complexities for the management of Waiheke Island. It is therefore important to appreciate the nature of the Island for the context of this research.

Topography

Waiheke or 'cascading waters', is the second largest island after Great Barrier in the Hauraki Gulf Region, with an area of 9,324 hectares, or ninety-two square kilometres. Judging by the length of the beaches and coastline as mentioned above, Waiheke sounds physically big. However, total length of the Island is only twenty-six kilometres, with a maximum width of just nineteen kilometres. This tapers down to a mere one kilometre in some places, and the highest point on the Island is just 230 metres (Picard & Picard, 1993). In general, Waiheke enjoys a maritime climate when compared to Auckland. The Island has less rain, a lower humidity factor, and temperatures averaging four degrees higher than in Auckland. All of these factors, combined with such diverse landscapes, and favourable weather patterns, make Waiheke both a popular holiday destination and residential location.

The location map and detail map of Waiheke Island is shown in Figure 1.1

Figure 1.1 – Location map and detail map of Waiheke Island



Chronological History

Historically, ownership of this 'Jewel' of the Gulf, with its considerable attributes has been a highly sought after prize, by both Maori and European alike, for generations. Pre-colonial occupation, of Waiheke or Te Motuarairoa, the 'long sheltering island', as it was originally known, was highly contested by two Maori tribes, the Ngati Paoa and Ngati Maru (Monin, 2001). Each tribe wanted the outright control of the Island. However, it was the Ngati Paoa who assumed possession of Waiheke Island in the early 1830s. They were finally able to relight the 'fires of occupation' (ahi ka), after the decision of Ngati Maru not to return themselves "to avoid rekindling the earlier troubles between the two tribes" (Monin, 2001, p.73). Ironically, these two tribes have now joined forces, along with the Ngati Rongo U, Ngati Tamatera and Ngati Whanaunga. The combined group make up the "five related iwi of Marutuahu Confederation" of the Hauraki Gulf Region (Monin, 2001, p.8).

Waiheke Island has therefore witnessed many different phases of Maori occupation over the centuries (Monin, 1992). However, apart from a few archaeological sites, there is little physical evidence left on Waiheke of these occupations. In contrast, the arrival of the European or 'Pakeha' in the early 1800s dramatically changed the physical landscape and the repercussions are still evident today. By the mid 1800s, the early settlers had literally 'stripped' the pristine native bush and forests for timber, which impacted on the whole environment. Colonisation of places like Auckland meant there was an ever-increasing demand for building materials, especially the Kauri trees. The need to trade in such commodities as building supplies, was why "Hauraki was the first region in New Zealand to experience extensive, sustained Maori-European contact" (Monin, 2001, p. 38).

The coming of the 'Pakeha' therefore signalled a new era for Waiheke Island. The actual landscape had undergone a dramatic transformation. Some parts of the Island had changed from pristine forest to virtually barren land in less than fifty years. However, more changes were to come, with the Island again being transformed into pastoral land between 1850 and 1920. The establishment of sheep farming on the Island was a natural progression in terms of development. The real money, however, was in farmland subdivisions, particularly in

west Waiheke. The settlements of Oneroa, Ostend, Onetangi, Palm Beach and Surfdale were amongst the first to be established, and were a direct result of 'farmland subdivision'.

The advent of World War II brought the next significant change to the Island. The army built large concrete gun emplacements, as well as a network of tunnels at 'Stoney Batter', a hill on the eastern end of Waiheke. These defence structures have now become one of the major tourist attractions on the Island. Other tourist activities include horseback riding, golf and fishing pursuits, along with a variety of marine related sports. Scenic bush walks are also popular, especially in places like the Whakanewha Regional Park near Rocky Bay.

Over the last decade, Waiheke has taken on more of an 'urban look' due to an increase in both sub-division and general development on the Island. However, Waiheke's diverse topography restricts the usual resident population of approximately 7000 to small concentrated pockets at the western end of the Island. The northern side of the Island features Oneroa, the main rural service town, and gateway to the ferry terminal. The two small townships of Onetangi and Palm Beach are also located on this side of the Island. The southern side of the Island has the residential areas of Surfdale, Ostend, Kennedy's Bay, Blackpool, and the more isolated community of Rocky Bay. The eastern side of the Island in contrast, is still predominantly pastoral, and is reminiscent of the remote 'Scottish Highlands'.

Seasonal Variation

The western end of the Island is therefore more developed and attracts both international tourists and local holidaymakers alike. In the summer, or 'high season,' the population can swell to over 32,000 people. Therefore, the same facilities and services, which in reality can barely cope with just over 7000 residents, must now deal with nearly five times as many people. Oneroa, the hub of the local business community for retail shops and support services, is unable to cope with such big influxes of people. The 'downtown' area becomes so heavily congested over summer, that many of the Island residents actually avoid the area during the 'high season', especially on the weekends. The winter brings a reprieve from the onslaught of visitors; such is the marked seasonal variation experienced on the Island.

Ferry Services

Two ferry companies service Waiheke Island and provide both commercial and domestic transportation all year around. Subritzky Line, based in Half Moon Bay, operates a car and passenger ferry service. The Fullers Group operate out of Auckland Central and provide mainly a passenger service, with up to 19 ferry trips daily to the Island. Fullers also bring the bulk of the day-trippers to the Island, mainly due to their convenient downtown location and Devonport connection services. With literally an hourly service running through peak periods of the day, both Island commuters and visitors have plenty of options available to them. During the summer, day-trippers normally catch the 9 or 10 am sailing, spend between 6 to 8 hours on the Island and take the late afternoon sailing back. Due to the popularity of these sailing times, the wharf area is often congested. Island commuters also experience similar peak time congestion, as part of their daily routine.

Regional Implications

The close proximity of Auckland has had other ramifications beyond just the impact of visitor numbers over the summer to the Island. This 'Jewel' of the Hauraki Gulf, for all intends and purposes, has become part of the inner city zone. The fact, that Auckland City Council has jurisdiction over Waiheke Island has been a point of contention for several Island residents. The inner city zoning has resulted in a general reduction in the disparity of the overall 'cost of living', in comparison with the Greater Auckland Area. Rates have increased and now match some inner Auckland suburbs. As the vast majority of Waiheke residents still rely on tank water and maintain their own septic tank systems, these rate increases have met with some resentment. Considering the revenue generated from rate collection, the upgrade of amenities on the Island seems comparatively slow, another point noted by the local community.

Future Development

However, the true dilemma facing Waiheke residents involves how to retain the enviable 'lifestyle' and upgrade these amenities, without encouraging yet more people to come. Another option taken by some local residents was to face the inevitable, relocate to places like Great Barrier Island, and literally start again. These were just some of the issues that the Auckland Region Council hoped to address in the adoption of the 'Essentially Waiheke – A Village and Rural Communities Strategy' in October 2000. The strategy was part of a fifty-year regional plan which aimed at greater local involvement in the planning process. The 'Essentially Waiheke' Strategy comprised of five central principles: environmental protection; economic development and employment; strong communities; location and principles to protect and enhance Waiheke's character.

The implementation of these management strategies was essential, with projections made as part of the 'Essentially Waiheke' Strategy, estimating the Island population will reach 10,000 people by the year 2006. The projected figure would be approximately 1.5 times the present resident population. The long-term goal of these strategies was to ensure a sustainable future for the Island:

"where opportunities for development are facilitated and the Island's community values and outstanding natural environment are respected and nurtured"

('Essentially Waiheke' – A Village and Rural Communities Strategy, 2000, p.1).

Changing Demographics

Waiheke Island has not only changed in terms of its physical landscape, but there has also been a marked change in the basic demographics as well. It is therefore important to gain a perspective of the demographic history of the Island, to acquire a 'feel' for the 'Waiheke of old'. The brief synopsis that follows highlights the ten-year period between 1986 and 1996 as it was a transitional time on the Island. Statistical information used in this section was part of a survey released by the Auckland Region Council in 2000. The primary source of data used in the survey were figures obtained from Statistics New Zealand. The usual residential population of Waiheke's major rural towns: Onetangi, Ostend, and Oneroa were used to generate all figures and percentages shown. Detail is provided in Appendix A.

The employment profile of the Island offers a good barometer of the changes that have transpired. An upward trend was noted in the 'change of gainfully employed' figures from 1986 to 1996. In that 10-year period, there was a 96% increase recorded for Oneroa, 53% for Ostend, and a massive 140% for Onetangi. The intermediary changes were also significant with a 62 % increase shown for Oneroa, 41% for Ostend, and 50% for Onetangi in the 1991 to 1996 period. What these figures failed to show was that employment opportunities were lacking on the Island. In reality, only 38% of Oneroa population were actually 'gainfully employed in 1996, up from 27% in 1986. Ostend fluctuated between 28% and 32% during the ten-year period, with Onetangi going from 26% in 1986 to 40% in 1996.

These figures also reflect Waiheke's alternative lifestyle era, where a significant number of residents were not actively in the workforce. Some residents simply opted out and others were ruled 'unfit' to work for various reasons. The 'labour force status' figures collected in 1996 illustrated that point, with 43% of Oneroa's population not in the labour force and a further 4% unavailable for work at all. Another interesting statistic to emerge in relation to Waiheke's employment figures was the change in occupational status of the residents of the Island. Based on the Oneroa population, the 1986 figures showed only 4% were listed as 'Administrators and Managers', which increased to 15% in 1996. The same trend emerged in the 'Professional and Associated Professional' category, with the figure going from 10% in 1986 to 27% in 1996. These figures give some indication of the number of Waiheke residents who were commuting daily to work in the Auckland Central Business District.

Conversely, Waiheke has seen a decline in the 'Service and Sales Workers' category with figures dropping from 25% in 1986 to 15% in 1996. This trend continued in the 'Tradesmen / Machine operators' category with 39% listed in 1986 dropping to 23% in 1996. All other occupational categories remained relatively constant over the corresponding period. The upward movement in the 'professionally' orientated workforce appears to have been at the detriment of the more 'manual' occupations.

Job flexibility was also crucial to maintain a decent standard of living, due to seasonal nature of the tourism industry on Waiheke. The employment profile of the Island residents again reflects the changes that have occurred and the impact of development that has taken place.

1.2 Overview

Waiheke Island offers a myriad of landscapes with sandy beaches, rocky headlands, sheltered bays, and natural anchorages. The landscape bears the scars of invasions, colonisation, pastoral farming and now the effects of intensive subdivision. However, without proper planning, the changes that Waiheke Island has witnessed in the past will pale in comparison to what may happen. According to projections made as part of the 'Essentially Waiheke' Strategy, the Island population will reach approximately 10,000 people by the year 2006. The effective implementation of these strategies needs to be based on sound research. An examination of the environmental impacts of development is one obvious area the Regional Council will need to address. However, it is important to ascertain how the local residents perceive the future of Waiheke Island, and what role tourism will play. By quantifying these values and expectations, and using appropriate management strategies, the future development of the Island will be sustainable.

This research addresses this component, and assesses the perceptions of both local residents and visitor to the Waiheke Island landscape. The specific research question is:

What are the perceptions of residents and visitors to the Waiheke Island environment?

This will be achieved through an examination of the following objectives:

to quantify residents' perceptions

to quantify visitors' perceptions

to enhance the quantitative data obtained by more in-depth qualitative method

1.3 Structure of the Report

This first section has provided a background to Waiheke Island and highlights the importance of both maintaining the quality of the environment and understanding how people feel about their environment. The next chapter examines the literature on the perception of beauty and how it applies to the aesthetics of the landscape. Following this, the methodology used in the research is reviewed with both qualitative and quantitative methods discussed. The results and discussion chapters will be then examined, with the final chapter containing the conclusions and recommendations.

Chapter Two

2.0 Literature Review

This section outlines the relevant literature in the context of the research, from the perception of beauty, to the application of landscape assessment techniques. The literature provides the historical background of theories used in landscape management and assesses current models in use. The final part of this section examines Q method, a technique used in landscape assessment in further detail.

2.1 Perceptions of the Environment

"We are visual creatures in a visual world surrounded by perplexing rich stimulus arrays that we cannot afford to take for granted" (R. Kaplan, 1975, p.129)

Visual perception is, literally how we see the world. In fact, visual stimuli can influence our opinions on things as diverse as how we judge people, or how we view the environment in which we live. According to Bell, visual perception involves
"... the reception of visual stimuli, the intuitive recognition of an aesthetic quality and the ability of the mind to connect sensory information to other knowledge and so to develop opinions about what has been perceived"
(Bell, 2001, p.207).

One of the key elements of Bell's definition is aesthetic quality. This relates to the appreciation of beauty in all its forms. Accordingly, the 'intuitive recognition' factors, in terms of beauty, dictate if an object is 'aesthetically pleasing' or not. The depth of the 'other knowledge' also affects the interpretation of the aesthetic quality of an object. More importantly, however, are theoretical foundations that people use to form their opinions on aesthetic quality. In fact, what defines aesthetic quality, or the beauty of an object?

Since time immemorial, it seems philosophers have been searching to define 'beauty', and hence determine what is 'aesthetically pleasing'. Classical philosophers like Socrates linked beauty and morality, whilst Plato believed objects were "always beautiful in their very

nature" (Lothian, 1999, p.183). Christian philosophers also concurred that beauty was intrinsic to the object, as nature was seen as the work of the Creator. However, the concept of beauty underwent a transformation in the early Renaissance period with the emergence of 'classicism'. Beauty was redefined by classic characteristics such as "regularity, restraint, symmetry, proportion and balance" (Lothian, 1999, p.185). Ironically, mountain landscapes were an affront to the principles of classicism, as they lacked essential elements such as 'symmetry' and 'balance'. In fact, the aversion felt towards mountain landscapes lasted for many centuries, because of these classicism principles.

Despite the fact that the concept of beauty was reclassified during the Renaissance period, the traditional stance has been that beauty is 'inherent' in an object. The 'objectivist' or physical stance has encompassed this. These traditional theories were however, about to be challenged. John Locke, a British empiricist in the 17th Century, was the first to introduce the concept of 'subjective' qualities into the equation. Locke's concept provided the theory behind the subjective stance, and was where "the leap of realization that beauty is of the mind" originated (Lothian, 1999, p.186). Locke proposed that the beauty of an object also comprised of secondary qualities, such as colour, touch, taste and smell (Lothian, 1999). Locke was describing aesthetics, although German philosopher Alexander Baumgarten coined the actual term in 1750.

It was the 18th century, however, that became know as "*the* century of aesthetics", because of the work of philosophers like Germany's Immanuel Kant. The validity of the objectivist theory was challenged by Kant when he introduced "the philosophical rationale for understanding aesthetics as a wholly subjective phenomenon" (Lothian, 1999, p.196). Consequently, Kant actually refined Locke's theory, that it was the 'mind's representation' of the object, not the actual object itself, that exhibits beauty. This new 'subjectivist' or psychological stance was encompassed by the old adage 'beauty is in the eyes of the beholder'. This subjectivist theory was further endorsed by Goldman in the 1960s who stated "Kant shows that beauty, which at first sight seems to be an objective property of a beautiful object, is in reality a human valuation of it" (Goldman, 1967, p.184 cited Lothian, 1999, p.188). Zimmerman later offered a more concise definition for Kant's theory, stating

"it is the object *as experienced* which exhibits beauty" (1968, p.386 cited in Lothian, 1999, p.188).

The concept of beauty has therefore evolved to encompass many aspects of everyday life, including the natural landscape. People use accumulated sensory experiences to form their opinions and to determine the relative aesthetic quality of an object. In fact, the way we perceive our environment can ultimately affect how we view or value its aesthetically quality. For, as Bell states

> "... we do not perceive our environment neutrally, but view it in terms of what it affords us. This adds a utilitarian overlay to the purposes of perception, a very significant factor when we consider who is looking at our visual landscape and why (tourists, loggers, etc.) " (2001, p.207).

Environments that are balanced in terms their physical, biological, and cultural processes are also highly regarded as landscapes. The perceived visual quality reflects the harmonious relationship between these landscape elements and the effectiveness of the management strategies in place (Goodwin, de Lambert, Dawson, Mc Mahon and Rockman, 2000). These elements also quantify the landform, land-cover, and land-use components that are present in each landscape. The interrelationship between these three components determines the character of the landscape, which can range from a pristine to a highly modified form. This also reflects the natural character of the landscape, which determines its beauty or aesthetic quality. Even highly modified landscapes still exhibit some of these processes and hence, some type of aesthetic appeal. Therefore, preservation of the landscape involves "maintenance of the natural processes and systems, as well as the visual attributes of naturalness" (Goodwin *et al.*, 2000, p.61).

The environment is dynamic in nature, which means monitoring the effects of change also becomes part of managing these natural processes. Sustainable development offers the ideal solution, as it promotes the preservation or enhancement of the environment. It also provides a guideline to minimise the impact of any changes that may occur between these natural processes.

The widely accepted definition of sustainable development is "to ensure that it meets the needs of the present without comprising the ability of future generations to meet their own needs" (World Commission on Environment and Development (WCED), 1987, p.8). The above definition was taken from "Our Common Future", referred to as the Brundtland Report. The release of the Brundtland Report provided a framework for the development of future policies on environmental sustainability (McChesney, 1991). The Brundtland Report also recognised the importance of sustainable development both globally, with greater interdependence amongst nations and more importantly on a national level (Selman, 1996). The adage 'act locally, think globally' is very apt when describing sustainable development.

New Zealand's adoption of the Resource Management Act (RMA) of 1991 was in direct response to this global shift towards more sustainable development. The RMA is regarded as a blueprint to ensure the sustainability of the natural and physical environment (Knight, 1999). Memon states, "New Zealand may be the first country to have turned sustainable management into law" (1993, p.13). Three sections of the RMA directly pertain to the sustainable management of the physical landscape. Section 6 (b) concerns the protection of landscapes of national importance, which display outstanding natural features (Goodwin *et al.*, 2000). Section 5 covers the majority of landscapes, which simply come under the resource classification. Section 7 (c) & (f) promotes the maintenance and enhancement of both the amenity value of the landscape and quality of the environment (Goodwin *et al.*, 2000).

These three sections of the RMA have been instrumental in the protection of New Zealand's greatest natural asset, its landscape, for over a decade now. It is important to note that the RMA is a not a prescriptive piece of legislation. The focus is on managing the effects of an activity (such as tourism or viticulture) rather than the activities themselves (Page & Thorn, 1997). As such, there is a need for sophisticated and effective management tools to determine the effects of any activity and to minimise the impacts of that activity. Landscape assessment methods are one such tool used to monitor the environmental impact caused by land-use changes in scenic areas (Jones, Patterson, and Hammitt, 2000).

For the RMA to succeed as the 'blue print' for sustainable development, management strategies need to start at the 'grass roots' level. These strategies involve evaluating one factor over another as part of the decision-making process. This applies to any management strategy, regardless of the discipline involved. To rank these factors according to their priority status, there must be a common basis of comparison. Therefore, landscape quality, like any another natural resource, needs some form of mechanism by which to evaluate its relative importance. This would facilitate the evaluation of factors, such as quantifying the impact of highly modified landscapes on the environment. Others factors include the ability to measure the degree of modification, or conversely naturalness, on the landscape's overall aesthetic value.

2.2 Measurement of Environmental Quality

When measuring the aesthetic quality of landscape therefore, it is important to determine how individuals' perceive and value it as a resource. Combining a number of these individual values represents a consensus on issues, such as the qualities that contribute to the aesthetics of a landscape. This consensus also forms the framework to construct a model which is representative of that sample group. This type of assessment process originates from Kant's subjectivist or psychological stance. However, not all methods rely on public preference when it comes to accessing the 'community's views'. Options vary in these methods, from using a group of professionals to access the 'community's views', to relying on an individual's assessment. This type of approach emanated from the traditional objectivist or physical stance.

These two stances, the objectivist and subjectivist, form the continuum in terms of landscape quality assessment. They have also provided the foundation for the development of different landscape assessment models. Consequently, before contemplating any type of landscape study, a researcher must be aware of both the strengths and inherent flaws of these original paradigms. This involves identifying the fundamental differences between the two methodologies.

The subjectivist method relies on the community's assessment of landscape preferences. Subsequently, it represents the consensus, not just one individual's assessment of a given

situation. The 'subjectivist' method believes in the old adage, 'a picture paints a thousand words'. Therefore, the data collected has an in-depth richness to it, not seen in other methods. The subjectivist paradigm has scientific rigour and statistical validity, which also implies that it is both replicable and objective in nature. These criteria are all considered as fundamental to scientific research methodology (Page & Meyer, 2000). In addition, the subjectivist paradigm has the flexibility to depict a variety of landscape scenarios concurrently. This can also extend to predicting impacts of proposed land-use options, with the public assessing a series of photographic scenarios. The consensus view of the public would then become part of both the planning and decision-making processes.

The subjectivist model has very few limitations in terms of its use as a research method. It does, however, require a certain level of expertise in its application. This includes issues such as the selection of photographs, conducting interviews, and using statistical analysis in order to interpret the results. Consequently, this technique tends to be both more time consuming and expensive than the objectivist method (Lothian, 1999).

Ironically, the objectivist method is subjective in its construction, as it only assesses the object itself. The objectivist approach uses clinical measurements, such as surveys of the physical landscape. The research tools employed in the objectivist method are simple in terms of design, with less expertise required in their application. However, the research method fails to deliver in-depth data, because of its subjective nature. The ability to ascertain other aspects such as how aesthetically pleasing people find the landscape is also lost. Results obtained from this method also lack replicability, given that the study may have only involved one individual's assessment. These apparent flaws of the objectivist method are contrary to the basic statistical and scientific requirements of a good research method (Page & Meyer, 2000). In fact, the scientific credibility of the objectivist paradigm has been an inherent flaw since its very conception (Lothian, 1999). Consequently, the objectivist model is now primarily used as a complementary method.

This brief synopsis of the development of the concepts of landscape perception clarifies the fundamental differences between the two paradigms, as outlined in Table 2.1. It also draws attention to the importance of developing an effective method to assess landscape quality.

The concept of sustainable development was also examined, and its application assessed in terms of management strategies especially for environmental issues.

Table 2.1 **Characteristic of the Two Paradigms**

Objectivist or Physical Paradigm	**Subjectivist or Psychological Paradigm**
Landscape quality - an intrinsic attribute Assessed by applying criteria to landscape Subjectivity presented as objectivity	Landscape quality -the eyes of the beholder Assessed by psychological methods Objective evaluation of subjectivity

Adapted from Lothian, (1999)

The following section involves aligning both the objectivist (physical) and subjectivist (psychological) paradigms with the appropriate landscape assessment methods. As with any research method, certain criteria, such as reliability, validity, and sensitivity are applicable (Page & Meyer, 2000). All of these factors are crucial, along with utility and generality to ensure landscape quality aligns with other relevant environmental quality measures. These relate to the physical / biological and social features of the environment, so that accurate predictions of the implications of environmental change can be made (Arthur, Daniel and Boster, 1977; Wohlwill, 1976).

In an effort to simplify the landscape assessment process, five conceptual models have been identified. These comprise of the ecological, formal aesthetic, psychophysical, psychological and phenomenological models (Daniel & Vining, 1983). Zube, Sell, and Taylor (1982), enhanced these five conceptual models as shown in Table 2.2. Daniel and Vining (1983) and Uzzell (1991) made further refinements, particularly in terms of social and cultural constructs, and these are shown in parenthesis. These conceptual models serve to further extend the two original paradigms. The objectivist (physical) paradigm, however, is more pragmatic in nature, and therefore is encompassed by the "expert" model (refer Table 2.2.). In contrast, the subjectivist (psychological) paradigm emphasises the human element. Consequently, the subjectivist paradigm has more flexibility in design and can align with the psychophysical, cognitive, socio-cultural and experiential models identified in Table 2.2. These models can be used to quantify key factors, such as what nature elements contribute to landscape quality, and how it rates aesthetically.

Table 2.2

Paradigms of Landscape Perception Research (after Zube et al.,1982)					
Dimension	**Paradigm**				
	Expert (Aesthetic & ecological)	Psychophysical	Cognitive / Psychological	Socio-Cultural	Experimental (phenomenological)
Human	Passive →				Active
Landscape	Dimensional →				Holistic

Adapted from Fairweather, Swaffield & Simmons (1998)

However, landscape resource management also involves the integration of certain social values which, when combined, determine the landscape's net worth to society (Daniel & Vining, 1983). The focus then shifts towards the 'environmental quality' of the landscape and thus, the protection of its aesthetic value or 'beauty'. The main fundamental difference between the five conceptual models, as interpreted by Zube *et al.* (1982) is the degree of human interaction in the assessment process. The expert model has a passive human element, therefore the landscape quality is entirely based on the physical attributes and ecological features present. The psychophysical model also involves objective measurements of the actual physical landscape. However, the human element is less passive in nature. In contrast, the cognitive / psychological model involves subjective judgements, consequently the human element takes a more active role. The phenomenological model is the most subjective of the five conceptual models, and thus involves the highest human element (Daniel & Vining, 1983).

Modern research techniques tend to reflect Kant's approach which involves using subjective preferences and judgements to assess the human element. Therefore, a combination of two conceptual models may be preferable to cover different aspects of this approach. This method would also ensure that the research design meets both the statistical and scientific mandates, as stipulated for landscape quality assessment. The predominant approaches for evaluating visual preference in natural resource management are the psychological and psychophysical models (Jones *et al.*, 2000). These meet the statistical

analyses and subjective judgement criteria. Fairweather, Swaffield and Simmons (1998) however, used a combination of the socio-cultural and phenomenological methods in their research design, which is also appropriate. These combined models can be used to assess relationships such as landscape quality and people's perception of it.

Landscape quality assessment as a research method therefore, has a well-proven philosophical base. Internationally, the use of landscape perception and preference techniques is highly regarded, and have been for well over thirty years now (Palmer, 1997). The theory behind the five conceptual models (refer Table 2.2) reinforces the development of this research. The emphasis has now shifted towards the more practical applications, such as the interpretation of the "landscape experience" (Fairweather *et al.*, 1998, p.4). For that reason, this section of the review will focus on the implementation of landscape assessment methods in the field. This will also involve highlighting the use of this method as a 'multidisciplinary' application.

R. Kaplan, S. Kaplan and Wendt (1972); R. Kaplan (1975) and S. Kaplan (1975) explored the use of the psychological model in landscape assessment. In fact, their work in the 1970s is now considered as seminal in this area of research. The studies involved the use of photographs in order to "identify relevant psychological variables" of the landscape (Daniel & Vining, 1983, p.67). The basic method involved collecting the preference ratings of individual observers, which were then combined and ranked by cluster analysis. Kaplan *et al.* (1972); R. Kaplan (1975) and S. Kaplan (1975) identified variables such as mystery, coherence and legibility that were used to develop a landscape assessment model. This also provided a method to predict landscape preferences (Daniel & Vining, 1983).

Similarly, the psychophysical methods also rely on individual preferences and judgements to assess landscapes. This method has been used to explore areas such as paired-comparison choices (Buhyoff & Wellman, 1978); rating scales of various kinds (Brush, 1979; Daniel & Boster, 1976); Q-sorts (Pitt & Zube, 1979); and ranked orders (Shafer & Brush, 1977). There has been a resurgence of interest in the use of psychophysical methods in research design in the last decade. This renewed interest in quantifying the aesthetic value of the landscape is based on the need to appraise its 'tangible value' as an asset.

This relates back to sustainable management practices and the need to prioritise assets using predetermined values. In terms of land-use management, the landscape's aesthetic quality can now determine its net worth to society. This may result in the decision to preserve, or even enhance the landscape, according to its perceived value.

Landscape assessment methods can be utilised in areas such as environmental planning, evaluating changing land use, and in recreational landscape management. In fact, this very diversity makes it such an effective management tool across a variety of disciplines. In addition, there is also scope for other applications in the future. Kane (1981) outlines the potential use of these methods in the following:

1. to help establish priority lists of sites and regions that should be preserved as part of our natural heritage;

2. to provide a means of aesthetically comparing sites and regions so that, if desired, human impact can be used to advantage or guided into the least attractive areas;

3. to help monitor deterioration of landscape quality for specific places, by means of periodic evaluations;

4. to provide a means of carrying out 'before and after' studies in order to gauge the impact of particular kinds of human activities and alterations;

5. to define and isolate the perceptual factors and physical-landscape components that are important in environmental perception and if desirable or necessary, to be able to itemise why a particular landscape is or is not aesthetically pleasing.,

6. to collect data on landscape preferences from different cultures and from diverse sub-populations (e.g. male/female, young/old, travelled / untravelled) so as to better understand technique theory, the working of our senses, the differences between various societal groups, and the biases of our cultures;

7. to satisfy a growing body of environmental law in many countries...to ensure that presently unquantified environmental amenities may be given appropriate considerations...
(1981, p.78).

Photographs, as a research tool have the advantage of being economical to produce, relatively simple to oversee and easily incorporated into any research design. The use of visual stimuli, such as photographs, has now been accepted as a surrogate to experiencing the physical scene or object. In fact, the actual scope and application of landscape assessment methods has been further enhanced by the use of photographs. Computer-simulated photographic images have also been used as surrogates in research applications (Fairweather & Swaffield, 2000). Digitally enhanced images are used to portray potential future landscapes which can then be evaluated by the public or even professional consultants.

In terms of its practical application, Fairweather and Swaffield (1999) stated "respondents correctly interpret photographs presented to them as indicators of the 'real' landscape, and make their evaluation on that basis" (1999, p.6). Fairweather, *et al.* (1998) observed that there was no significant difference in the results between that of photographs and "from experience in the field" (1998, p.8). Therefore as a visual surrogate, photographs were "able to convey much of the richness of a landscape setting" (Fairweather *et al.*, 1998, p.8).

The general viability of photographs as surrogates for landscape experience is supported by a series of comparative evaluations conducted through the 1970s and 1980s (Shafer and Brush, 1977; Shuttleworth, 1980; Sheppard, 1982; Coeterier, 1983; Zube and Pitt, 1981). Palmer (2000) also examined the validity of photographs as surrogates as part of his research into the reliability of rating visual landscape qualities. Palmer concluded that any problems encountered were normally because:
"... the instructions describing the landscape attributes to be evaluated were not understood or were inadequate in other ways" (Palmer, 2000, p.180).

Palmer recommended that a form of 'visual instruction' should also be included in research designs. This would not only improve the reliability of the results obtained but also reinforce the normal written or oral instructions given.

Cherem and Driver's (1983) research also featured photographs, but from a different perspective. Their work focused on the development of the Visitor Employed Photography (VEP) landscape assessment method. In this method, visitors used disposable cameras to record what they considered pleasing landscapes along a predetermined nature trail. The designated person also recorded the location and reasons for selecting each landscape. On the completion of the walk, part of the interview process involved participants ranking the top three locations and justifying their selections. This technique can help to "quantify the perceptual responses of recreational visitors" (Cherem &Driver, 1983, p.65). The practical aspect of the research involved identifying methods in order to assess the common perceptions of the natural environments. This was in recognition of the difficulties of "inventorying and classifying natural areas for their scenic values...[in] the land management planning process" (Cherem & Driver, 1983, p.65).

Indications from previous VEP studies suggested that visitors photographed similar scenes (Cherem, 1973; Traweek, 1977). The trend was termed as a 'commonality of response' and was measured by identifying 'consensus photographs'. The criteria given for consensus photographs were that at least 10% of the participants included these particular photographs in their selection (Cherem & Driver, 1983). The consensus photographs were visitor generated, and were therefore seen as a "measure of human responsiveness to the natural environment, generated as directly as possible from the perceptions of on-site visitors" (Cherem & Driver, 1983, p.66). The technique therefore allowed for a higher degree of involvement in terms of the participant input than the more traditional verbal response techniques (Cherem & Driver, 1983).

Longitudinal studies also incorporate photographs in the research design, as they provide a point of reference between the different studies. Palmer (1997) used photographs to assess the stability of landscape perceptions in the face of landscape change. The original piece of research was conducted in 1976, based on the town of Dennis, in Cape Cod, Massachusetts. Palmer's comparative study in 1987 was an "opportunity to study a community's landscape perception and their relation to landscape change" (Palmer, 1997, p.113). One of the main objectives of Palmer's study was to quantify the residents' perceptions of landscape classes and scenic value. The original research methodology was based on two evaluation exercises

and a questionnaire. Initially, a free-sort technique was used to categorise the photographs into similar landscape groups. Palmer then used the Q-sort method, in conjunction with a seven-point scale, to evaluate the scenic quality of each photograph.

Part of the procedure involved participants explaining in their own words, "what characteristics distinguished the most and least scenic landscapes from other landscapes" (Palmer, 1997, p.110). The combination of these two techniques produced a set of data that had both depth and richness. Subsequent analysis of the data enabled each photograph to be rated in terms of "the view's scenic resource value" (Palmer, 1997, p.110). Results showed that natural forest areas were regarded as having a higher 'scenic resource value' than residential housing developments (Palmer, 1997). One interesting aspect to emerge from this research was that residents' perceived the various local landscapes as part of their community's identity. Sustainable management practices were therefore encouraged by the residents to protect the local landscapes. Palmer reinforced the management aspect of landscape research when he stated that the study was " one more indication that visual qualities can be treated as just one more natural resource and managed as such" (1997, p.112).

Landscape assessment techniques, especially those involving photographs, have therefore proven to be both practical and reliable management tools. Despite this, only certain disciplines actually use these techniques to their full potential. The forestry industry is one such exception, where the potential of visual landscape assessment was quickly recognised. Bell's (2001) research into sustainable forestry management highlighted the importance that planners, designers and managers placed on sketches and photographs. He identified that these traditional methods provided a 'quick, simple and cheap' option for project visualisation (Bell, 2001). The forestry industry has also used the 'predictive' abilities of landscape assessment methods in order elicit public opinion on future developments. Forestry planners use computer-generated images to present a variety of scenarios, such as landscape changes caused by clear felling. Then, by gauging the different public preferences to these changes, planners can pre-empt the negative impacts of any proposed management strategies.

In New Zealand, techniques such as landscape assessment methods are used to measure the effectiveness of the Resource Management Act. The RMA literally dictates that any economic growth needs to be environmentally sustainable (Rainbow, 1993). Tourism is one economic activity that impacts on the environment and also the quality of the landscape. Tourists in New Zealand, in fact often impact on the very natural environment which enticed them to the country originally (Ward, Hugley & Urlich, 2002). The type of damage caused by tourists can happen inadvertently, for example trampling on bush tracks and walking on sand dunes, or more purposely, such as littering (Weaver & Opperman, 2000). Further, the facilities provided for tourists, such as roads, hotels and commercial signage could prove to be visually disruptive.

2.3 Measurement of Tourism Impact

Visitor impact management (VIM) has been used to assess the effects on the environment from tourism and its related activities. These types of studies normally focus on the impact to parks and conservation reserves. Graefe, Kuss and Vaske's (1990) work used case studies to examine the interrelationships between tourism and the environment in the United States. These interrelationships provide an insight into problems such as over-crowding in parks. They also indicated which type of management strategy would be the most effective to implement.

Buckley and Pannell (1990) also approached the management of tourism in natural areas. Their research addressed three main issues: zoning, intensity of use, and multiple–use management of national parks. The concept of zoning simply involved restricting activities to certain areas (Buckley & Pannell, 1990). Intensity of use focused on environmental degradation by assessing the capacity of the land in terms of both population and activities it could support. Multiple-use management focused on incorporating tourism into areas without jeopardising their conservation status (Buckley & Pannell, 1990). The researchers also recognised that both the environmental changes, and the numbers, types and behaviours of visitors needed to be monitored (Buckley & Pannell, 1990).

Butler (1992) introduced the term 'tourism landscape' to help visualize the effects of the interrelationships between the environment and visitors in general. The different types of 'tourist activities' and actual visitor numbers present will dictate the degree of modification to the environment. Butler described the transformation from a pristine landscape, to that of a modified tourist landscape, as the following:

"the original pre-tourism landscape will be utilised by tourists and changed to a landscape which is more attractive and appropriate for tourism over time, as numbers of visitors increase and specialised facilities and services are developed"

(1992, p.5)

The degree of modification can be passive, which includes options such as non-development or preservation of an area (Butler, 1992). The other end of the continuum is the active option, where extensive development takes place. This type of modification is normally undertaken to make certain areas more tourism orientated. Theme parks epitomize the "ultimate tourism landscape" as they have been specifically designed for tourism purposes (Butler, 1992, p.4). The public is willing to pay for these facilities, with most theme parks conveniently located close to urban areas. Theme parks also qualify as the most 'unnatural' tourism landscape in terms of its geographical origin.

On the other end of the continuum, national parks represent the 'least' modified landscapes. The type of tourist activities available will depend on the type of park and the remoteness of the location. Entry to national parks is normally free or at a nominal charge. The 'degree of naturalness' exhibited by the different types of tourism landscapes also determines its impact on the environment. This concept is shown in Table 2.3, where five different types of tourism landscapes have been ranked on the continuum from least to most modified.

Table 2.3 **Types of Tourism Landscapes**

	National Parks	Scenic areas	Specialised Resorts	Coastal Resorts	Theme Parks
Users:	Public	Public	Paying Public	Paying Public	Paying Public
Location:	Remote/Rural	Rural/Semi	Rural/Isolated	Urban	Rural/Urban
Examples:	Yellowstone	Himalayas	Club Med.	Atlantic City	Disneyland

Degree of

LEAST MODIFIED ◄——————————► **MOST MODIFIED**

Naturalness

Adapted from Butler (1992)

Modification of the landscape can therefore range from passive to active, all of which impacts on the environment. The degree of 'naturalness' measures the aesthetic quality of a particular landscape, which again affects the environment. Even the most modified landscapes can still exhibit some type of visual appeal. However, other factors play a significant role in this transformation process and ultimately impact on the host community. The next section of the review will focus on the host community's role in tourism and environmental management. As this research occurs within a popular tourist area, it is also pertinent to further detail the positive and negative effects associated with tourism.

.Butler identified three significant factors which affect the host community and defined these as environmental, social/economic and technological (1992) as illustrated in Table 2.4. The environmental factor encompasses the reasons why tourists were attracted to the area originally. Certain geographic and climatic elements of an area may appeal to tourists or the natural features present, such as geysers and waterfalls may be the major attraction. The social/economic aspect involves identifying the expectations of tourists and assessing the host community's ability to fulfil their needs. The host community's attitudes towards tourism can range from a positive to negative stance, making it a point of contention between some stakeholders. McKercher states "tourism enjoys a love-hate relationship with its host community. It is both a much sought after and reviled activity" (1993, p.6). The technological factor is equally important, as both the host community and visitors require the appropriate infrastructure and facilities to be in place.

These factors can also affect other features within the landscape which serve as indicators of changing patterns. Butler has classified them into five distinct categories comprising of relics, modified, concerted, vanished and new elements. These five categories reflect the changes in preferences, economics, controls and environmental attitudes of the host community (Butler, 1992). One approach is to maintain the status quo or no change, with the presence of relics enhancing the visual experience for both the visitors and residents. The other end of the continuum is a complete transformation or total change, as shown below, where residents and visitors encounter an entirely modified landscape (Butler, 1992).

Table 2.4 **Continuum of Change**

Original Landscape/Uses

⇩

Modified by Three Factors

Environmental	Social/ Economic	Technological

Produce a Dynamic Tourism and Recreational Landscape/ Uses
Which Contains Five Elements

Relics	Modified	Converted	Vanished	New

No Change → Sympathetic → Major Change → Total Change

Reflecting Changes in Preferences, Economics, Controls, Environment

Adapted from Butler (1992)

Managing the effects of change between the environmental, economic and technological factors can help to minimise the effects on the host community. Dowling (1993) identified several phases that define the host community's response to change, dating back to the 1950s. These phases include "one of coexistence, conflict or with symbiotic possibilities" (Dowling, 1993, p.17). The relationship between the environment, the host community and tourism has become more integrated in recent years.

Dowling defines 'integrated' as the "potential for both conflict or symbiosis" (1993, p.17). Inskeep is regarded as a strong advocate of environmental planning for tourism, and he acknowledges that

> "...it is now generally recognised that tourism development is not necessarily detrimental to the environment and society, and can actually be a positive force in achieving conservation objectives and maintaining or even improving environmental quality..." (Inskeep 1987, p.131).

This reinforces McKercher's earlier statement that "tourism enjoys a love-hate relationship with its host community" (1993, p. 6).

McKercher's own research investigated the impact of tourism development on the host community, with both the positive and negative stances addressed. His findings culminated into the development of eight fundamental truths about tourism. Of particular relevance to this research is the third truth, which states that "tourism as a resource dependent industry must compete for scarce resources to ensure its survival" (McKercher, 1993, p.9). Other relevant "truths" are that tourism, as a consumer of resources, has the ability to over consume resources, create waste and demand specific infrastructure to support it (McKercher, 1993). All of these statements explain why it is difficult to implement environmental planning strategies in tourism areas. They also support the concept of a 'conflict' relationship with the host community and tourism as discussed earlier.

McKercher's research identified that many of the social, cultural, and environmental impacts associated with tourism development appeared to be inevitable. McKercher highlights the point that "tourists are consumers, not anthropologists" and "tourism is entertainment" (1993, p.7). These fundamental truths emphasise the more positive aspects of tourism, which is to ensure all parties benefit from the overall experience. The mandate is therefore on the host community to balance their needs with that of the environment and tourist expectations. This view further reinforces Butler's argument that communities can hold both positive and negative attitudes towards tourism simultaneously (1975). The long-term impact of tourism on host communities is clearly an area where more research is

required. This will help to identify, measure, and analyse the host community's response to a variety of tourism activities.

Allport was one of the first researchers to examine the attitudes of residents towards tourism. He defined 'attitude' as a 'state of mind' of the individual towards a value (1966 cited in Page & Lawton, 1997). The main research on attitudes to tourism and the way in which individuals react, has to date been mostly of an exploratory and descriptive nature (Ap, 1990). Ap further acknowledges that there: "is limited understanding of why residents respond to the impacts of tourism as they do, and under what conditions they react to those impacts" (1990, p. 612). Ap and Crompton (1993) later concluded that there were four different strategies employed by residents toward tourism. They described these as embracement, tolerance, adjustment and adaptation, and considered that the degree and timing of each could be placed on a continuum.

Page and Lawton's (1997) research sought to further refine this concept by examining the impact of urban tourism on destination communities. The main objective of their research was to investigate the first stage of a community-based approach to tourism planning. Devonport, an Auckland suburb, well known for ambience and cafe culture, was chosen for their case study. The popularity of Devonport as a destination community is directly attributable to its close proximity to downtown Auckland, and the commuter ferry service that links them. These ferries bring an influx of both international and domestic day-trippers to Devonport seven days a week, with peak visitation in the summer. Attractions include small speciality shops, cafes, parks and beaches, which all contribute to Devonport's character. Residents' attitudes towards tourism can also affect the attractiveness of a destination (Page & Lawton, 1997). The destination's ability to cope with the influx of visitors also affects how residents view certain types of tourism activities.

The research focused on identifying community's values to evaluate the importance of tourism to the local economy. Extensive surveys were conducted to quantify factors such as residential stability, residents' attitudes to tourism, and responses to future development of tourism, (Page & Lawton, 1997). The consensus on community values then helped to facilitate future management strategies for Devonport. Overall, residents were generally

supportive of tourism, with visitor impact contained within the town centre. The lack of major attractions and accommodation were self-limiting factors, but Devonport's popularity as a day excursion destination continues to grow. Effective management of future developments, in line with community values, will help to preserve the distinct character of the area.

Regardless of the 'type' of tourism experienced by the host community, sustainability of natural resources remains the key issue. Wight (1993) examined both the issues of sustainable tourism and ecotourism from within an ethical framework. Wight considered that there were nine principles which were fundamental to sustainable ecotourism from an ethical perspective. However, most of these nine principles are just as applicable to sustainable tourism. The following principles concerning ecotourism illustrate this point:

> "...it should not degrade the resource and should be developed in an environmentally sound manner.
>
> ...it should encourage all-party recognition of the intrinsic values of the resource.
>
> ...it should provide long-term benefits – to the resource, to the local community, and to industry." (Wight, 1993, p.56).

To promote the use of sustainable tourism practices, the United Nations has designated 2002 as the Year of Ecotourism. This 'global shift' towards more environmentally sustainable tourism encourages countries like New Zealand to adopt innovative approaches to development in this area. These innovative approaches will help to safeguard future potential earnings from tourism. Recently released tourism figures showed that $3 billion in foreign earnings was generated by the 1.96 million tourists who visited New Zealand in the year to June 2002 (Bell, 2002). International travellers are now more astute and expect to have the option of more 'environmentally friendly' activities. It is envisaged that sustainable tourism practices will eventually supersede the 'mass' or 'non sustainable' tourism operations. Regardless, New Zealand's rich and natural bio-diversity, in conjunction with a vibrant cultural heritage, is still a winning formula. The grandeur of the physical landscape continues to be the essential ingredient that sets New Zealand apart from many other destinations.

The New Zealand Tourism Industry promotes the 'clean & green' and beautiful image of the country, to entice international visitors to New Zealand. Bell further emphasises the positive 'flow on' effects of this 'clean & green' image in that

> "... a wonderful thing about having nature as the main promotional imagery for a country, is that, if protected, the value of dramatic mountains and steep untouched bush or raging rivers cannot be depleted. In fact, as development proceeds elsewhere and many of the world's wilderness areas are destroyed, untouched nature becomes rarer and so more valuable" (Bell, 1996, p.33).

New Zealand could become a truly 'holistic' tourist destination by safeguarding the natural resources for future generations. The adoption of the Resource Management Act over a decade ago was the first positive step towards a sustainable future.

2.4 Perceptions of Regional Tourism Environments

Inskeep examined the regional implications of sustainable tourism and stated "regional tourism development strategies must reflect environmental as well as socio- economic objectives" (1987, p.131). Inskeep's recommendations included the importance of promoting less 'environmentally disruptive' forms of tourism, which focused on quality rather than quantity. In terms of the overall 'tourism experience', the role of the host community was again considered an essential element. Surprisingly, despite the fact that New Zealand relies so heavy on its scenic landscape, there has been little systematic research into either residents or visitor landscape perceptions and experience (Kearsley & Higham, 1997).

Lincoln University addressed this issue by designing a series of community-based studies in New Zealand. The objective of the research was to evaluate a location's evolution as a tourist destination and to make recommendations for future management strategies (Simmons & Fairweather, 2000). The first two case studies focused on the towns of Kaikoura and Rotorua, with a regional study conducted in Westland in the South Island. The series will finish with a regional study of Banks Peninsula, another popular South Island recreational area.

The studies addressed how the New Zealand tourism industry has adapted and evolved in terms of overall management strategies. The conclusions drawn from these studies could then be used to establish better guidelines for New Zealand's tourism industry (Fairweather *et al.*, 1998). These guidelines include how to integrate sustainable development into future planning strategies, to accommodate the expected growth of tourism in New Zealand. One interesting design feature of these studies was the use of the Q sort method as a landscape assessment tool. The background and research applications of this method will be explored further at the end of this review.

The first destination in the series to be evaluated was Kaikoura in 1998. This small provincial town in the South Island has a significant level of tourism activity. Kaikoura has experienced rapid growth since the first 'whale-watching' venture started in 1988 (Horn, Simmons, & Fairweather, 1998). Previously, it was the close proximity of the seal colonies and other marine life that attracted visitors to the area. Kaikoura's environment is "both spectacular and geographically unusual", which makes this type of interaction with the marine life possible (Horn *et al.*, 1998, p. xii). An integrated framework was used to evaluate Kaikoura as a tourist destination. The research looked at the social, cultural, economic and environmental aspects of tourism development. For the purposes of this review, the focus will be on understanding visitors' experiences in Kaikoura, as outlined in Report No.5. This study was based on 38 visitors who evaluated the different types of 'landscape experiences' of Kaikoura.

The methodology used was the Q sort procedure, which involved visitors ranking 30 photographs by the following criteria: typical and untypical; liked and disliked; natural and unnatural. Five factors or themes were identified by factor analysis of the three individual Q sorts. These included iconic Kaikoura, coastal retreat and the coastal community. The respondents were also interviewed and asked to justify their top twelve photographic selections in each Q sort. Interestingly, it was noted "while visitors could sort them with enthusiasm, they did not always explain their Q sort with the same enthusiasm" (Fairweather *et al.*, 1998, p.18). Only a small number of consensus photographs, defined as those receiving similar scores across all factors, were identified in this study.

Fairweather *et al.* (1998) surmised that these responses directly relate to the "socio-cultural characteristics and expectations of the visitors" (1998, p.47). In addition, they also stated "these results are typical of research paradigms at the right hand (experimental) end of Zube *et al.*'s range of paradigms of landscape perception research" (Fairweather *et al.*, 1998, p.47). The results showed the importance of 'naturalness' in preferred landscape experiences, as identified in the other landscape perception literature. It also highlighted the need for sustainable management of the both the physical and visual effects of tourism (Fairweather & Swaffield, 2001). The overall consensus was that residents were positive about tourism and the type of tourism development to date (Simmons & Fairweather, 1998). However, according to Fairweather & Swaffield (2001) Kaikoura has reached a critical stage where further development or commercial exploitation of resources may have a negative impact on how visitors' perceive the area.

Rotorua was selected as a case study because of its various tourist attractions and well-established tourism industry, which dates back 150 years. The large resident population base also enabled the research team to assess the degree of importance placed on tourism by Rotorua's multifaceted economy. Like the Kaikoura studies, several different aspects of tourism in Rotorua were covered, with each reported separately. For the purposes of this review, the focus will be on 'Experiences of Landscape' contained in Report No.13. This study used 66 respondents, comprising of both residents and visitors to the area, to rank Rotorua's landscape in terms of 'preferred experiences'.

The Q sort method was also used in this study, where respondents evaluated 30 photographs and ranked them from the most 'liked' to those most 'disliked'. Three different sampling frames were used, with the local landscape assessed in terms of its landforms, features and attractions, and activities (Simmons & Fairweather, 2000). As with other studies of this type, all Q sorts were factor analysed. This process identified four main themes comprising of the sublime natural experience; the iconic Rotorua experience; the picturesque landscape experience, and the New Zealand family experience. Interviews were also conducted, which recorded the "subjects' attitudes, beliefs and expectations" used to

justify their selections (Simmons & Fairweather, 2000, p.17). This produced data with a greater depth and richness, which could then be used to interpret the four main themes.

In fact, the data collected identified an area that had not previously been appreciated in relation to the 'picturesque landscape experience'. The research showed that a "picturesque orientation applied to nature and built structures" (Simmons & Fairweather, 2000, p.20). This was based on analysis of the data, in which people showed an "aesthetic appreciation of the variety, contrast, composition, irregularity and interesting features of both nature and architectural settings" (Simmons & Fairweather, 2000, p.20). Two other themes also helped to differentiate if nature was appreciated for its visual appeal (sublime natural experience), or as a venue for activities (New Zealand family experience) (Simmons & Fairweather, 2000). This report contributed to the overall study of Rotorua, which has resulted in greater local control and better tourism management strategies. These strategies have been used to address environmental issues which previously threatened the sustainability of tourism in Rotorua (Simmons & Fairweather, 2000).

The Westland case study focused on the Region's role as a link between Christchurch and Queenstown, both major tourist destinations in the South Island. The Region itself is renown for its rugged scenery, with Franz Josef and Fox Glacier the major tourist attractions. Due to the rugged nature of Westland's environment, the Region is sparsely populated. The visitor numbers, both international and domestic, travelling through the area is also relatively low. As with the two previous studies, an integrated framework was used to evaluate the region as a tourist destination. For the purposes of this review, the focus will be on evaluating both the visitors and locals' experience of tourism in the Westland, as contained in Report No.29 (Simmons & Fairweather, 2001). This study was based on 111 visitors and locals who evaluated the region in terms of landscape quality and existing tourism infrastructure.

Two separate sets of photographs were used in this study, one of natural scenes, and the second of tourism infrastructure. Using the Q sort method, respondents ranked the first set of the photographs based on the criteria of 'liked' and 'disliked'. There were three themes

identified by factor analysis, comprising of 'pure nature experience', 'living in nature experience' and 'pastoral nature experience' (Simmons & Fairweather, 2001). The second Q sort ranked the remaining set of photographs using the same criteria as the first sort. The factor analysis undertaken identified four main themes, defined as the nature heritage experience, at one with nature experience, cultural heritage experience and quality and care experience.

Similar factors were identified in the Kaikoura and Rotorua case studies indicating that there is a "strong consensus in core environmental preferences among overseas and domestic visitors and local residents" (Simmons & Fairweather, 2001, p.13). Another reoccurring theme was that both residents and visitors showed a particular "sensitivity to the appearance of infrastructure provision" (Simmons & Fairweather, 2001, p.13). The integration of essential infrastructure into the natural setting was therefore seen as crucial, to minimise the impact on the environment. The recommendations of this report reinforced the importance of the degree of naturalness, as identified in the previous studies. The promotion of these natural scenic attractions will gradually decrease Westland's heavy reliance on primary production and the extractive sectors. Effective management strategies will ensure the sustainable development of Westland as a tourism destination.

These studies added to the systematic research on the residents and visitor landscape perceptions and experience in New Zealand that has already been conducted. The research also highlighted the need for "locally grounded contextual understanding of visitor experience in order to interpret the variations around and within generic themes of visitor experience in New Zealand" (Fairweather *et al.*, 1998, p.49). Regionally based studies were proposed to gain a broader pattern of response.

The use of Q sort method as a research tool in landscape assessment studies was again validated. The importance of landscape assessment techniques, which allow for the inclusion of aesthetic considerations into the environmental planning process, has also been shown. The effectiveness of long-term environmental management strategies depends on

the ability to recognize the rights of all stakeholder groups. Their inclusion in the decision making process has become crucial as:

> "different people, groups, cultures and sectors within the community each bring a complex mix of personal, spiritual, traditional and aesthetic dimensions, economic imperatives and opportunities, values and ideals, assumptions and expectations to their various interactions with the biophysical environment".
> (Parliamentary Commissioner for the Environment, 1999, p.5)

2.5 Q Method

The Q method has therefore become an established tool in the determination of perceptions of the environment. Consequently, it is important to outline the development and the process of Q sort in more detail.

Historical Background

In the early 1930s, the Q method evolved as a statistical alternative to Pearson's traditional 'R' methodology in social science research. In 1935, two British factorists, Sir Godrey Thomson and William Stephenson, independently put forward their theories on computing the correlations between subjects, rather than test scores (Fairweather & Swaffield, 1999). Thomson and Stephenson used the term Q method, to differentiate it from Pearson's 'R' methodology, when presenting their separate theories. Pearson's 'R' technique focused on the 'tests' or individual differences. 'Q' method correlated 'persons' instead of tests, which was seen as the fundamental difference between the two (Addams, 2000). In addition, the 'R' technique relies on a large sample size in comparison to the new Q method, which incorporates small in-depth studies. In fact, the large sample size needed for 'R' technique has always been an inherent weakness of Pearson's traditional methodology.

Stephenson first discussed Q method in a letter to *Nature* in June 1935, which was exemplified later that year in an article titled 'Correlating persons instead of tests' (Stephenson, 1953). Thomson mentioned Q method in an article which appeared in the British Journal of Psychology in July 1935.

However, both researchers held different views on the Q method, and as Brown (1980) explains, Thomson conceptually:

"...had approached Q factor analysis from the standpoint of the psychology of *inter*individual differences whereby subjects were independently assessed for each trait in a battery of tests...[which]...led to enormous statistical difficulties" (1980, p.10)

In contrast, Stephenson's work was considered to be a more innovative approach, as it was based on the "*intra*individual differences in significance" (Addams, 2000, p.36). Subsequently, it was Stephenson's innovative approach that helped form the basis of the modern Q methodology.

Research Applications

In terms of research, Q method therefore offers a "fundamentally different philosophical approach to social science research and measurement" (Addams, 2000, p.15). The Q method has evolved as a technique in social science research to rank a pre-selected group of 'objects' in order of importance. As a research method, it is methodical in its application and comprises of a number of basic steps (Addams, 2000). A typical study would involve the researcher identifying the areas of concern or 'discourse' to be addressed, for example pollution in the environment. Addams defines discourse as "a set of views and attitudes on a particular topic" (2000, p.15). Interviews would be used to collect statements concerning the area of discourse, from stakeholders, including the local community and appropriate professional groups. These statements would then be complied and used as the 'objects' in the sorting procedure.

Q sort Procedure

The actual ranking of these statements or objects would be "according to a condition of instruction, with the terms 'most agree' to 'most disagree' normally used. The array of statements is a Q sort" (Fairweather & Swaffield, 1999, p.3). Separate cards would be used to record each statement, so that the participant could physically rank them. There are nine categories used in a standard Q sort, which are ranked on a continuum between –4 to +4.

These categories help to distribute the individual statements into the continuum (Fairweather & Swaffield, 2002). The 'disagree' statements would be in the range of -1 to –4. Conversely, for the 'agree' statements, the rating scale would be from +1 to +4. In Q sort, zero is the measure of indifference, and is used to rate objects which people hold no strong opinions about either way (Addams, 2000).

The number of objects per category is also limited, as Q sort uses a degree of forced selection (Fairweather & Swaffield, 2002). For a Q sort containing 36 statements, a limit of two objects would be set for both –4 and +4 categories. The zero category (measure of indifference) would have eight, the maximum number allowed. The stylised grid in Table 2.5 shows the complete format for both the ranking scale and allocation per category for a Q sort of 36.

Table 2.5	**Q sort Ranking and Card Allocation**								
Rating Scale	-4	-3	-2	-1	0	1	2	3	4
Number of objects	2	3	4	5	8	5	4	3	2

The result of this forced selection process, as applied in Q sort, is a type of quasi-normal distribution (Addams, 2000). According to Fairweather *et al.* (1998) there was no technical reason for the normal curve to be used and it was simply for convenience. Regardless, the 'normal curve' distribution pattern remains the standard, with variety of hierarchical charts having now evolved to record the results of the ranking procedure. These charts have been adapted from innovators in the field, including Fairweather & Swaffield (1999), and redesigned to suit individual studies. Examples of charts used are shown in Appendix B.

The Q sort procedure commences by familiarising the participants with the actual Q 'set', which would involve the participants reading the individual statements. By reviewing the statements, the participants are then able to ascertain the range of opinions contained in the Q set. The initial procedure ultimately makes the Q sort easier, as they are familiar with the range of statements and have physically handled the cards. When participants are asked to sort statements, the majority of people have strong views either for or against certain issues. However, there is always an area of 'indifference' (Fairweather *et al.*, 1998).

The Q method accommodates this human response by automatically including an indifferent option in any condition of instruction. Participants sorting the statements would therefore have the choice of 'agree' and 'disagree' or the 'indifferent' option available to them.

Q method relies on an individual's subjectivity. Therefore participants are free to alter the placement of statements at anytime (Addams, 2000). Consequently, the final ranking procedure does not commence until the participants are satisfied that the initial sort reflects their own personal views and opinions. The actual ranking procedure to sort the three individual options follows the same formula as outlined, with a hierarchical chart used to record the order in which the statements are selected. The participants start by ranking the 'agree' and 'disagree' piles first. The 'indifferent pile' then follows, which acts as a type of buffer between them, filling in the chart where required. This entire procedure would then be repeated, until a variety of respondents had completed the Q sort 'according to the condition of instruction'. Correlation and factor analysis of each individual Q sort would then follow.

Statistical Analysis

Addams (2000) states that there are three statistical procedures needed to analyse the data from the Q sorts these are "calculation of a correlation matrix, extraction and rotation of significant factors to an acceptable solution and the computation of a set of factor scores for each factor" (2000, p.23).

Computer software packages, including the *p.c.q* program, have been specifically designed for processing Q sort data, and perform these statistical calculations automatically. However, other mainstream statistical packages such as SPSS or SAS also produce similar results. Once the statistical calculations are complete, the emphasis shifts to interpreting the results, commencing with factor analysis.

Page & Meyer (2000) define the process of factor analysis as "each variable is standardised so as to contribute a variance of one to the overall variation contained in the data" (2000, p.198). In Q sort, the variables to be correlated and subsequently factored are the actual participants (Addams, 2000). Factor analysis aims to "explain at least 60% of the overall variation for studies in social sciences...[and]... all factors should make obvious sense" (Page & Meyer, 2000, p.199). Fairweather & Swaffield (1999) state "factor analysis 'simplifies' the results by identifying common patterns to the Q sorting" (1999, p.5). In Q sort analysis, the emphasis is placed on the interpretation of the factor arrays and factor scores. Other analytical methods use the factor loading as the basis for interpretation (Addams, 2000).

To determine if a loading is significant, the standard error (SE) of a Q sort is first calculated. Extraction and rotation of any significant factors helps to interpret the possible explanations for the variance (Pallant, 2001). The varimax method is used, which is the most common type of orthogonal rotation and "produces factors that are uncorrelated with each other" (Page & Meyer, 2000, p.199). Each factor therefore represents the average score for the participants who load on it (Fairweather & Swaffield, 1999).

The number of factors extracted depends on the degree of variance which the research seeks to explain. In Fairweather and Swaffield's (1999) Coromandel case study, the first two factors alone accounted for 74% of the variance of the rotated correlation matrix. However, the five factors extracted in Fairweather *et al.*'s (1998) Kaikoura case study, only accounted for 64% of the variance of the rotated correlation matrix. In summary, the statistical analysis helps to identify respondents who ranked the statements in a similar way (Fairweather & Swaffield, 1999). These similar arrays can then be analysed to identify the one factor which best describes the group's characteristics. Fairweather and Swaffield state "it is customary in Q method to personify each factor and treat it as if it had human qualities (1999, p.3).

Advantages of Q Methodology

As a research tool, Q method is very versatile with multidisciplinary applications beyond the realms of social science research. Q method provides an economical and practical alternative to current research tools, which includes surveys and questionnaires. The relatively low technology factor of Q method also means its ideal for 'on site' data collection, as used in this research. The main advantages of Q methodology as stated by Addams, is the ability to combine the "openness of qualitative methods with the statistical rigour of quantitative research analysis" (2000, p.14). Q method needs a relatively small sample size, with a larger number of tests undertaken. Conversely, the 'R' technique uses a large sample size, and a relatively small number of tests. In regards to single studies, Q method now facilitates correlation and factor analysis in both laboratory and clinical situations (Stephenson, 1953). Previously, this was not practical as 'R' technique depends on a large sample size, which makes it unsuitable for these types of controlled situations.

One of the other main advantages of Q method is that it focuses on an individual's interpretation and personal viewpoint. Typically, other scientific measurements take no account of an individual's concerns on the area of discourse. The researcher does not set any pre-specified concepts or measures when using Q method (Addams, 2000). Therefore, "the act of Q sorting reveals the respondents' subjectivity, making it measurable" (Fairweather & Swaffield, 1999, p.3). Consequently, there is no right or wrong way to rank the actual objects in Q sort. In contrast, other scientific measurements normally use a predetermined set of standards for comparison (Fairweather *et al.*, 1998). The use of these pre-specified measurements in the research design, results in subjectivity being fact lost. (Addams, 2000).

The Q methodology therefore has significant advantages for a landscape perception study. These include the ability to identify the patterns of subjective views and attitudes held by a certain group of people, and the use of factor analysis to systematically examine the range of views of that group (Addams, 2000, p.14).

Limitations of Q Methodology

The Q method, like any other research tool does have some limitations. The key constraint is the sheer quantity of data collected. Ironically, the very richness of data Q method provides can actually cause problems with later analysis (Fairweather *et al.*, 1998). The practical application of Q method also requires a certain degree of skill, relative to other research techniques. Q method includes the selection of photographs, conducting interviews, and using statistical analysis in order to interpret the results. Therefore, the researcher needs to show a high level of commitment to Q method in all aspects of the research design.

One of the major limitations of Q sort method is that it "does not make predictions about preferences in the population as a whole: it interprets preferences only of those who are surveyed" (Swaffield & Fairweather, 1996, p.219). Q method also relies on 'one to one' interactions, making it unsuitable for use in measuring collective responses (Fairweather & Swaffield, 1999). The introduction of bias in the final Q sample is another area of concern for some researchers. McKeown & Thomas (1988) felt that the use of unstructured samples, might lead to some aspects of the issue, either being under or over sampled. However, most of the issues concerning Q method are surmountable by the use of a good research design.

Combination of Research Methods

One way to accommodate the richness of data collected is to use a combination of techniques. In Fairweather and Swaffield's (1999) Coromandel study, they used Q sort in an interpretative and explorative way, focusing on a small sample group. To compensate for any reduction in quantitative data, the research design also incorporated in-depth interviews. The qualitative data collected in these interviews included the participants' personal attitudes and values, which were also used in later analysis. Combinations of research methods therefore facilitate better data management in terms of statistical analysis without compromising the richness of the data collected. Fairweather *et al.* (1998) used a combination of the socio-cultural and phenomenological methods in their research design for the Kaikoura case study. In Fairweather and Swaffield's (2002) Rotorua case study, they opted for the experimental and socio-cultural paradigms, as defined by Zube *et al.*

(1982) and Uzzell (1991). By combining two separate research methods, the inherent weaknesses or strengths of each technique are then quantifiable.

The traditional use of Q method was to rank 'statements of opinion' in social science research. However, as stated, Q method is applicable to any objects which can be physically ranked (Fairweather & Swaffield, 1999). Therefore, a myriad of stimuli can be used, including photographs, posters and even music tapes (Fairweather & Swaffield, 2000). Interestedly, Zube, Pitt and Anderson's (1975) work to examine the use of photographs as surrogates, was also one of the earliest examples of Q method's use in research. Zube *et al.* (1975) included a comparison study between photographs and the field experience using Q method as part of their research design. The results of Q method concurred with other research, endorsing the use of photographs as surrogates.

Applications outside the Realm of Psychology

Research conducted by Zube, *et al.* (1975) therefore highlighted the use of Q method as a multidisciplinary research tool. However, no research of any magnitude using Q method to assess scenic values was carried out until the 1980s (Fairweather *et al.*, 1998). In terms of landscape perception research, longitudinal studies were recognised as one area which needed further exploration. Palmer's (1997) use of Q method to evaluate scenic quality in a longitudinal study was therefore quite significant. The main objective of Palmer's research was to compare 1987 Q sort results with that of the original study conducted in 1976 (Palmer, 1997). Palmer's overall recommendation was "to create stronger linkages between the fields of landscape perception and landscape ecology" (Palmer, 1997, p.113).

The use of Q method, in conjunction with photographs, has again come to the forefront with the recent global shift towards more sustainable development practices. Environmentally based studies, in particular, have adopted Q method to help quantify the perceived value of the landscape. For sustainable management practices to be truly effective, all resources need to be quantifiable, which includes the landscape.

Practical application of Q method in New Zealand based studies

Studies by Fairweather and Swaffield (1995) and Swaffield and Fairweather (1996) have set the benchmarks in the practical application of Q method incorporating photographs in New Zealand based research (Swaffield & Foster, 2000). Their programme of research commenced in 1993, and focused on the MacKenzie High Country of the South Island, where they examined the public preferences for land-use options (Fairweather & Swaffield, 1995). The aim of the study was to develop methods to improve land-use management, in the areas of forestry and agriculture. Fairweather and Swaffield incorporated the strengths of the Q method in their research design "to provide a detailed insight into the landscape experience" (2000, p.138). They also used Q method to help "interpret the socio-cultural significance of individual experiences" (Fairweather & Swaffield 2000, p.138). Their subsequent tourism-based studies have been discussed.

Fairweather and Swaffield (1999) further validated the use of Q method, with a Coromandel Peninsula case study, focusing on the forestry industry. Coromandel Peninsula, with its diversity of topography, high visitor numbers and changing land use, was similar to Waiheke in many respects. The aim of the research was to investigate public perceptions of natural and modified landscapes. An interesting aspect of this research was the use of two sets of images. One set comprised of long-range views or 'full focus' images, the other set showed more detail and were called the in 'focus' range of images. Fairweather and Swaffield (1999) used the two sets of images to represent the widest possible range of landscape settings as they 'would be experienced' to the respondents. The research also showed that Q method was suitable for comparative studies, as the respondents viewed both sets of images under similar conditions. Fairweather and Swaffield's (1999) research has therefore further extended the applications of Q method and its versatility as a research tool.

The results of Fairweather and Swaffield's (1999) research also concur with the other New Zealand studies undertaken. The consensus validates the effectiveness of Q sort method, using photographs in landscape perception work. The combination of techniques has allowed for the "great richness of subjective experience and perception of environment to be investigated and interpreted" (Fairweather and Swaffield, 2000, p.138).

Future applications

Advances in computer technology will only further enhance the versatility of Q method as a research method. Subsequently, fieldwork using visual stimuli to depict different landscape scenarios will become more feasible. The diversity of Q method is ideal for destination marketing and branding strategies or in any area where subjective evaluation is required.

Conclusion

Q method in conjunction with photographs provides "a unique way of systematically establishing patterns among individuals, thereby eliciting the variety of accounts or discourses about or around a particular theme or issue" (Addams, 2000, p.15). Q method, in terms of this research involves quantifying both the residents' and visitors' perception of Waiheke Island's environment. The versatility of Q method and richness of data generated, suited the overall research design.

Chapter Three

3.0 Methodology

This section details the research procedure followed in this study. A diagramatic representation of this process is shown in Figure 3.1.

3.1 Research Design

The research design combined two methods of data collection which was supported by the literature, based on Zube et al. (1982) original paradigms of landscape perception research. A combination of quantitative and qualitative methods were chosen, to meet both the statistical and scientific requirements of a good research design (Page & Meyer, 2000).

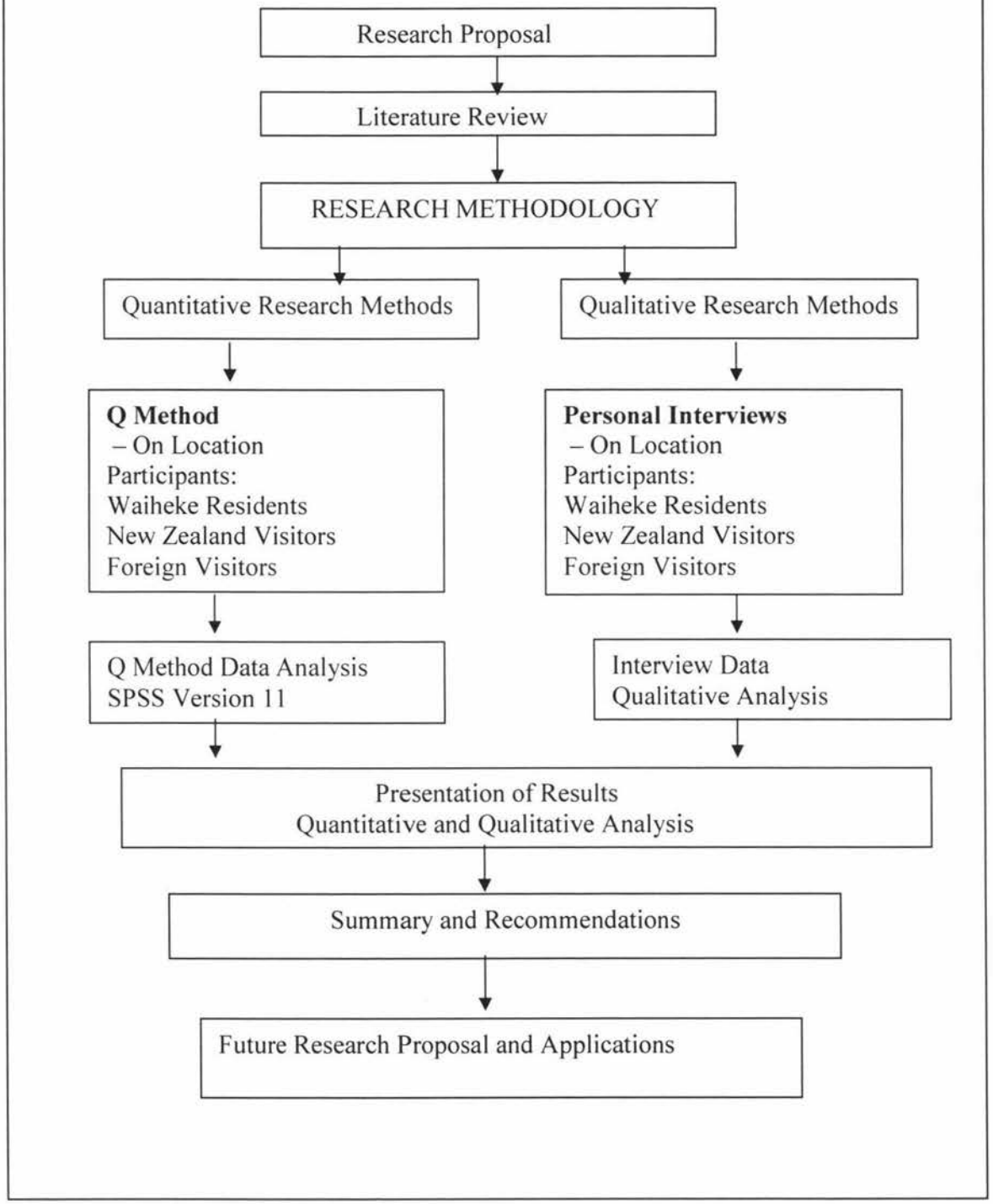
Ethical Issues

The design of the research project did not require approval from the Massey University Ethics Committee because both the interview procedures and survey tools, met with ethical standards. Interview techniques were part of the qualitative research method, however data collected was non-specific in nature assuring the anonymity and confidentiality of participants involved. Participants were advised approximately how long the interview would take, and the type of demographic information that would be required. No coercion was involved, with participants advised they could withdraw at anytime.

Personal issues

Any personal bias felt towards the present state of environmental management and tourism impact on Waiheke Island was recognised and addressed. The researcher personally conducted all of the eighty-two interviews, which ensured consistency of interview technique. However, any limitations in interview technique remained uncorrected.

Figure 3.1 Research Design Map



Design Limitations

As with any research design there were limitations, regardless of the level of planning involved. The timing of the research was significant, with visitor numbers lower than expected. However, in the course of the research, there were other limitations to take in account.

Time Constraints: Day-trippers

Day-trippers to Waiheke only spend between six to eight hours on the Island, and even less in the colder winter months. Therefore, many would prefer to 'sight see', rather than participate in this type of study. It is important to recognise therefore, that sampling bias is likely to occur, with less day-tripper interviewed than would be excepted.

Extended visits and overnight guests

Contrary to the above situation, participants who have spent an extended period on the Island are more likely to agree to an interview. They would also have a wider range of experiences on which to base their opinions.

Perceived participant bias: Resident

Residents' have 'in depth' local knowledge of both the past history, and current state of affairs on the Island. This local knowledge could result in observations outside the realm of just the 'face value' of the images. Residents are more likely to understand the consequences of certain images or to link images with past events. This also encompasses factors such as the personalities involved, knowledge of future developments, as well as accounting for their own personal bias towards changes occurring on the Island.

Perceived participant bias: Visitor

Visitors may also introduce a certain degree of bias, especially if they regularly frequent the Island. The 'nostalgia' factor associated with previous visits to Waiheke Island may influence their attitude towards the current development under way.

Seasonal variation in terms of visitor numbers

The actual fieldwork on Waiheke Island extended over a five-month period, mainly during the winter months. Therefore, the seasonal variation in terms of visitor numbers may have introduced an area of possible bias.

Field work in relation to seasonal weather conditions

Given the focus of the research, the optimal situation was to interview people in environments such as on beaches and in parks. However, adverse weather conditions deter most people from utilising these public areas, which meant trips to Waiheke were totally weather dependent. In addition, people were less likely to be staying in one place for extended periods, making them more difficult to approach. Daylight saving also influenced the amount of time people spent outdoors, with fewer people available before 9.00am and again after 4.00pm.

Strengths and Weaknesses of the Research Design

The main advantage of using a combination of research techniques was the richness and depth of data obtained. Q method was ideally suited for the Waiheke study, as it was both versatile and portable, which eliminated the need for permanent interview sites. All of the participants were interviewed under the same conditions, which meant comparisons could be made.

The timing of the research was a good reflection of the winter period, with more residents included in the research sample. However, further study would be needed before any comparisons were made in relation to the summer or the 'high season'. Interviewing overnight guests on the Island may be more practical in summer with higher occupancy rates. Interview times ranged between 15 to 40 minutes, however it would be difficult to implement a stricter procedure, as each participant varied in his or her response time.

3.2 Quantitative Research

The theory of Q Method was extensively covered in Chapter Two. Current research applications of Q method include extensive work in landscape perception studies. The main advantage of Q method was the combination of photographs and a structured sorting procedure.

The use of photographs in Q method

The literature supported the use of photographs as surrogates for the landscape experience, with little difference shown in results between the two different visual stimuli (Fairweather *et al.*, 1998). The primary focus of the study was to quantify how people perceive the physical environment. Consequently, the use of photographs as visual stimuli was an important element to the study.

Photograph Categories

The selection of categories used in the research was from the sampling frame of landscape categories, derived from previous studies of landscape perception (Fairweather & Swaffield, 2001). The four categories used to sort the images were Natural, Land-use, Activities, and Cultural. These four categories ensured a good range of the landscape types were included in the final Q set. Fairweather *et al.* (1998) used the same four categories in the Kaikoura case study, which had a similar diversity of landscapes types.

Q set Number

In research carried out Fairweather *et al.* (1998), along with Fairweather and Swaffield (1995, 1999, 2000, 2001, 2002) stated that a Q set range of between 25 to 35 images was ideal. In the course of their research, it was determined that a Q set in that number range provided a good diversity of landscape types and physically easy to handle. Twenty-five cards were used in the Q set for the research, which met the criteria of the research design.

Interview sites

Due to the flexibility of Q method, several different interview sites were available, both indoors and outdoors, weather dependent. Interviews conducted in public recreational areas, resulted in a greater participant interest level, given that the focus was on the environment. The actual Q sort involved very simple research tools, therefore Q method was ideally suited for fieldwork, as it was both versatile and portable.

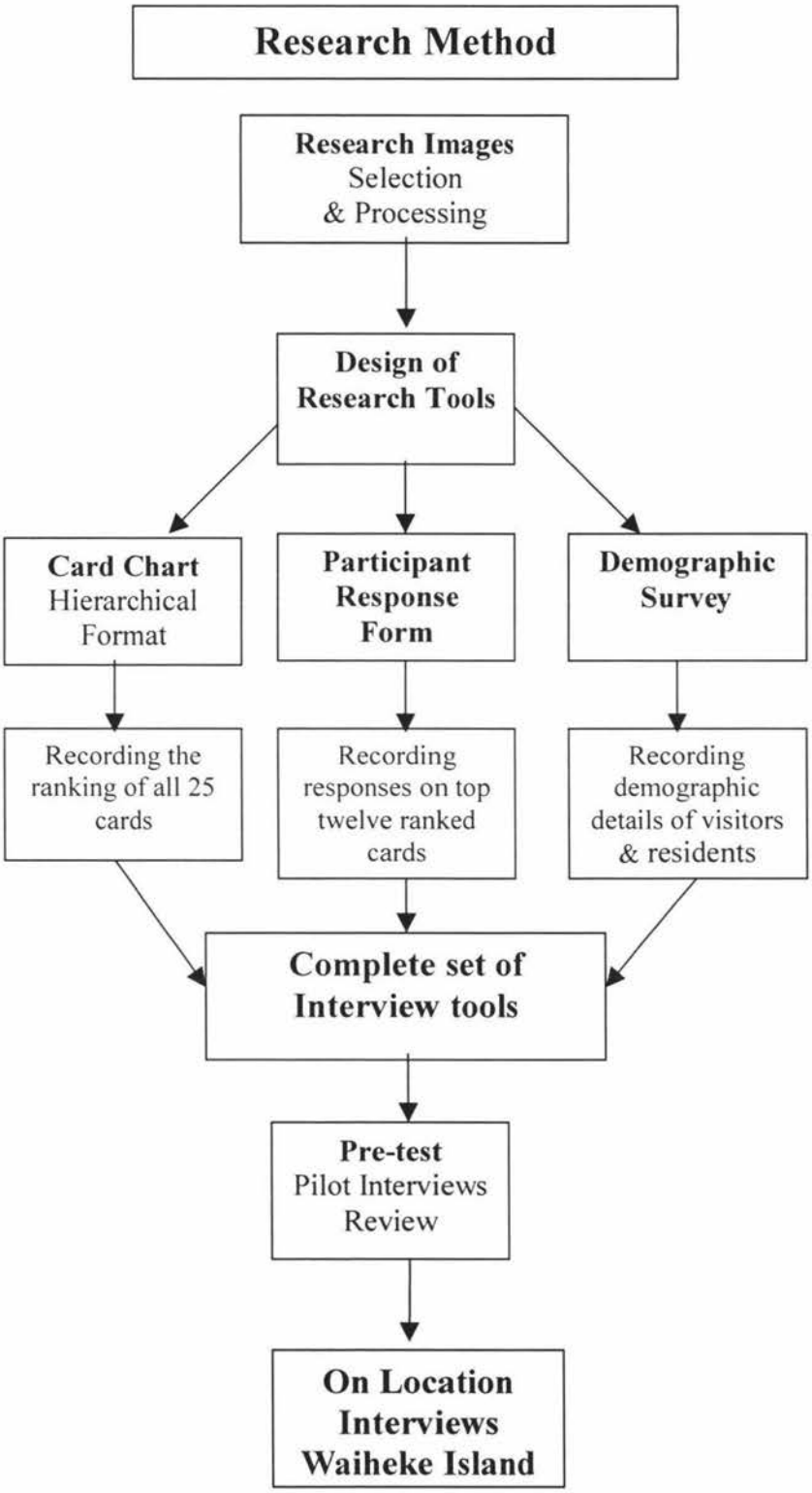
The next section discusses the research procedure in detail, with reference to Figure 3.2. The process will be followed from with the initial photographic selection, to how the final Q set was determined. The research tools used in the study are also explained, with importance of each explained in detail. The pre-test procedures used and final preparations for on site interviews will end this part of the method discussion.

3.3 Research Procedure

Photograph Selection

The first trip to Waiheke Island on April 13, 2002 was primarily to take a selection of photographs for possible inclusion in this research. As the photographs were taken over the course of the day, basic visual elements such as lighting did naturally differ over that time. A digital camera was used to take the photographs, as this allowed for onsite editing, and also enabled the shot to be retaken if necessary. Photographs were taken from typical viewing locations, such as local beaches, to ensure these images reflected a normal visitor's experience. There were approximately eighty digital images taken over the course of the day, with the corresponding locations recorded for future reference. Fairweather and Swaffield (2001) also used this approach in their Kaikoura case study, with photographs taken specifically to represent a variety of experiences.

Figure 3.2


Research Method
Research Images
Selection
& Processing
Design of
Research Tools
Card Chart
Hierarchical
Format
Participant
Response
Form
Demographic
Survey
Recording the
ranking of all 25
cards
Recording
responses on top
twelve ranked
cards
Recording
demographic
details of visitors
& residents
Complete set of
Interview tools
Pre-test
Pilot Interviews
Review
On Location
Interviews
Waiheke Island

As the research design specified twenty-five images were to be used, the next step was to subjectively analyse the photographs. The four categories previously specified were used to sort the photographs, and those not fitting the criteria were discarded. This procedure resulted in a sub group of thirty-five photographs which were all rated as being suitable for the purposes of the research. Then, to eliminate any possible bias by the researcher, the thirty-five images were each assigned a number, and subjected to a computer generated random numbering process. The corresponding photographs of the first twenty-five numbers generated became the research sample (refer Appendix C1). The photographs were then sorted back into the four categories, as shown in Appendix C2. The final Q set and descriptive comments for each image are shown in Appendix C3.

Formatting Final Selection

Having selected the images, the final step was to then process and print them. An A5 image size was chosen, so they would be easy to handle, but still large enough to view properly. Each individual photograph was identified with a letter located on the bottom left-hand side. Given these images were to be handled extensively, there was some compromise made between visual quality, and durability. The final format used was heavy card for the printing process with lamination to protect the images.

Other research tools

The research design stipulated that all interviews were to take place 'on location'. Therefore the research tools had to be both durable and portable in nature. Given the variety of locations likely to be encountered, collapsible boxes were the most practical receptacle to use in the 'card' sorting procedure. Palmer (2000) recommended the inclusion of visual instructions such as colour and symbols as part of the research design. This not only improves the reliability of the results obtained, but also reinforces the normal written or oral instructions given. In the research, three distinct coloured boxes were used, representing a different category for each sort. In addition to the use of colour, a form of 'smiley face' was put on the front of each box. The three different facial expressions used for each, as illustrated below, again further reinforced the sorting procedure.

Red: Non Scenic  Yellow: Indifferent  Green: Scenic 

As the interview procedure involved the collection of both quantitative and qualitative data, a variety of research tools were required. The first tool was a quantitative 'card chart', which was designed to record the individual cards in order of preference. The 'card chart' shown in Appendix B, was adapted for this research from Fairweather & Swaffield's (1999) Coromandel Study.

The Q method involves a 'forced ranking' procedure, with the number of cards in each column limited, as per the hierarchical chart. Following Palmer's (2000) recommendations on visual guidelines, squares were shown on the 'chart', which represented the number of cards allowed per column. Further, it made the ranking procedure easier to follow for both participant and researcher. The numeric quantity allowed for each column was also noted on the actual chart for additional clarification.

As noted by Lange (2001), the data collected would ultimately be used in parametric statistical analysis; consequently the columns were assigned a numeric value. The numeric values ranged from –4 to +4, with zero assigned to the central or neutral column.

The stylised grid in Table 3.1 illustrates how both the numeric values, and the number of cards per column were assigned for a Q sort of the 25 photographs.

Table 3.1	**Q sort Ranking and Card Allocation for 25 Images**								
Rating Scale	-4	-3	-2	-1	0	1	2	3	4
Number of cards	1	2	3	4	5	4	3	2	1

To ensure the participants are totally unaware of the rating scale used in Q sort, the numeric values (-4 to +4) do not appear on the charts. The resulting format of the 'card chart' was suitable for both the first and second sorts used in this research. A double-sided form is used, with both 'card charts' on it, which helps to keep all the data together and minimises paper volume.

A specialised form was also required for the qualitative data collection included in the research design. A participant 'response form' was constructed, featuring two distinct sections to record the top six positively and negatively ranked cards. This is attached in Appendix D. Each section had a column for the card identification and sequential ranking, with sufficient provision made for participant's comments.

The final form was quantitative in nature, and used to record demographic details. The design of form was multi functional, in that both visitors' and residents' details could be recorded on the one copy, as shown in Appendix D. The 'demographic survey' form also featured user-friendly options, like 'quick response' categories. For example, participants were given five options to help categorise the main purpose of their visit Waiheke Island. The type of demographic details required were deliberately non-specific in nature, which ensured both the confidentiality and anonymity of the participants involved.

Double-sided printing again ensured that all the crucial data was on one form, with the 'demographic survey' printed on the reverse of the participant 'response form'. Consequently, with less physical paper to handle, it also helped to streamline the data entry required for statistical analysis purposes.

To evaluate the anticipated procedure, pilot interviews were conducted using four Massey University lecturers who had agreed to participate. Three of these lecturers had extensive backgrounds in terms of environmental management. The fourth lecturer, who was also a part-time resident on Waiheke Island, offered yet another prospective. The feedback from all four lecturers was positive in terms of Q method. There were minor changes suggested for the other research tools, which included deleting some questions from the 'demographic' form.

However, the most important information to be gleaned from this exercise was the interview time. Fairweather and Swaffield (1999) normally required an hour per participant for their studies using Q sort method. However, the interview length needed to be more flexible in this research, as ferry timetables tend to dictate the itineraries of visitors to the Island. Most day visitors only stay on the Island between six to eight hours, even less in the winter period. Therefore, a shorter format would be preferable, due to obvious time constraints imposed. The pilot studies indicated that the sorts could be completed in 15-30 minutes, depending on the detail of the comments.

It was originally intended that the sample population would come from three sources- regular commuters on the ferry between Waiheke Island and Auckland City; visitors staying in commercial accommodation on the Island; and temporary residents of Waiheke Island (Bach owners). There were, however, some difficulties encountered with this approach. A letter was sent to Fuller Ferries Group, as shown in Appendix E, asking for permission to interview onboard the vessels. However, they did not wish to be involved with the study, therefore a land–based option had to be adopted. This meant that people were approached at various locations on the Island.

A letter was also sent seeking permission to interview visitors in a variety of accommodation establishments as shown in Appendix E. The response to these letters was, however mixed. The research would be undertaken during the off-season, so occupancy levels were low. However, several of the proprietors were happy to participate and were included as residents. The final group were hard to locate, again because of the winter season. Only three participants were identified, and these were incorporated into the residents' group.

3.4 Qualitative Method

Interviews were used to compliment the Q sort procedure, primarily to help capture the richness and depth of data available. The combination of these two techniques has been used extensively used landscape perception research in New Zealand. (Fairweather *et al.* (1998); Fairweather & Swaffield (2001); Simmons & Fairweather (2000); Simmons & Fairweather (2001).

Advantages of Interview Procedure

Participants were very receptive to the direct approach used in the research. The acceptance rate was 90%, which exceeded expectations, with a good sample of the population having been interviewed. The interview technique also allowed for the number of participants to be predetermined, unlike in a postal questionnaire where the response rate is unpredictable.

3.5 Participants

The focus of the research was to quantify both residents' and visitors' perception of the environment. Research conducted by Fairweather and Swaffield (1995, 1999, 2000) highlighted the importance of separating out the visitor groups into international and domestic travellers. They found both groups responded differently to visual stimuli, with the international visitors' group showing a preference for a higher natural element. The research design therefore used three separate groups to explore these trends further.

Residents

Waiheke residents' group, for the purposes of the study comprised of permanent residents, part-time residents, and seasonal bach owners.

New Zealand Domestic Visitors

The New Zealand visitors' group for the purposes of the study comprised of non-rate payers who were visiting Waiheke Island for a short time. The group comprised of both day-trippers and overnight guests, whose normal place of residence was elsewhere in New Zealand.

International Visitors

International visitors group, for the purposes of the study, comprised of all overseas travellers who were on Waiheke Island, as either day-trippers or overnight guests.

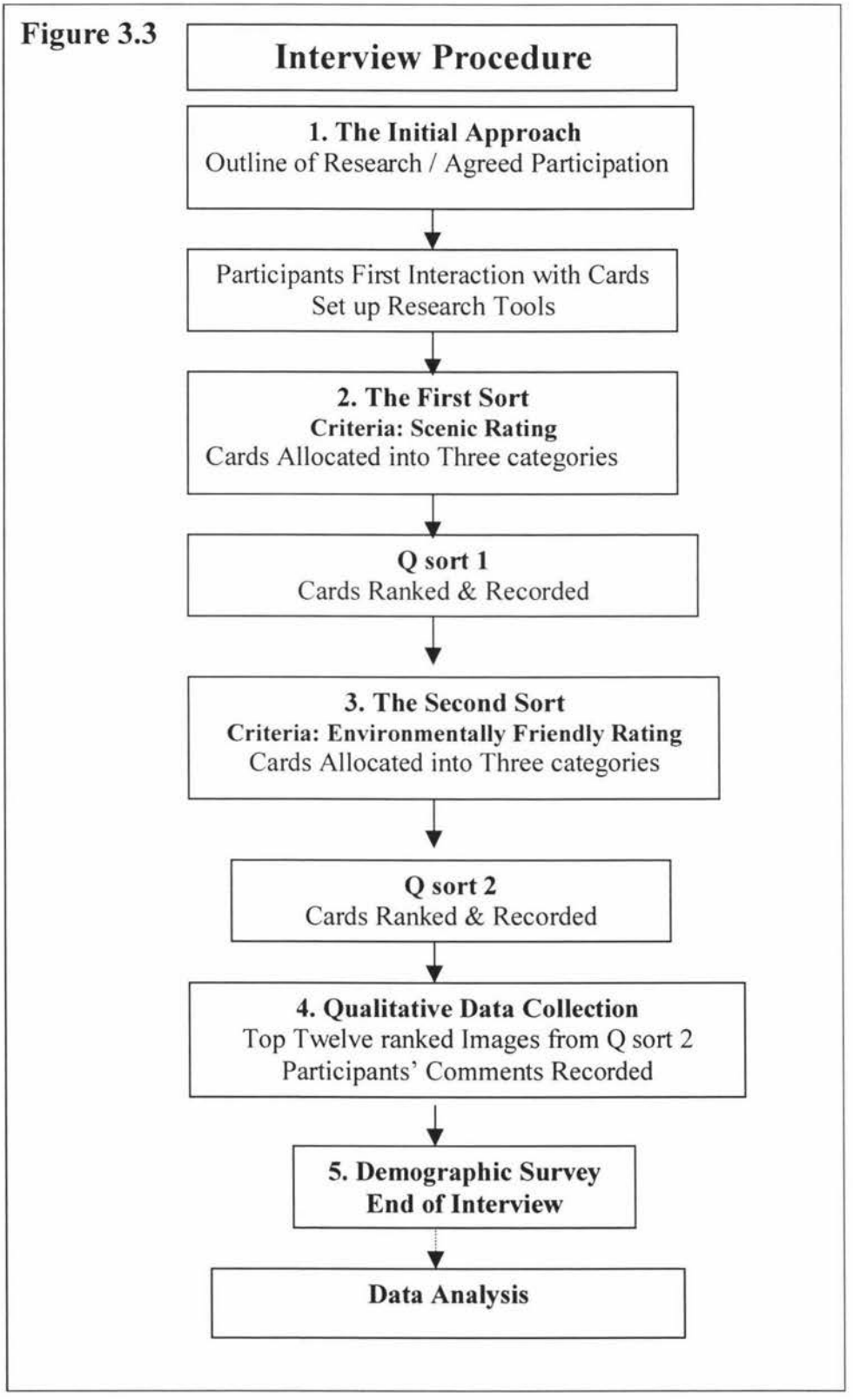
Seasonal Variation in Visitor Numbers

The research period was during the winter season, which meant visitor numbers might have been lower than normal.

3.6 Interview Procedure

The interview procedure is summarised in the five steps as shown in Figure 3.3. The interviews occurred over a two-month period, from July to August, 2002. Seven trips were made to Waiheke Island over this period, culminating in 82 interviews.

Figure 3.3


Interview Procedure
1. The Initial Approach
Outline of Research / Agreed Participation
Participants First Interaction with Cards
Set up Research Tools
2. The First Sort
Criteria: Scenic Rating
Cards Allocated into Three categories
Q sort 1
Cards Ranked & Recorded
3. The Second Sort
Criteria: Environmentally Friendly Rating
Cards Allocated into Three categories
Q sort 2
Cards Ranked & Recorded
4. Qualitative Data Collection
Top Twelve ranked Images from Q sort 2
Participants' Comments Recorded
5. Demographic Survey
End of Interview
Data Analysis

The interview procedure involved approaching a randomly selected member of the public to see if they were willing to participate. This involved briefly explaining what the research was about, and what they would be required to do. Other details, such as the approximate time that the interview would take, were also given. They were then asked it they wished to participate; if the answer was no, they were thanked for their time; if they agreed the interview commenced. The participants were then asked to look through the cards while the boxes for the Q sort were set up. This initial interaction with the 'cards' gave the participants the opportunity to preview the ranges of images which they would be evaluating. The significance of the three coloured boxes was then explained to the participants, and the role they played in the sorting procedure. Participants were also advised that there were no restrictions on the number of cards per box, or that all boxes had to be used. They were also instructed that they could exchange the cards between the three different boxes during this initial procedure.

The First Sort

The participants were next given the criteria for initial sort, which was based on how they rated the images 'scenically'. They then proceeded to sort the cards depending on whether they perceived them as:

'non-scenic'	'indifferent'	'scenic'
(red box)	(yellow box)	(green box)

Once the participants had indicated they are satisfied with their selection, the actual ranking procedure, or Q sort commenced.

The first box to be ranked was the 'green' one, as in the most '*scenic*', with the remaining two boxes, placed off to the side to avoid confusion. The participants were first asked to select the single, most '*scenic*' card. The researcher then recorded the corresponding letter in the first column on the far right of the 'card chart', as shown in Appendix F. The participants were asked to select the next two most '*scenic*' cards in order of preference. The researcher again recorded the two corresponding letters, this time in the second column.

This process continued as shown below up to a maximum of fifteen cards:

First column:	one card only selected
Second column:	next two cards: preference required between
Third column:	next three cards: as above
Fourth column:	next four cards: as above
Fifth column:	next five cards: neutral column, no ranking required

If there were more than 15 cards in the box, then the process continued. However, the results were recorded in the column immediately to the left of the central column, as in the '*non-scenic*' section. Once all the cards from the '*scenic*' box were ranked, they were then placed back in the box, and put to one side.

The next box to be ranked was the red '*non-scenic*' box, again following the same procedure as outlined above. However, this time the participants were asked to select the single, most '*non-scenic*' card, and the corresponding letter was recorded in the first column on the far left of the 'card chart'. The process continued as with the '*scenic*' box, with subsequent selections recorded in each column. As with the '*scenic*' ranking process, the central or neutral column was the last to be completed. If there were any overlaps, as noted for the '*scenic*' box, then the same procedure occurred. Any remaining cards were recorded in the '*scenic*' section, and again ranked in order of preference.

Finally, the yellow or 'indifferent box' was sorted to complete the chart, with the same sorting procedures used as for the previous two boxes.

Procedural Note

In preparation for the second sort, the cards were shuffled to ensure that the chances of selection were the same as in the first sort. The three boxes were returned to their original configuration, with red to the left, yellow in the middle, and green to the right.

The Second Sort

Consistency was paramount for the second sort, so participants received the same explanation concerning the significance of each box. The criteria given for this sort was how '*environmentally friendly*' they rated each of the cards. As with the first sort, they then proceeded to group the cards as shown below:

'environmentally unfriendly' (red box)	'indifferent' (yellow box)	'environmentally friendly' (green box)

The entire ranking procedure used in the first sort was then repeated, with the green '*environmentally friendly*' box, the first to be processed. The red '*environmentally unfriendly*' was next, and again the yellow '*indifferent*' box used to complete the new card chart. As only two sorts were conducted, this was the end the ranking procedure.

The 'card chart' was used then used to identify the top six selections, from both the '*environmentally friendly*' and '*environmentally unfriendly*' categories of the second sort. The corresponding letters of each set of six cards were then transferred to the appropriate section of the participant 'response form', again in order of preference 1 to 6. To ensure that the participants were not distracted by unnecessary clutter all other interview tools, such as the boxes and remaining cards were removed from the sorting area.

3.7 Qualitative Data Collection

The participants were then advised that the ranking procedure had finished, and that the two sets of cards that remained represented their top selections, in order of preference, for each category. The next procedure involved participants giving a brief explanation concerning the main characteristics, or visual stimulus, which influenced their choice of rankings for both sets of cards.

As with the main sorting procedure, participants were first asked to comment on the '*environmentally friendly*' set of cards. Each card was shown individually, with sufficient time given for the participant to recall the reason for its selection, before proceeding further. The comments for each card, in order of preference, (1 to 6), were then recorded in

the appropriate section of the participant 'response form' .The 'environmentally *unfriendly*' set followed, and the same procedure was followed. The comments were again recorded in order of preference (1 to 6), in the appropriate section of the participant 'response form'. An example of a completed form has been included in Appendix F.

Demographic Survey

The final part of the interview was the demographic survey, and was conducted verbally. It was quicker to ask the participants the relevant questions and record the details, as the survey form was multi-functional with sections for both visitors and residents. The official part of the interview was then complete, with the participants thanked for their time and effort.

The 82 interviews were completed on August 28. At this date, the process was reviewed, and the data initially examined. The review showed there had been as recent plateau, in the raw data, with little variation occurring in subsequent interviews. The 82 interviews conducted therefore became the research data for this study, representing a diverse range of opinions and views from the participants.

Quantitative Analysis

All relevant data from the Q sorts were then prepared for analysis, with post coding and data entry undertaken. Version 11 of the computer software package SPSS was used as the main statistical analysis tool.

Qualitative Analysis

The qualitative data collected from the interview was analysed manually. The process initially involved scanning all the participants' comments, to gauge the range of opinions and viewpoints. The next step was to arrange the comments into two groups, based on the original sorting criteria of 'environmentally friendly' and 'environmentally unfriendly'. The sorting procedure continued within each group, until common themes had emerged to match both criteria.

CHAPTER FOUR

4.0 RESULTS

This section details the findings from the interviews and the Q sort procedure. The first part deals with the quantitative data collected from the demographic survey, with a simple analysis of the characteristics of the sample population. Part two examines both the quantitative and qualitative data collected from the Q sort, which includes detailed statistical analysis.

4.1 Demographic Survey

Sample Group

There were three sample groups in the study, comprising of 52 Waiheke residents, 19 international visitors and 11 New Zealand domestic visitors. Proportionally, 63% of the sample group were Waiheke residents, as expected due to the timing of this research. The remaining 37% of the sample were the combined visitors' groups, which comprised of international visitors and New Zealand visitors, at 23% and 14% respectively (Table 4.1). The research design had no pre-set targets for either gender or group representation, therefore the male to female ratio of one-to-one was not expected. The actual percentage of males and females within both the visitor and residents groups was also relatively balanced (Table 4.1). For the visitors' group, a higher proportion of men were interviewed, 57% compared to females at 43%. However, more females were interviewed in the residents' group, at 54% and 46% respectively.

Table 4.1

Sample	Male	Female	Total	% of Sample
Visitor	17	13	30	37%
Resident	24	28	52	63%
Total	41	41	82	100%

The age profile of the visitors' group showed a higher proportion in the 25 to 34 year age category, especially when compared to the 65+ category (Figure 4.1). The residents' profile was more balanced, with half the sample group 45 years and over (Figure 4.2).

The residents' 55 to 64 age group or the next 'retirement generation' was also significant as many plan to stay on the Island once they cease work.

Figure 4.1

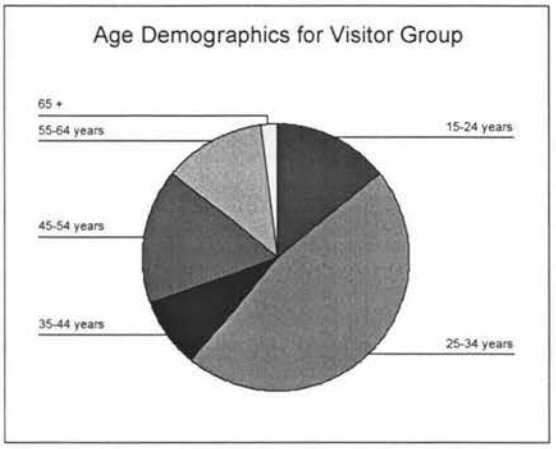
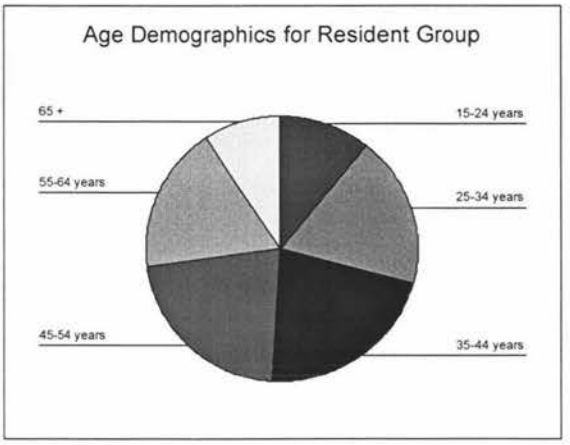


Figure 4.2



The age profile of the combined sample group (Figure 4.3) was more reflective of the resident pie chart, with proportionally less participants in the 25 to 34 year age group. The combined age profile also showed a good representative sample was achieved overall, in terms of age group categories.

Table 4.3

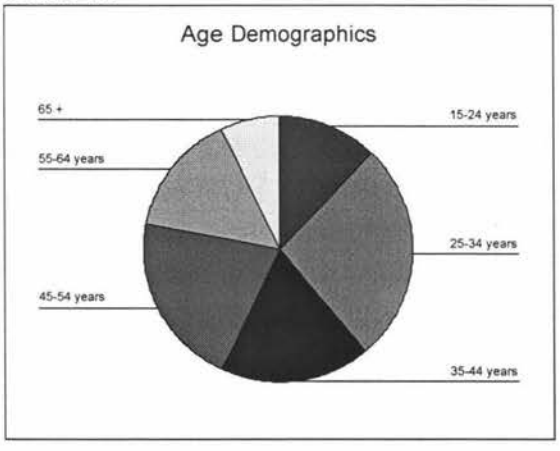
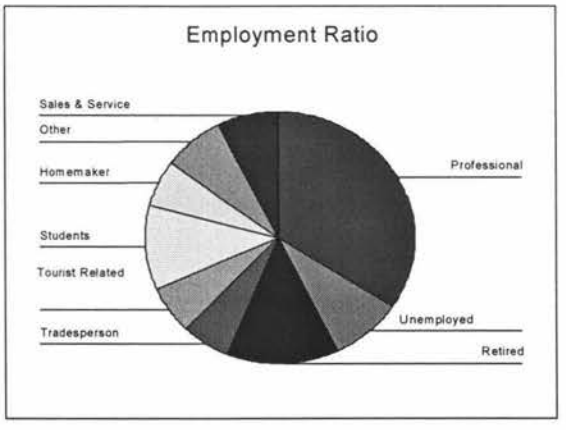


Table 4.4



The employment profile was also interesting for the combined group, with a significant proportion in the professional category (Figure 4.4). There were proportionally more retired

and unemployed in both the combined and residents' group pie charts than was seen in the visitors' profile (Figure 4.6).

When examining the employment profiles for both groups separately (Figure 4.5 & Figure 4.6), the standout feature of the visitor group was the large professional and student categories. For the resident group, the professional category was also relatively large, as was the combined retired and unemployed categories. Interestingly, participants in the service sectors were similar in both groups. Only 5% of the residents' group listed their occupation as tourist related, however, it is interesting to note that many tourist operators themselves, take holidays off the Island, during the 'off season' or winter period.

Figure 4.5

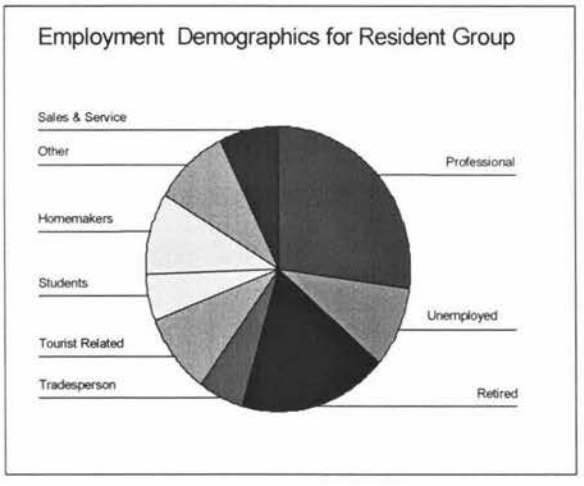
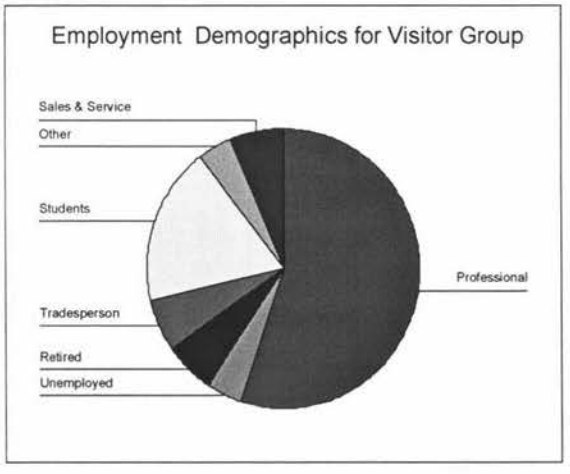


Figure 4.6



Visitors' Group

Of the thirty visitors in the combined sample group, 60% were day-trippers, with another 23% staying on Waiheke for less than a week (Figure 4.7). The remaining 17% of visitors intended to stay on the Island for longer than one week. The trip to Waiheke Island was part of a holiday for 70% of the visitors, with 13% coming to see friends and relations. The remaining visitors were those on business or seeking employment on the Island. Staying in 'backpacker' establishments were a popular accommodation choice, along with private residences for those visiting family and friends.

Residents' Group

The length of residency on the Island was also an interesting result, with many new families moving to the Island in recent years. Of the resident sample group, 44% had lived on the Island for less than 5 years, with 25% of the residents having been there between 5 and 10 years (Figure 4.8). Residents, who had lived on the Island between 11 and 20 years, accounted for 18% of the sample group. The remaining 13% of the sample group had been on Waiheke for over 20 years. One member of the resident group was 92 years old and had lived on the Island for 57 years.

Figure 4.7

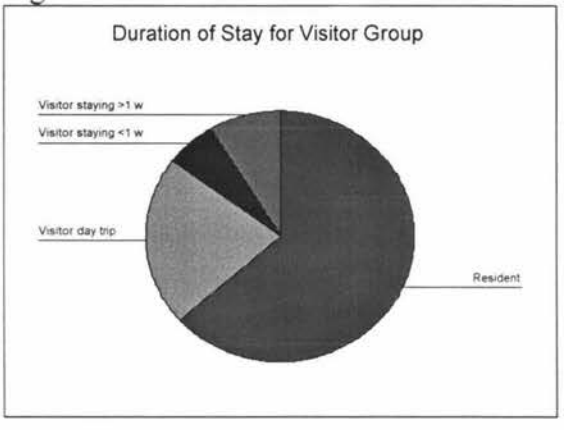
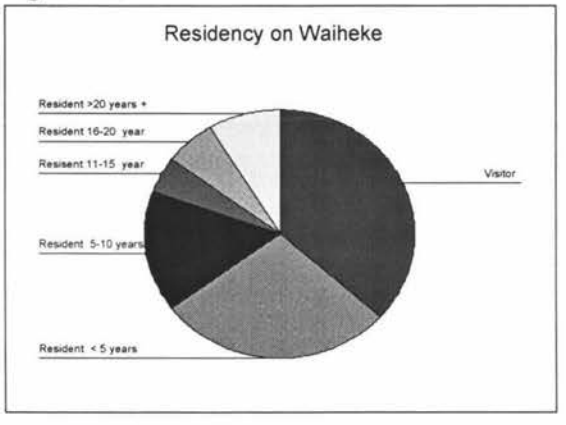


Figure 4.8



4.2 Qualitative Data – Q sort

Statistical analysis

This next section focuses on the different types of statistical analysis, which are used to identify common practices, patterns or ranking orders. These represent a shared viewpoint regarding preferred experiences, which in this study are the consensus photographs.

Factor analysis of individual Q sorts

In Q sort the variables to be correlated and subsequently factored are the actual participants (Addams, 2000). In terms of practical research applications, Fairweather & Swaffield (1999) stated that "factor analysis 'simplifies' the results by identifying common patterns to the Q sorting" (1999, p.5). Page and Meyer (2000) specify that factor analysis must explain

at least 60% of the overall variation and that factors identified needed to be logical. Each factor is an 'average' Q sort for the participants who load on it, and this indicates that their individual Q sort has a statistically significant correlation with the array of images in that factor.

Factor analysis was therefore used to identify which of the 82 individual Q sorts had similar rankings and these were automatically loaded onto the same factor. For reference, the cumulative results for the 25 images are included in the frequency tables contained within Appendix G. Pallant (2001) explained that extraction and rotation of the significant factors helps to interpret the possible explanations for the variance. The varimax option of the orthogonal rotation provided the best fit for the data in this research (Appendix H). Varimax rotation identified 10 factors, as shown in Table 4.2, and accounted for 71% of the total variation. Subsequently, out of a total of 82 participants, there were 58 (71%) who loaded onto one factor only. This loading was termed as 'pure' and determined the specification of factors (Fairweather & Swaffield, 1999). The remaining 29% that loaded onto more than one factor were not significant and therefore eliminated.

To determine which of the factors are significant in a Q sort of 25, the standard error of factor loading is used, $SE\tau = 1/\sqrt{25} = 0.20$. Consequently, to be considered statistically significant at the 0.01 level, a loading has to be in excess of 2.58 ($SE\tau$) = ± 0.516 (Addams, 2000). This figure of ± 0.516, according to Addams, is "indicative of a meaningful relationship between the participant's Q sort and factor type" (2000, p.25). Images that met these criteria were then used to describe each group's characteristics. These consensus images therefore represent shared viewpoints concerning the perceived state of Waiheke Island's environment. Cherem and Driver (1983) used consensus photographs in a similar concept to identify the perceptions of on-site visitors to a nature trail in their research.

The first three columns featured in Table 4.2 show the 10 main factors or themes which were identified, along with the percentage of variation explained by each. The next column gives a cumulative total of the percentage of variation explained by each factor, up to the cut off point of 71%. The last column contains the consensus photographs which help to describe each factor's characteristics.

Table 4.2

	THEMES	**% of total variation**	**cumulative total**	**consensus images**	
1	VISUAL IMPACT OF CROWDS	12.76	12.76%	P, M	
2	HIGH NATURAL ELEMENT	10.44	23.20%	L, X, V	
3	VISUAL BUILT ELEMENTS	8.41	31.61%	O, B, F	
4	MARINE POLLUTION	7.26	38.87%	J, N, U	
5	CULTURAL DIVERSITY	6.36	45.23%	H, Z	
6	VISUAL PERCEPTIONS	6.02	51.25%	Y, C	
7	PASSIVE-ENVIRONMENTAL DAMAGE	5.65	56.90%	K, G	
8	VISUAL POLLUTION	5.46	62.36%	S, T	
9	HOUSING DENSITY	4.62	66.98%	D, E	
10	COMMERCIALISATION / VISITOR EXPECTATIONS	4.05	71.03%	R, Q, W	
	Source refer Appendix H				

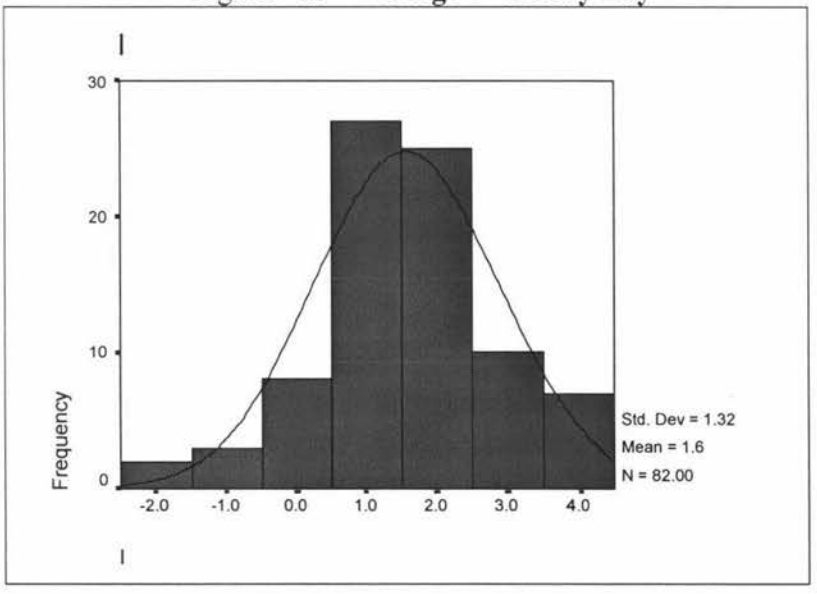
For ten factors to explain 71% of the total variation would indicate that there was broad range of viewpoints held about concerning the perceived state of Waiheke's environment. The low number of images per factor confirmed this, as only four of the factors (2, 3, 4, 10) had three significant consensus images. The remaining six factors (1, 5, 6, 7, 8, 9) had only two significant consensus images.

For these six factors, the next highest image from the rotated component matrix (Appendix H) was included in the individual factor tables (denoted by *). These non-significant images were only used to further illustrate the trends shown. In this section, both quantitative and qualitative methods will be used throughout the results to add depth to the data and help describe the ten themes identified. Individual tables, histograms, and box plots provide further clarification and illustrate emerging patterns.

Example of Analysis

Image 'I' was not identified as a consensus image and is now used as an example to explain the significance of the tables, histograms, and box plots. The histogram shown in Figure 4.9 is simply another way to display the frequency distribution. Each bar represents a class interval, and the maximum range for this research was between –4 and +4. The participants ranked image I between –2 and +4 (bottom axis) which was range used for the histogram.

Figure 4.9 **Image I - Rocky Bay**



To determine how many participants ranked image 'I' at +3 (bottom axis) for example, the corresponding point is found on the frequency axis, which is 10 (Figure 4.9). The percentage of participants in this interval class can also be compared to the total sample. In this case, 12.19% of the participants ranked 'I' at +3 (10 divided by 82 expressed as a percentage), this would normally be rounded to 12%.

The standard deviation (Std. Dev), mean and number (N) in the sample are also shown to the right of each histogram. The standard deviation is used because of its relationship with a theoretical distribution frequency, commonly referred to as the normal distribution (Hussey & Hussey, 1997). Unlike the interquartile ranges, the standard deviation uses every value, and presents the results "in the same units as the original data" (Hussey & Hussey, 1997, p.213). The mean also uses every value to calculate the centre of the distribution. In 'I', the mean is +1.6 and the standard deviation is +1.32, indicating the spread is quite large.

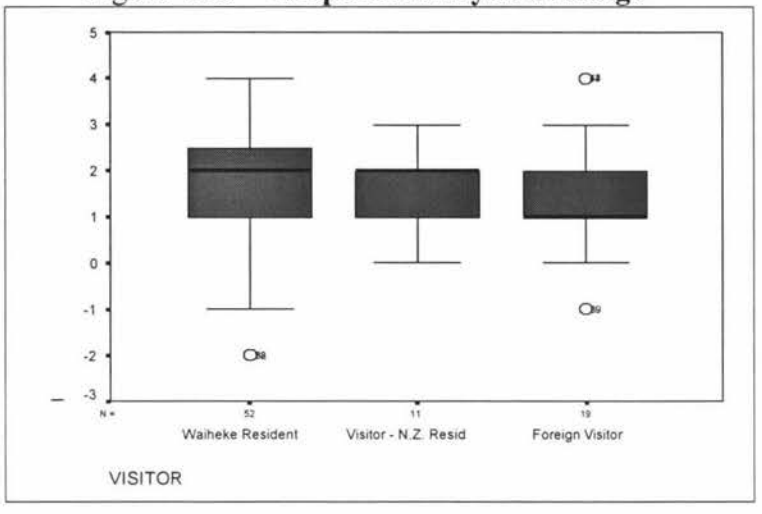
The frequency distribution can also be interpreted form the histogram, and relates back to the standard deviation. To determine the 'middle' of the normal distribution curve, as superimposed above, descriptive statistics comprising of the mean, median and the mode are used. These descriptive statistics are termed as 'measures of central tendency', and for the normal distribution curve to be symmetrical, they all must share the same value (Hussey & Hussey, 1997). However, most frequency distribution curves tend to be skew slightly, which indicates the mean, the median and the mode have different values.

These curves can either show positively or negatively skewed data. In curves where the tail is on the right, with the bulk of the data in the lower end of the range, the data is positively skewed. Conversely, when the tail is on the left, with the bulk of the data at the upper end of the range, the data is negatively skewed (Hussey & Hussey, 1997). 'I' shows a negative skew and to illustrate this, a normal 'bell shaped' curve was superimposed. This 'curve' however, will not appear in the main results, as it tends to detract from the visual impact of the data.

Box plots, (see Figure 4.10 for example) also illustrates the shape of the frequency by showing the upper and lower extremes, the median, and the upper and lower quartiles (Q1 and Q3). The 'box' or interquartile range represents the middle 50% of the data, and includes the median, as denoted by the dark horizontal line. The upper and lower extremes or 'whiskers' which extend away from the 'box' each represent another 25% of the data. The box plot also indicates if any data falls outside the general pattern, or is considered to be an extreme value, by mapping individual points or 'outliers' (Hussey & Hussey, 1997).

Image I has again been used to illustrate how the box plot can be interpreted (Figure 4.10). In this instance, the group assessed is the Waiheke residents' group, a subset of 52 people. The range for I was between –1 and +4, as shown by the lower and upper extremes (whiskers). The box plot also shows outliers at -2, which were considered to be outside the general pattern, as the median was +2 (dark line in the interquartile box).

Figure 4.10 **Response Analysis of Image**



The 'whiskers' in box plots are also a good indicator of skewness in the data (Hussey & Hussey, 1997). For 'I' the Waiheke residents' box plot shows a slightly positive skew, as the lower extreme or 'whisker' is longer than the upper extreme. As with the histograms discussed earlier, the box plots will also highlight the variance, both between and within the three groups.

Factor 1 Theme - The Visual Impact of Crowds

Factor 1 accounted for 12.76% of the total variation in the rotated factors, with M and P the consensus images identified as significant. The next highest image was R, and although not significant, it does assist in highlighting the theme as shown in Table 4.3. The correlation of images M and P highlights negativity towards such elements as overcrowding, poor wharf facilities and visual pollution. Both images showed passengers embarking and emphasised the inadequacy of the present wharf facilities, to cope with the congestion. The environmental impact of the ferries, whilst not visible, is still implied. Image R also showed people, however they were engaged in various activities on the Matiatia waterfront area. Therefore, it was the straight 'crowd' element of M and P which participants found unappealing.

Table 4.3 **Factor 1**

Image	Level of Significance	Working Titles
P	0.822	Matiatia wharf – embarking 2
M	0.827	Matiatia wharf – embarking 1
R	-0.374*	Matiatia wharf- waterfront

The results of the Q sorts undertaken for P and M (Figures 4.11 & 4.12) show both have a positively skewed distribution, although M has a lower standard deviation at 1.09. The visual picture of overcrowding and general chaos on the actual wharf was not how most people wanted to see Waiheke portrayed. Image P, where a long queue of people are shown waiting to embark, represented a negative image and was ranked between –2 and –4 by 79% of participants.

M showed fewer people, however it highlighted the basic wharf facilities, and similar to P, was ranked between –2 and –4, by 78% of participants. Most participants accepted that crowds were inevitable due to the popularity of the Island. However, the consensus was that the inadequacy of present wharf facilities further exacerbated the problems for passenger processing.

Figure 4.11 **Matiatia Wharf (P)**

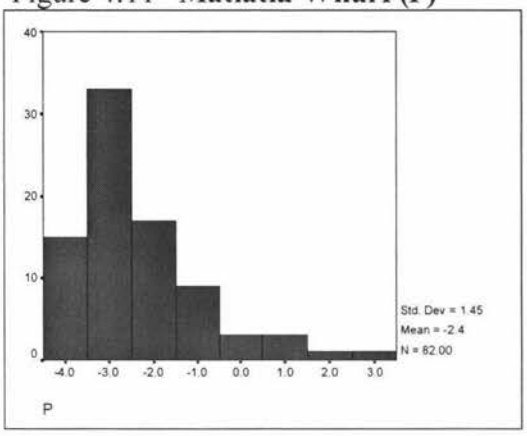
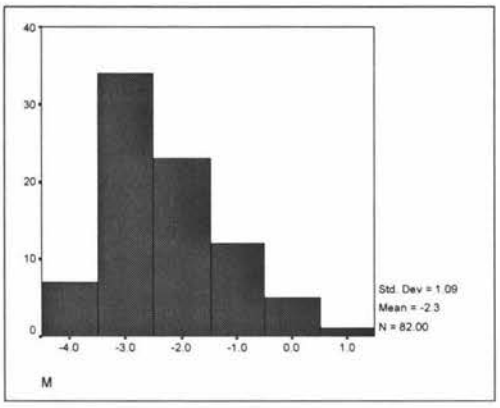


Figure 4.12 **Matiatia Wharf (M)**



The box plots for P and M (Figures 4.13 & 4.14) illustrate the differing opinions on the 'crowd' issue. Interestingly, for both P and M, the New Zealand visitors' group was the most 'anti' crowd. P, which showed the most adverse effects of tourism, was ranked by 73% of the New Zealand visitors' group at –3, with only three outliers (-4, -2,0). The residents' group, showed a slightly higher tolerance for the tourist numbers in P (-1 to –4), and again in M (0 to –4). The positive outliers in P for the residents' group were due to the perceived financial benefits of visitors to the Waiheke community. International visitors were also generally more accepting of crowds and considered them part of the normal travel experience and ranked both images similarly (0 to –4).

Figure 4.13 **Response Analysis of P**

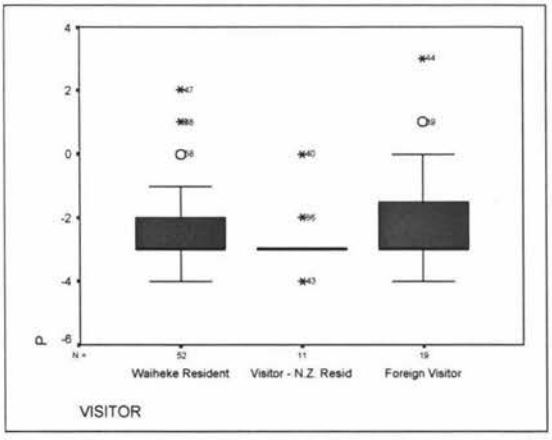
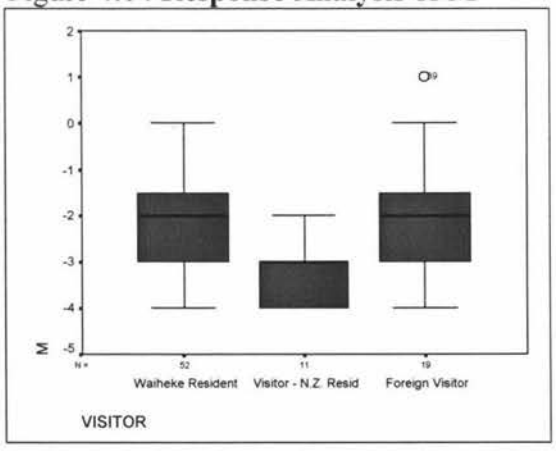


Figure 4.14 **Response Analysis of M**



Factor 2 Theme - High Natural Element

Factor 2 accounted for 10.44 % of the total variation in the rotated factors. X, L and V were the consensus images identified as significant (Table 4.4). The correlation of images X and L illustrates a preference for very natural and scenic elements. Other factors include the lack of visual development, low-density housing, and the general low human element present. Conversely, image V represents a more built up area with a low natural element and visible traffic congestion, as shown by the negative rating given.

Table 4.4 **Factor 2**

Image	Level of Significance	Working Titles
X	0.611	Onetangi Beach -dunes
L	0.792	Onetangi Beach –dunes/path
V	-0.698	Oneroa- shopping centre

The Q sorts undertaken for X and L (Figure 4.15 & 4.16) both show a negatively skewed distribution. This is especially the case for L, with a mean of 2.6. In fact, 67% of participants ranked L between 3 and 4, with X ranked within the same range by 51% of participants. The consensus was that all groups prefer the natural beach scenes with both images enhanced by the presence of plenty of native bush and dune vegetation.

Figure 4.15 **Onetangi Beach (X)**

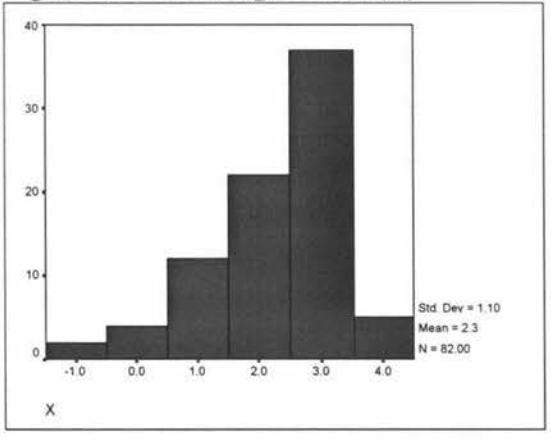
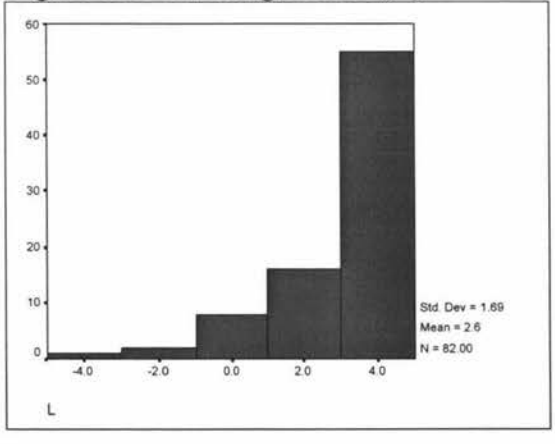


Figure 4.16 **Onetangi Beach (L)**



In contrast, V has a positively skewed distribution, which indicates that the image of downtown Oneroa, rated poorly (Figure 4.17). On closer analysis, 51% of the participants ranked it between –3 and –4, and just 6% ranked it above zero. The failure of the downtown area to blend in with the natural surrounds lead to comments such as the town's

architecture lacked character and the area was poorly landscaped. The contrast between the traffic congestion and crowds, verses the Island's relaxed lifestyle was also commented on.

The box plot for V gives a better indication of which of the three groups rated it poorly (Figure 4.21). The international visitors' group in particular, were critical of the general lack of character of the downtown Oneroa, with 75% ranking V between –2 and –4. Both the New Zealand visitors' and Waiheke residents' groups shared the same median of –2, however their interquartile rankings were slightly different. The resident group showed a higher acceptance of V perhaps because the scene was more familiar and therefore less offensive. However, the consensus was one of aversion, as most participants ranked V at –1 and below, across all three groups.

Figure 4.17 **Oneroa (V)**

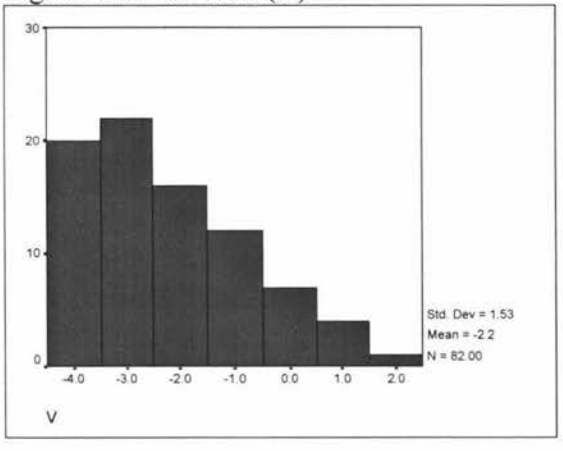
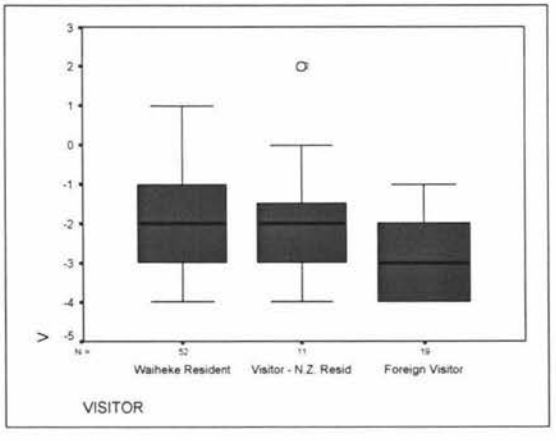


Figure 4.18 **Response Analysis of V**



In contrast, the box plots for X and L, (Figures 4.19 & 4.20) reinforces the partiality for scenic vistas between all three groups. However, L had a lower visual human element and was therefore ranked higher (2 to 4) by the bulk of both the visitors' and residents' groups.

Figure 4.19 **Response Analysis of X**

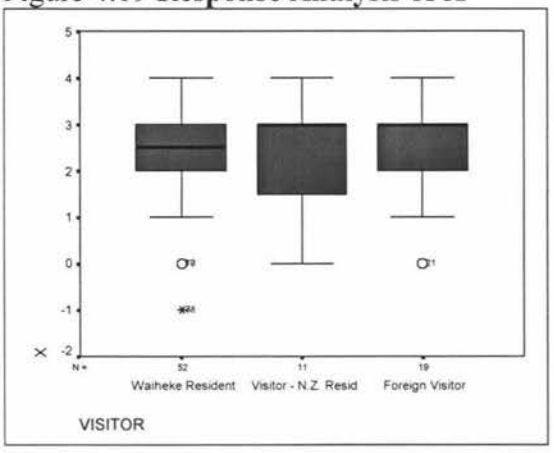
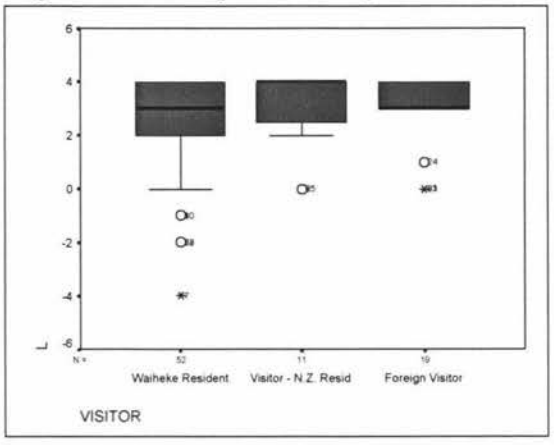


Figure 4.20 **Response Analysis of L**



A strong preference was therefore shown for pristine natural scenery with a low human element. The residents' group appreciated the natural scenery as it reinforced their lifestyle choice, with open spaces for recreational use, and again, that low human element. Of interest were the negative outliers present in both X and L. These outliers indicated that some of the participants were aware of the impacts of dune erosion on the local beaches. Image L, which ranked higher overall than X actually showed a visible track across the dunes in the foreground.

Factor 3 Theme – Presence of Visual Built Elements

Factor 3 accounted for 8.41% of the total variation, with F, B and O identified as the significant consensus images (Table 4.5). The correlation of B and O focused on lack of visible development and showed a preference for native bush, especially where visual regeneration was evident. A notable feature of both images was the low constructed/artificial element present and practical functionality of human artefacts that were in place. The absence of anything visually harmful to the environment was therefore termed as a positive factor. However, the farmland in the background of F resulted in a lower rating, although it was classed as functional land-use.

Table 4.5 **Factor 3**

Image	Level of Significance	Working Titles
F	0.683	Palm Beach-farming
B	-0.618	Palm Beach-picnic area
O	-0.772	Palm Beach- bush regrowth

The results of the Q sorts undertaken for B and O (Figures 4.21 & 4.22), showed both images had a negatively skewed distribution, with O having the higher standard deviation of 1.63. In terms of assessing the impact of human interaction with the environment, both B and O featured built artefacts. Seventy seven percent of the participants ranked O between +1 and +4, despite the set of concrete steps in the foreground. A wooden picnic table was visible in B, however this did not appear to detract from the image with over 87% of the participants, ranking it between +1 and +4. Therefore, the consensus was that these built artefacts were functional, and blended in with the natural scenery.

Figure 4.21 **Palm Beach (B)**

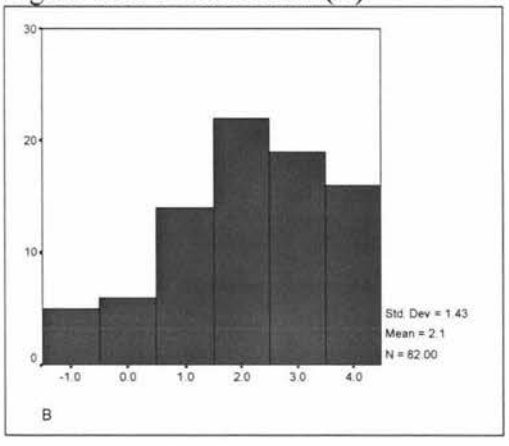


Figure 4.22 **Palm Beach- bush (O)**

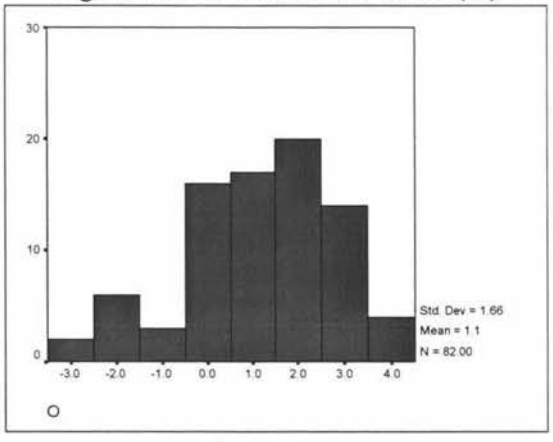


Image F was difficult to rank due to the variety of elements present, with a recreational boat in the foreground, structures on the beach, and a pastoral backdrop. However, the consensus was that the combination of elements present in F was generally acceptable with a mean of 1.3 and a standard deviation of 1.31 (Figure 4.23). Only 20% of the participants ranked F at zero or below.

Figure 4.23 **Palm Beach-farming**

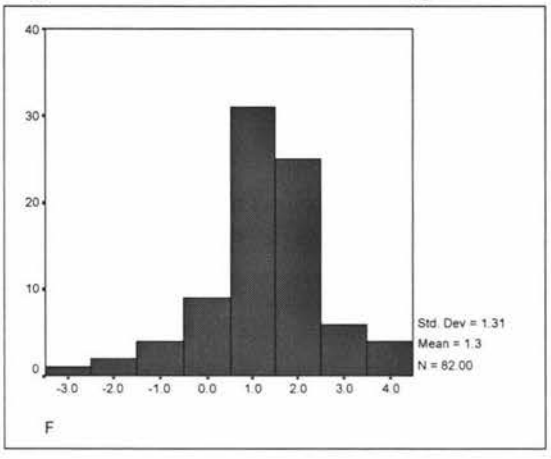
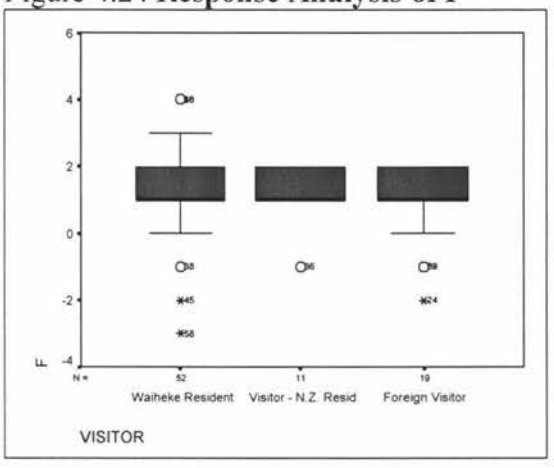


Figure 4.24 **Response Analysis of F**



The box plot for F (Figure 4.24) showed it was ranked consistently across all three groups, with a small interquartile range of between 1 and 2. The three groups also shared the same median of 1, with most of participants ranking F between 1 and 2. However, in terms of outliers, the resident group almost covered the whole spectrum from –3 up to +4. Residents' opinions ranged from finding the scenic combination of the visual elements very peaceful (outlier +4), to concerns about erosion and pollution problems (outlier –3). The international visitors' group, however were more consistent with only two outliers (-1 and –2) and a lower extreme between 0 and +1. The New Zealand visitors' group showed a higher consensus overall for F with only one outlier (-1).

The composition of B which looked suitably 'rustic' and appealing for picnickers, may have influenced the overall rankings of all groups. The box plot (Figure 4.25) showed that international visitors' group in particular rated B higher, with 50% ranking it between +2 and +3. The residents' and New Zealand visitors' groups, ranked B identically between +1 and +3, and a median of +2. Therefore, both of these groups regarded B as typical of a New Zealand beach vista.

Figure 4.25 **Response Analysis of B**

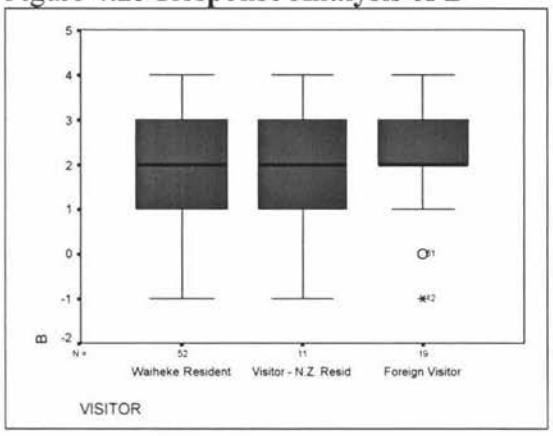
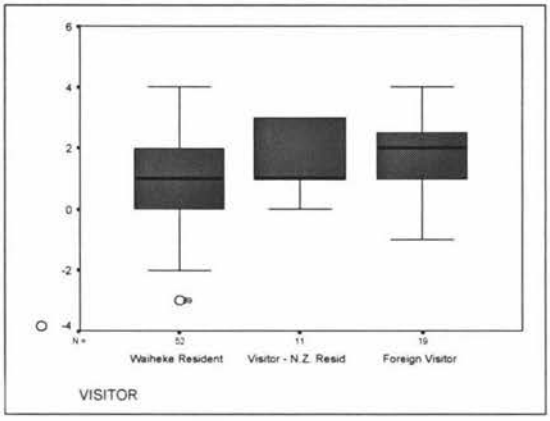


Figure 4.26 **Response Analysis of O**



O's composition also appealed across all three groups, with the majority of participants ranking it above zero. However, there was a marked variation between the groups, as shown by the interquartile ranges (Figure 4.26) although the resident group was the most consistent with rankings between 0 and +2, the upper and lower extremes were spread between -2 to +4. There was some debate over the presence of the concrete steps in the image. The New Zealand and international visitors' groups were more subjective in their evaluation of O and both actually ranked it higher than the resident group. The most positive factor mentioned by all groups was the visual evidence of bush regeneration. This may have also contributed to the higher ratings given by both the New Zealand and international visitors groups.

Factor 4 Theme - Marine Pollution

Factor 4 accounted for 7.26 % of the total variation in the rotated factors with J, U and N identified as the significant consensus images (Table 4.6). The correlation of U and N reflected an increased awareness of the marine pollution associated with all types of recreational boats. The blatant disregard that recreational boat owners' showed for the environment, especially those visiting the Island, was a strong negative comment to emerge. The cruise ship's presence (U) also provoked a mixed reaction, which ranged from a welcomed attraction, to an unwanted entity that was polluting the bay, both physically and visually.

The inclusion of J in this grouping relates to the marine pollution caused by the run-off from an exposed storm-water drain, on a popular beach. Visual pollution was also a factor, with its presence on the beach seen as an invasion. The potential run-off from new housing developments in the area was another negative comment to emerge as this would impact further on the environment.

Table 4.6 **Factor 4**

Image	**Level of Significance**	**Working Titles**
J	0.567	Onetangi Beach- storm water drain
U	-0.725	Oneroa- tourist yacht
N	-0.786	Matiatia Wharf -yachts

The Q sorts undertaken for U and N (Figures 4.27 & 4.28), both had negative means, -0.05 and -0.07 respectively. The negative means reflect the participants' concern over the environmental and visual pollution associated with recreational boats. There was an interesting response to U, with the ratings covering the whole spectrum from –4 to 4. Despite the economic significance of the cruise ship to the local tourism industry, 50% of the participants ranking it at –1 or below. However, many participants were simply indifferent to U and 27 % ranked it at zero.

Figure 4.27 **Oneroa yacht (U)**

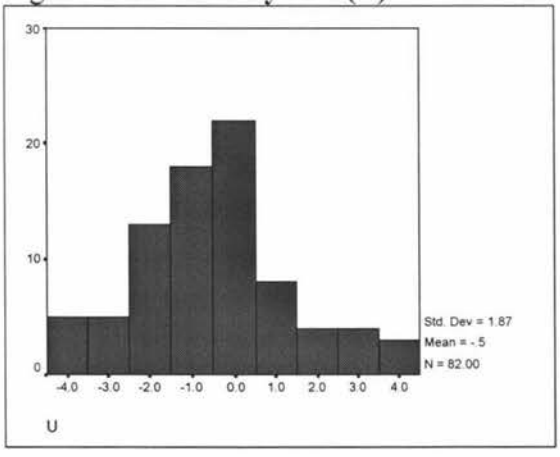
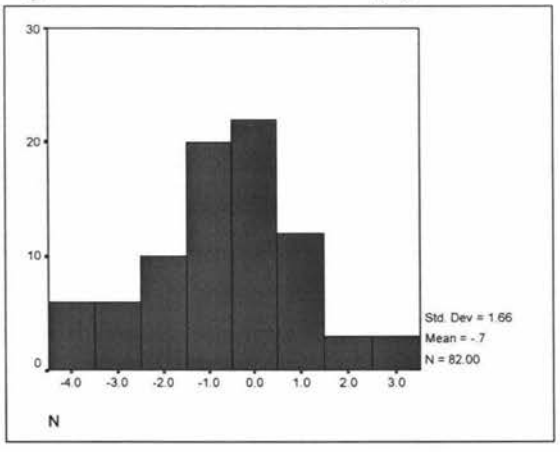


Figure 4.28 **Matiatia Wharf (N)**



N also had a wide distribution, from 3 to -4 with a standard deviation of 1.66. Similarly to U, 51% of the participants ranked N –1 and below. These negative rankings again relate to the high levels of pollution caused by recreational boat users, especially over summer.

However, the scenic aspects of the image counter balanced this negativity to some extent, with just over 7% ranking N between 2 and 3.

Image J showed a storm water drain, which rated poorly despite its functional nature, with a mean of –1.4, and a high standard deviation of 1.58 (Figure 4.29). J was ranked at –1 and below by 71% of the participants, who felt the perceived environmental and visual problems associated with the storm water drain were significant. Only one participant felt the storm water drain was both practical and function and ranked J at +3.

Figure 4.29 **Onetangi Beach (J)**

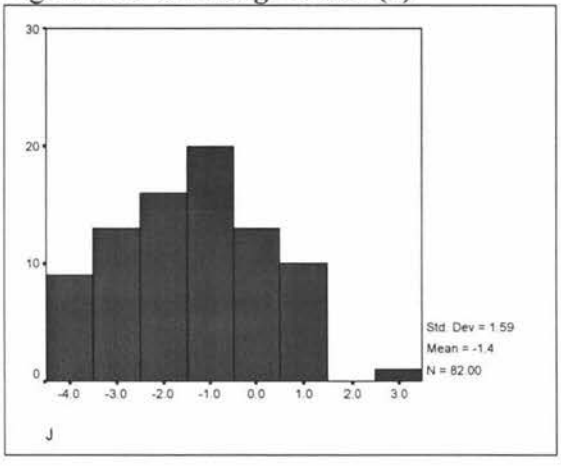
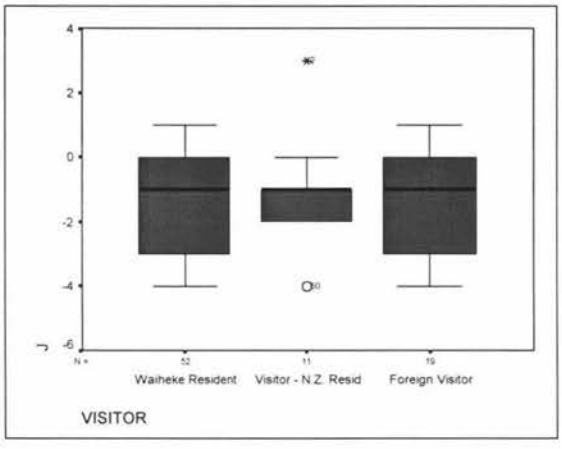


Figure 4.30 **Response Analysis of J**



The box plot for J (Figure 4.33) showed that both the international visitors' and residents' groups ranked J identically, with the majority between 0 and –3. International visitors, in particular, were aware of New Zealand's 'clean green image' and expected to find certain environmental standards. The New Zealand visitors' group was also of interest, with one outlier at +3 ranking J for functionality, with the –4 outlier more concerned about the beach run-off factor. The negative visual factor of J was another area of concern for all three groups and was another reason why the majority of participants ranked it below zero.

The box plot for U also showed the wide range of opinions as noted previously, with the residents' group having ranked it between –4 and +2 (Figure 4.31). The presence of positive outliers in the residents' group showed that some of the residents regarded the cruise ship, as a positive occurrence.

The international visitors' group covered the spectrum, with the upper and lower extremes ranging from +4 to -4. The New Zealand visitors' group was however slightly more conservative, with the majority between –1 and +1, except for the one outlier at +4.

Figure 4.31 **Response Analysis of U**

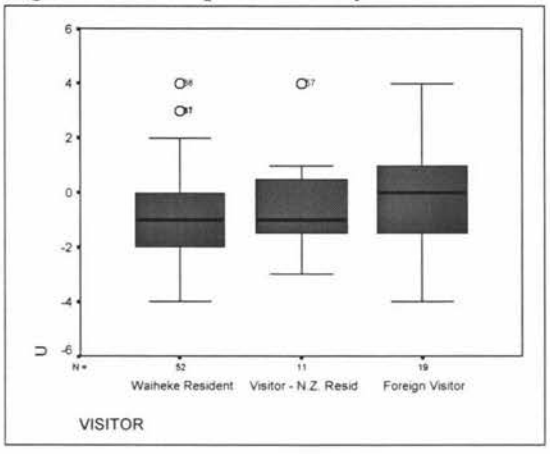
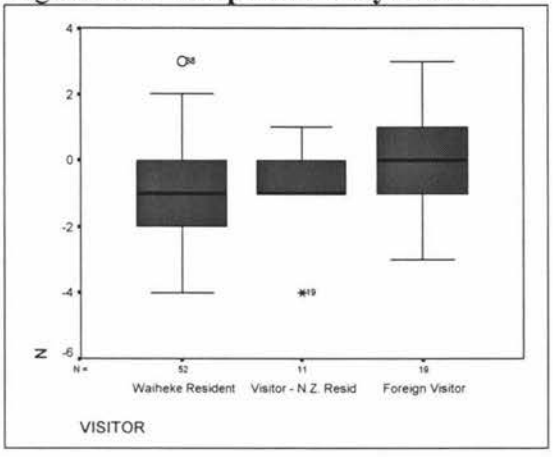


Figure 4.32 **Response Analysis of N**



In regards to N, the residents' stance concerning pollution levels and the impact it has on the environment was clear, with 50% ranking it between 0 and –2 (Figure 4.32). However, the outlier at +3 considered the scene of the moored yachts was 'peaceful', and appreciated the scenic aspect of N. International visitors too, showed an appreciation for the scenic aspects of the yachts moored at Matiatia, with 50% ranking it between -1 and +1. However, like the residents, they were also aware of the pollution problems associated with recreational boats. This accounted for the lower extreme of -1 down to -3. The New Zealand visitors' group showed a very small interquartile range for N, between 0 and –1, with the one outlier at –4 the only notable exception.

Factor 5 Theme- Cultural Diversity

Factor 5 accounted for 6.36% of the total variation in the rotated factors. Z and H were the consensus images identified as significant, with X the next most important image (refer Table 4.7). The correlation of Z and H reflected the diversity of cultures found on Waiheke Island. The Rocky Bay Store was symbolic of that isolated community, as people went there by choice, not in passing. Its subsequent closure was a reminder to all the residents that things have changed on the Island. Community spirit surfaced, as steps to preserve the building were taken. Many residents became involved on principle, because its closure was yet another familiar landmark that would disappear to make way for development. Z showed the more natural elements that people preferred to see, with the beach and native bush. However, as a community, they have now accepted roads and other structures as part of Island life as shown in Z. Similarly, X had a high natural element, but there were less built structures shown overall.

Table 4.7 **Factor 5**

Image	Level of Significance	Working Titles
X	0.430*	Onetangi Beach -dunes
Z	0.727	Onetangi Beach –dunes/road
H	-0.739	Rocky Bay-general store

The results of the Q sorts undertaken for Z and H (Figures 4.33 & 4.34) showed that Z had the least variability with a lower standard deviation of 1.15 and a higher mean of 1.4. Z had a much higher natural component than H, with only the visible road regarded as environmentally unfriendly. Consequently, 74% of participants ranked Z above zero, with most spread between +1 and +2. In contrast, only 39% of participants ranked H above zero with a further 34% sitting on zero exactly. However, due to the nostalgia felt toward the Rocky Bay Store and the visual appeal of the large palms as a backdrop, 23% ranked H at +1.

Figure 4.33 **Onetangi Beach (Z)**

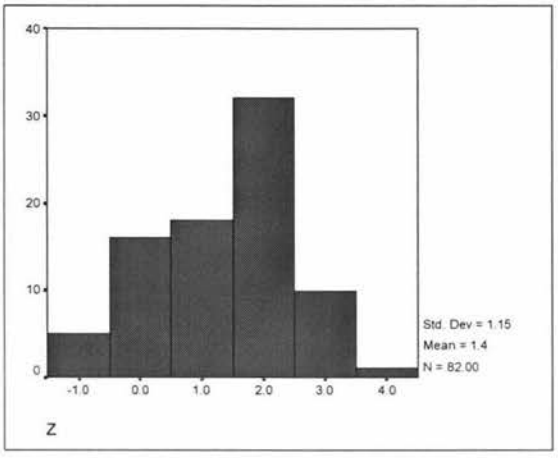
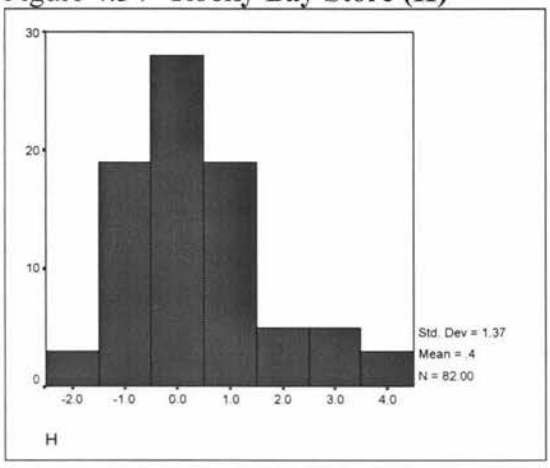


Figure 4.34 **Rocky Bay Store (H)**



The box plots for Z and H (Figures 4.35 & 4.36), again emphasised the appeal of a more natural environment. The majority ranked Z between 0 and +2, although the ranking varied between –1 and +4 across all three groups. The New Zealand visitors group ranked Z between +1 and +2 and actually ranked H lower down to –1. The outliers in H for the resident group (+3, +4) highlighted the nostalgia factor associated with the Rocky Bay Store. The international visitors' group, showed a large interquartile range for both Z and H at (0 to +2) and (+1 to –1) respectively.

Figure 4.35 **Response Analysis of Z**

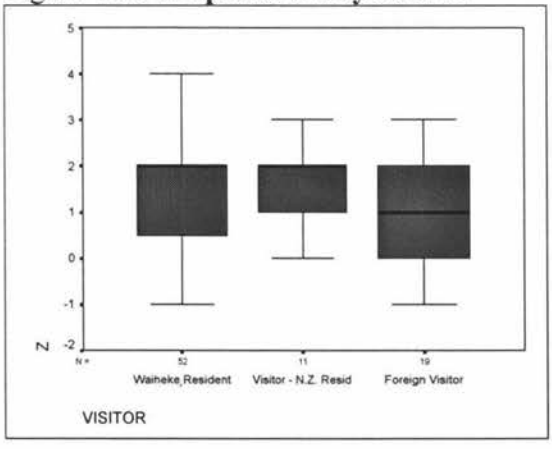
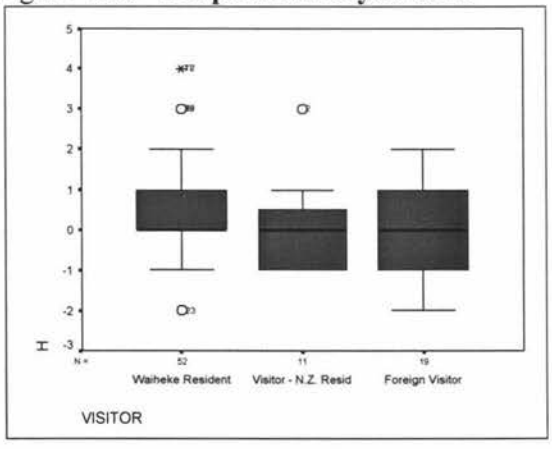


Figure 4.36 **Response Analysis of H**



Factor 6 Theme- Visual Perception

Factor 6 accounted for 6.02% of the total variation in the rotated factors. Z and C were the consensus images identified as significant, with J the next highest figure in this theme (refer Table 4.8). The correlation of Y and C was interesting, as both images contained elements that either appealed or were distasteful based on an individual's perception. Y was the local green grocery shop, brightly painted and quite a significant landmark in Oneroa Township. Themes to emerge included the visual aspect of the building, with opinions both for and against. The culture aspect was also important as specialty stores were considered as part of Oneroa's character.

C introduced another aspect with the presence of an environmentally friendly toilet block, not entirely appreciated by all participants. There was a creek in the foreground of C, which was polluted, however without that local knowledge, many participants saw nothing visually offensive. J's inclusion again emphasised the pollution verses functionality factor. The storm water drain was functional as it cleared the surface water effectively, however it drained straight on the beach, which was harmful to the environment.

Table 4.8 **Factor 6**

Image	Level of Significance	Working Titles
Y	0.636	Oneroa - general store
J	-0.396*	Onetangi Beach- storm water drain
C	-0.858	Palm Beach-facilities

The Q sorts undertaken for Y and C (Figures 4.37 & 4.38) showed both images had low means at –0.1 and +0.1 respectively. Of interest was the high standard deviation for C at 1.84, which indicated there was a broad range of opinions on that image. Most participants perceived Y as relatively environmentally friendly, with a 90% spread between –2 and +1, of which half were at zero. C however, covered the full spectrum from –4 to +4, as many participants perceived certain elements in the image quite differently. However, 55% of the participants ranked C between 0 and +1, which accounted for the higher mean in comparison to Y.

Figure 4.37 **Oneroa (Y)**

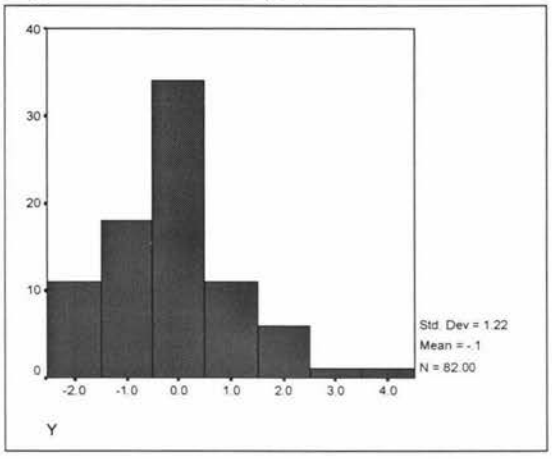
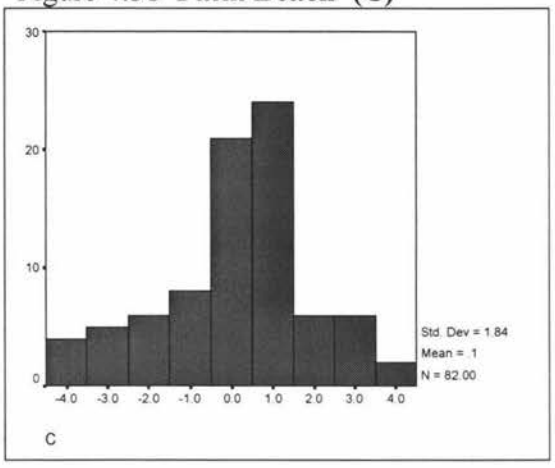


Figure 4.38 **Palm Beach (C)**



The box plot for Y (Figure 4.39) showed that both the residents' and international visitors' groups ranked the image almost identically, with the same interquartile range between 0 and –1. However, the residents' group had more of an affinity towards the store, as shown by the three positive outliers. The New Zealand visitors' group in comparison had a large interquartile range from 0 to –2. However, the median was 0, the same as the other two groups because of large upper extreme to +2, which helped the overall rankings for Y.

Figure 4.39 **Response Analysis of Y**

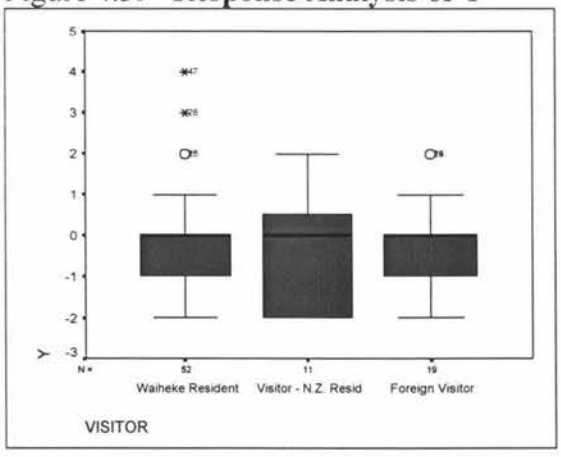
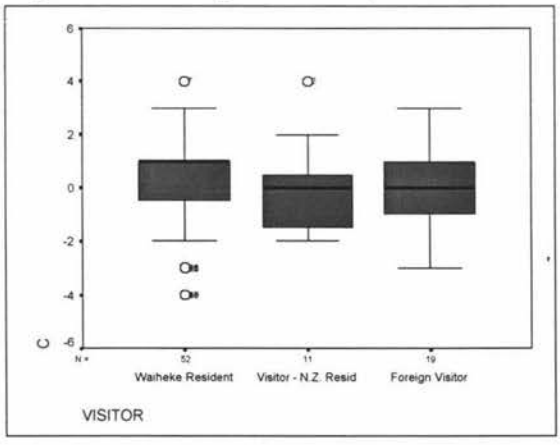


Figure 4.40 **Response Analysis of C**



The box plot for C (Figure 4.40) was also interesting, especially the residents' group, as the outliers ranged from +4 to –4. The negative outliers recognised the pollution problems in the creek, shown in the foreground. The positive outliers ranked C at +4 because of the environmentally friendly toilet.

However, it was the natural element present that improved the ratings for the international visitors' group, with an interquartile range ranged between –1 and +1. Interestingly, the New Zealand visitors' group ranked C the lowest, with comments that the sight of the toilet was offensive.

Factor 7 Theme- Passive Environmental Damage

Factor 7 accounted for 5.65% of the total variation in the rotated factors. K and G were the consensus images identified as significant, with R the next highest image in this theme (Table 4.9). The correlation of K and G shows a preference for natural scenery, a low human element and 'user' friendly recreational activities. Areas of concern included the marine and visual pollution associated with the dinghies shown in G. However, these images also portrayed the more positive facets of Waiheke Island and the lifestyle enjoyed by residents. The importance of marine related activities was also emphasised, with the number of dinghies in G representative of recreational boats in the area. Image R was included to show the contrast between 'tourist' orientated activities at Matiatia waterfront, verses the more recreational focused activities in K and G. The commercial aspect of R, as well as the higher human element shown, detracted from the natural scenery.

Table 4.9 **Factor 7**

Image	Level of Significance	Working Titles
K	0.655	Onetangi -activities
G	0.699	Rocky Bay-dinghies
R	-0.374*	Matiatia wharf- waterfront

The results of the Q sorts undertaken for K and G (Figure 4.41 & 4.42) showed that both images ranked well, with the majority above zero for all groups. The standard deviations were 1.14 and 1.49 respectively. Image K had the higher mean at 1.4, because it was non-intrusive in nature, with human elements counterbalanced by a scenic backdrop.

The ranking for K also reflected this, with 77% of participants grouped between +1 and +3. More importantly, this image showed that for most participants, passive environmental damage was harder to recognise. However, the scenic appeal of K may have also masked the passive environmental damage present.

Figure 4.41 **Onetangi Beach (K)**

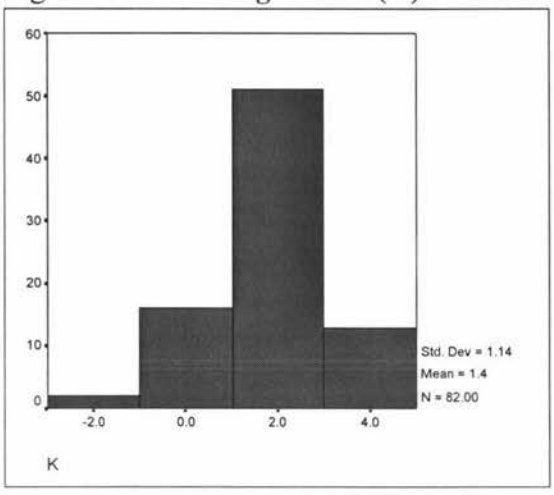
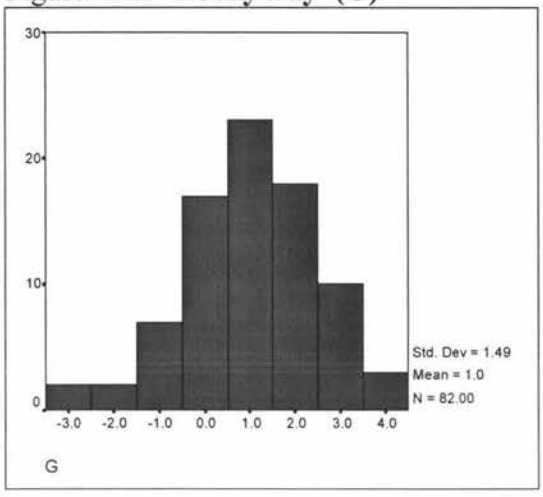


Figure 4.42 **Rocky Bay (G)**



The composition of G, which combined both native bush and colourful dinghies, appealed to a wide variety of people. 66% of participants ranked G at +1 or above despite of the number of dinghies shown. The absence of outboard motors on the dinghies also helped, especially from an environmental aspect, and may account for the 21% who ranked G at zero. As previously discussed, there was some concern over the high number of recreational boats in the area, however fewer than 5% of the participants ranked G at –2 or below.

When analysing the box plots for G and K (Figures 4.43 & 4.44) both the resident and international visitors groups showed a marked variation, with their extreme ranges from –3 to +4. However, half of the residents' group viewed the dinghies as part Rocky Bay's character and ranked it between 0 and +2. In contrast, the resident group in the lower extreme (0 to –2) were more concerned about environmental issues.

The international visitors' group had the largest interquartile range, with a negatively screwed distribution. The lower extreme (0 to –3) showed that the international group, like the residents, was more aware of environmental issues, and also preferred a higher natural element. By comparison, the New Zealand visitors were the most consistent overall, and ranked G within 0 and +2, with a median of 0. There was only one outlier at –3 who simply stated "Boats untidy, colour doesn't fit in bush".

Figure 4.43 **Response Analysis of G**

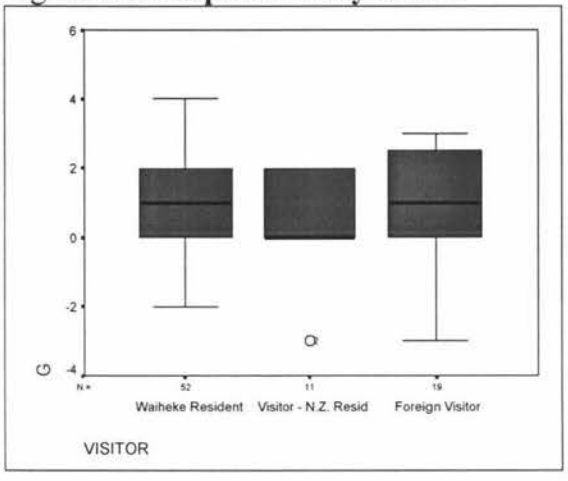
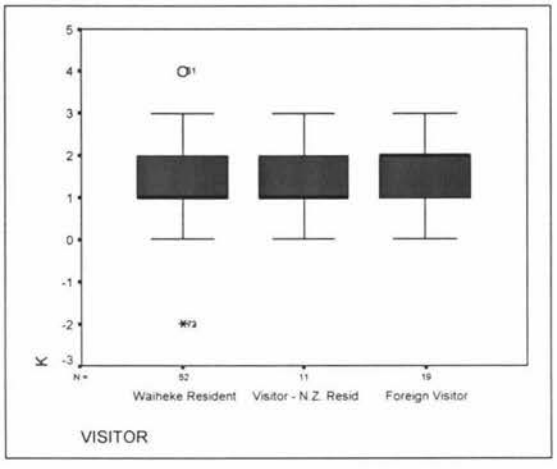


Figure 4.44 **Response Analysis of K**



K, in contrast, had a very small interquartile range of between 1 and 2 and was ranked almost identically across all three groups. The only difference was the medians, with the international visitors' group slightly higher on 2. The resident group had three outliers, two at –2, and the one at 4, the highest ranking. Of interest were the two outliers at –2, as these particular residents recognised the dune damage shown in the foreground of K. As previously discussed, the vast majority of people were unable to detect passive environmental damage.

Factor 8 Theme- Visual Pollution

Factor 8 accounted for 5.46% of the total variation in the rotated factors. S and T were the consensus images identified as significant, with R the next highest in the theme also (refer Table 4.10). The correlation of T and S indicated a low tolerance for blatant commercialisation and visual pollution by participants. The major areas of concern in these images were the over signage, visual human element, and general chaotic atmosphere created by the road works and overhead lines. A reoccurring theme to emerge was the preference for built elements that were functional and blended in with the natural environment. The importance of maintaining a balance between commercial interests and retaining the character of the Island was also a priority. Similar to the other seven factors discussed, the natural element and low human impact also rated highly. Some of the tourist operators have tried to establish Waiheke Island as an eco-friendly destination, therefore all of these factors were significant. In comparison, R had a scenic backdrop to counterbalance the commercialisation shown, relative to images S and T.

Table 4.10 **Factor 8**

Image	Level of Significance	Working Titles
S	0.813	Onetangi-general store 1
T	0.617	Onetangi-general store 2
R	-0.387*	Matiatia Wharf- waterfront

The Q sorts undertaken for S and T (Figure 4.45 & 4.46) both had low means at –1.5 and –1.2 respectively. Interestingly, S and T featured the same building, but taken from a different angle. It was relevant that the higher natural element shown in T influenced the ratings (72% of the participants ranked T below zero, compared to 78% for S). However, as visual pollution caused no actual physical harm to the environment, the majority of these participants ranked S and T at –2 (35% and 31% respectively). Only 2% of participants ranked S and T positively at +1 or +2.

Figure 4.45 **Onetangi Store (S)**

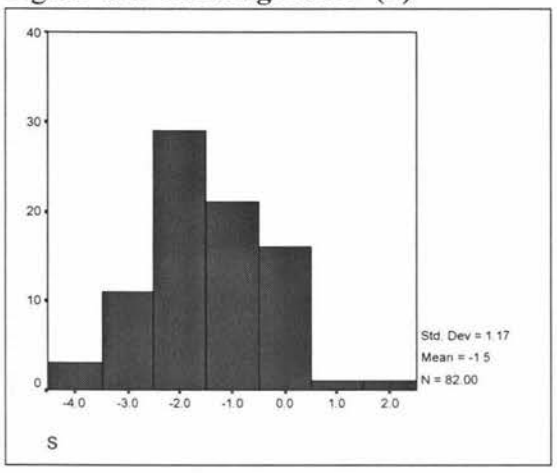
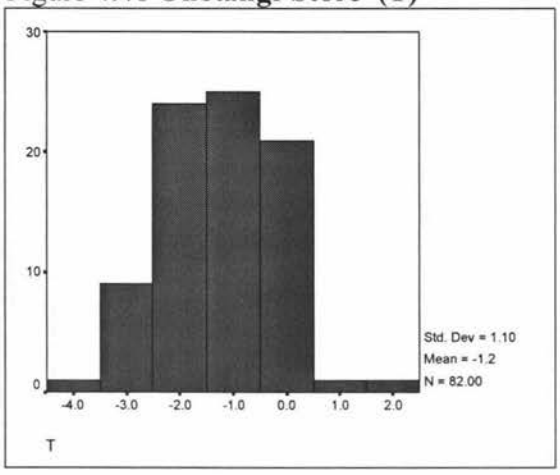


Figure 4.46 **Onetangi-Store (T)**



The box plots for S and T (Figures 4.47 & 4.48), again reinforced the value of a higher natural component, with T ranked more consistently across all groups than S. The biggest contrast between images was in the international visitors' group. The majority ranked S between –1 and –3, in comparison the lowest ranking given to was T was –2, due to the higher natural element. The New Zealand visitors' group ranked both images between –1 and –2, with a median of –1 for T, and –2 for S.

Figure 4.47 **Response Analysis of S**

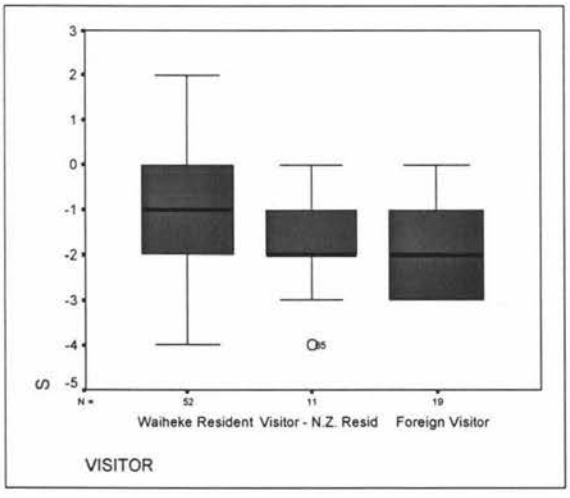
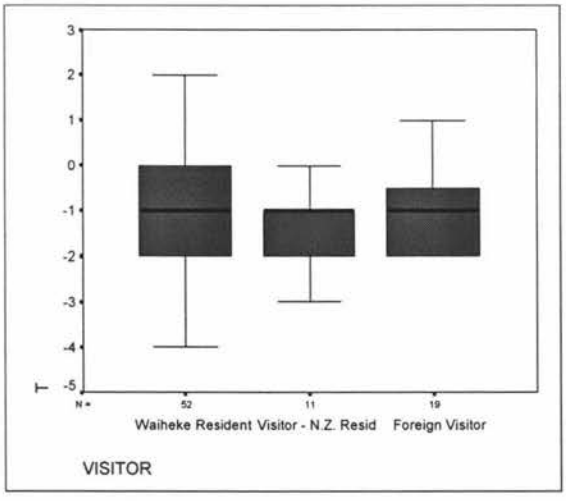


Figure 4.48 **Response Analysis of T**



The residents' group ranked both images identically (+2 to –4) which was interesting as it indicated that by their standards, the natural element was not significant. The residents' group also had that local cognition factor and therefore focused on the store and the associated chaos, which tended to discount the natural element.

Visual pollution was therefore a matter taken very seriously by both Island residents and visitors alike, as it affected their quality of experience. Visitors made several comments concerning the Onetangi Store, with most expressing a dislike for the excessive signage, poor architectural design of the Store and general chaos surrounding the building.

Factor 9 Theme- Housing Density

Factor 9 accounted for 4.62 % of the total variation in the rotated factors. D and E were the consensus images identified as significant, with T the next highest ranked image (Table 4.11). Several themes emerged from the correlation of D and E, mostly linked with the rate of development on the Island and the general lack of appreciation for community values. A need to consider the impact on the environment from both existing structures and any future developments was considered a priority. The extensive urban renewal that has taken place was also an area of concern, because it has altered the character of the older established residential areas. The preservation of the beachfront area from further development was an area of concern for all groups, with some developments that have taken place, regarded as visually offensive. The desire for more innocuous types of development was evident by the ratings of image T, where the visual signage and general chaos created by the outdoor structures, was thought to have failed to blend in with the natural environment.

Table 4.11 **Factor 9**

Image	Level of Significance	Working Titles
D	0.777	Palm Beach- pink house
E	0.811	Palm Beach- housing
T	-0.321*	Onetangi-general store 2

The results of the Q sorts undertaken for D & E (Figures 4.49 & 4.50) showed both had low means at –1.1 and –0.2 respectively. The housing density shown in Image D was visually intrusive, with several large homes having been built on the hillside, overlooking the beach. Several comments were made concerning one large pink multi-leveled house in particular, which was very prominent on the hillside. The vast majority of participants found the house visually offensive and considered it to be out of character with the area.

Subsequently, 67% ranked D below zero, solely based on the structure's failure to blend in with the environment.

Figure 4.49 **Palm Beach- housing (D)**

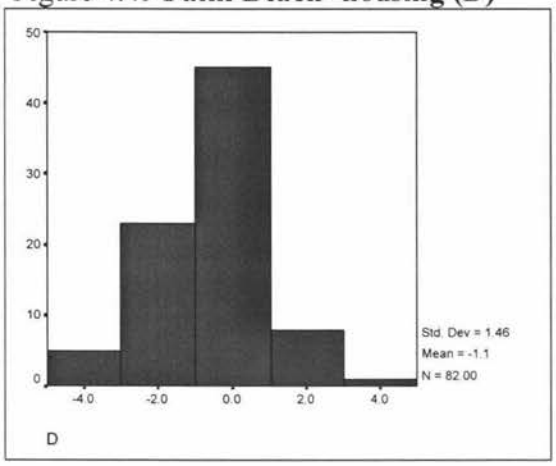


Figure 4.50 **Palm Beach -housing (E)**

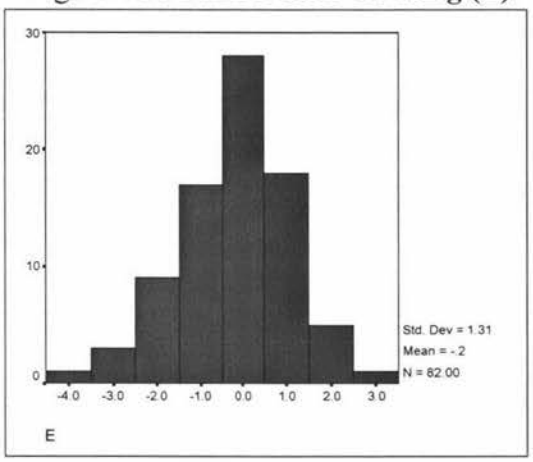


Image E also featured homes that were large and intrusive, although the main area of concern for participants was encroachment on the beachfront area. Surprisingly, only 37% of participants ranked E below zero, compared to 67% for D, as seen by the shape of the distribution curve (Figures 4.49 & 4.50). The bush area that dominated 60% of image E influenced the overall rankings as it shifted the focus off the housing.

The box plots for D and E (Figures 4.51 &. 4.52) showed quite a marked variation between images, especially in regards to both the New Zealand and international visitors' groups.

Figure 4.51 **Response Analysis of D**

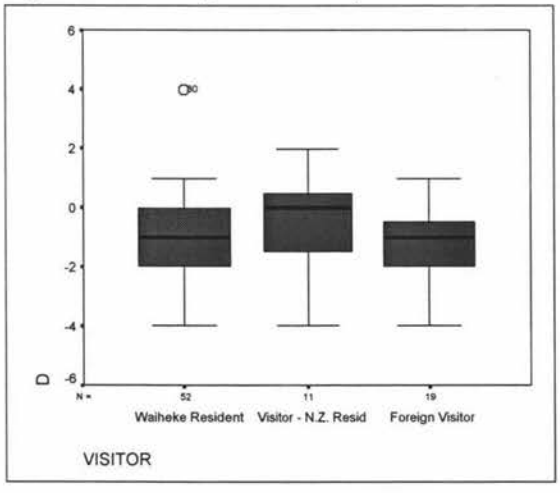
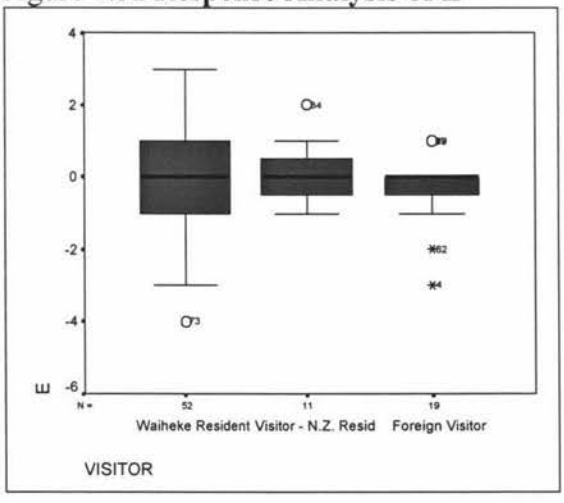


Figure 4.52 **Response Analysis of E**



The visual impact of housing was a major factor for the international visitors' group, who ranked D between +1 and –4. The high natural element present in E influenced the overall rankings for all three groups, in contrast to D. The international visitors' group ranked E higher, with a very small interquartile range and only three outliers. The New Zealand visitors' group also ranked E higher, with a median of 0, and only one outlier at +2. The residents' group nearly covered the spectrum, from +3 to –3, with an outlier at –4. However, the resident group also ranked E higher than D.

Factor 10 Theme- Commercialisation/ Visitor expectations

Factor 10 accounted for 4.05 % of the total variation in the rotated factors with R, Q and W identified as the significant consensus images (Table 4.12). The correlation of R and Q reflected the importance placed on how visitors' actually perceived Waiheke Island as a destination and total holiday experience. The Matiatia Wharf area that featured in both images acts as the 'gateway' to Waiheke. However, most participants felt that the commercial structures on waterfront detracted from the visual aesthetics of the area. Participants also felt that these existing facilities were basic, unattractive and totally inadequate, which only further compounded the problem.

Table 4.12 **Factor 10**

Image	Level of Significance	Working Titles
R	0.503	Matiatia Wharf- waterfront
Q	0.690	Matiatia Wharf - activities
W	-0.588	Palm Beach-dunes/buildings

One of the main reoccurring themes throughout these results has been the importance of maintaining a high natural element in the landscape. Therefore, the degree of commercialisation portrayed in these images was offensive to both Island residents and visitors alike. The majority of participants expressed concerns about the future development of the Island and the degree of commercialisation that maybe involved. W highlighted how unplanned development has impacted on the environment. Structures were visible right on the beach which showed a disregard for the natural landscape. People are more aware of the environmental issues now and found the structures offensive.

The Q sorts for both R & Q had low standard deviations of +1.12 and +1.08 respectively (Figures 4.53 & 4.54), which indicated a relative consensus. R had a higher component of both bush and water, which appeared more neutral, consequently 43% of the participants ranked R at zero, with a further 38% below zero. In contrast, the commercial structures were more prominent in Q and only 13% of participants ranked it at zero. Surprisingly, 82% ranked Q below zero, which clearly indicated that participants were adamant about the negative impact generated from that level of commercialisation. Several comments were made concerning the 'tacky' commercialisation present on the waterfront, and that all structures looked 'make-shift' in nature.

Figure 4.53 **Matiatia Wharf (R)**

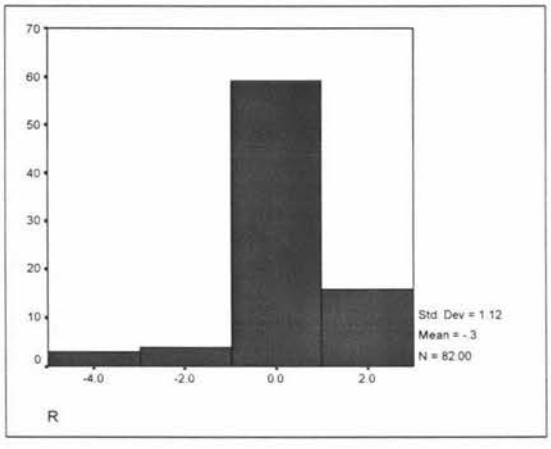
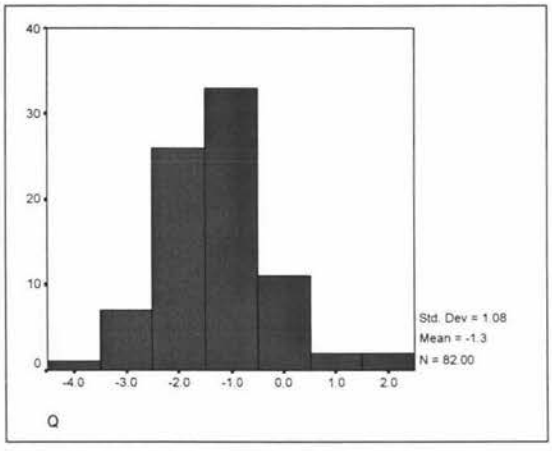


Figure 4.54 **Matiatia Wharf (Q)**



W had a mean of -0.1 and a standard deviation of 1.26, which indicated the participants were quite divided in their opinions (Figure 4.55). The results showed 33% of the participants ranked W below zero, 35% at zero and 32% above zero. Participants commented that the most offensive element in the image were structures that encroached on the beach. However, these were not commercial in nature, so the visual impact was less offensive.

The box plot for W showed that half of the resident and New Zealand visitor's groups, ranked W between +1 and –1 (Figure 4.56). However, one resident felt strongly about the structures on the beach and ranked W at –4. The higher ranking given by the majority of international visitors' group (0 to +1) was directly related to the natural element present.

Figure 4.55 **Palm Beach (W)**

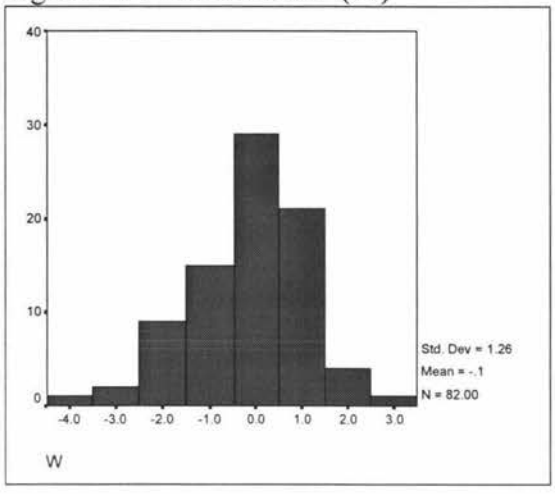
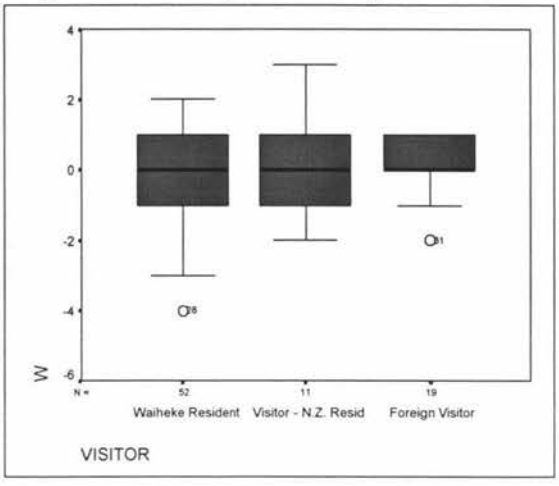


Figure 4.56 **Response Analysis of W**



The box plots for R and Q (Figures 4.57 & 4.58) again confirmed the consensus with small interquartile ranges for all three groups. The residents' and international visitors' groups both ranked R between 0 and –1, and also featured outliers at –4. The New Zealand visitors' group ranked R slightly higher, with an upper extreme of +3.

Figure 4.57 **Response Analysis of R**

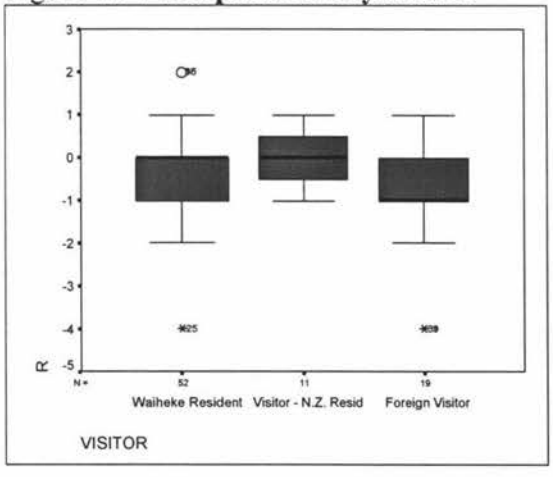
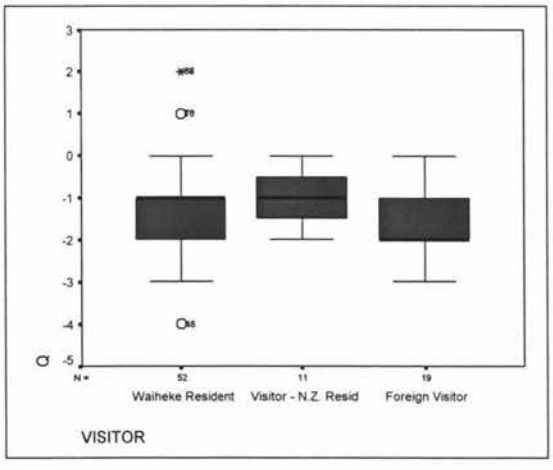


Figure 4.58 **Response Analysis of Q**



The commercial aspect of Q resulted in lower rankings across all three groups. Of interest were the positive outliers in the resident group, at +1 and +2, which showed that the commercial activities on waterfront area had some limited appeal. The majority of resident group however ranked Q between –1 and –2, which was the same as the international visitors' group. The New Zealand visitors' group ranked Q higher, with upper and lower extremes between 0 and –2. The New Zealand visitors' group ranked both R and Q higher on average than the two other groups.

4.3 Qualitative Analysis

Identifying themes by Qualitative analysis

One of the main advantages of the Q sort method was the abundance of rich qualitative data, based on an individual's interpretation and personal viewpoint. In this research, the 82 participants were asked for supporting comments to justify their top six selections, from both the 'environmentally friendly' and 'environmentally unfriendly' criteria. The total pool of comments for trait comparison was therefore nine hundred and 984, which represented both the residents' and visitors' groups. The compiled list used to identify these themes is attached, as Appendix H1. It became apparent on reading the comments that participants' viewpoints were quite polarised. Therefore, it was easier to identify common themes between the two groups for later comparison. Four main themes emerged which were the 'degree of naturalness'; 'impact of development'; 'traditional values' and 'human element'. These themes reflect both the residents' and visitors' perception of the current state of Waiheke's environment.

For the 'environmentally friendly' criteria, these themes were identified as 'natural'; 'balanced development'; 'high traditional values', and 'low human element'. Conversely, for the 'environmentally unfriendly' criteria, the themes became 'unnatural'; 'over development'; 'non-traditional values', and 'high human element'. A brief synopsis of the individual themes within both criteria follows, with participants' comments included to add more depth and show how strongly they viewed certain issues.

Environmentally friendly

The visual impact of the natural scenery in many of the images made the 'Environmentally friendly' criteria hard to judge for many participants. However, the four themes that emerged provided a good indication of the general perception of the environment.

'Degree of Naturalness'

'Natural' as a theme, encompasses the image of 'Waiheke at its best', with clean white sandy beaches, pristine vistas and native bush. Any human infrastructure present should blend with the natural environment to minimise the visual impact. The following participants' comments reflect this type of imagery.

"serene view" "simplicity" "perception of space"
"sparkling clean water, green bush" (16) "unspoilt" (49)
"beautiful beach , long walking beach" (68) "plant life & birds" (40)

Impact of Development

'Balanced development' represents the acceptance of change, but within certain boundaries, to protect the distinct character of Waiheke. This includes the promotion of low density housing which blends in with the natural environment. Future developments should also be low impact in nature, to preserve the aesthetics of the landscape. The following comments reinforce the need for balanced development:

"modified environment, unspoilt beaches, low impact- human artifacts"
"happy combination- low density housing / boats and vegetation"
"individual buildings unique"

Traditional Values

'High traditional values', as a theme, relates to the lifestyle choices made by the residents and the reason why many visitors come to Waiheke. There is a genuine desire to maintain the 'community spirit' which contributes to a feeling of peacefulness, and tranquillity on the Island. Supporting comments as specified above are noted:

"Waiheke on a good day before the boats come" "Waiheke at its best"
"beach free of people and commercial activities" "safe for children"
"fun beach, holiday beach"

Human Element

'Low human element' emerged as an underlying theme from comments mainly classified as 'natural' or pertaining to 'balanced development'. The 'low human element' is another reason why many visitors come to Waiheke, especially the day-trippers from Auckland City. Most residents and visitors regard a low human element as positive, as shown following comments:

"boats only evidence of humans" "nice unspoilt uncrowded"
"beach free of people and commercial activities" "secluded spot"

Environmentally unfriendly

While participants sometimes struggle to find a reason for choosing their top six environmentally friendly images, this was not the case for their environmental unfriendly images. In fact, participants appeared passionate about their selections, often explaining their reasons in considerable detail. Fairweather *et al.* (1998) also identified a similar trend in their research which dealt with similar issues.

'Degree of Naturalness'

'Unnatural' was an underlying theme present in most of the images used in the study. Increased traffic congestion, along with noise and marine pollution were just some of the areas of concern for participants. Visual pollution included 'tacky' forms of signage and even too many recreational boats. Structures that failed to assimilate into the natural environment also provoked unfavourable comments. The following comments cover the spectrum on the term 'unnatural':

"eye sore – buildings on beach" "pollution at its best"
"stagnant water tidal , summer sewage" "no vegetation"
"lot of clearing for development" "greenhouse effect
"signage too big why? Only shop!" "too much clutter'
"pink house, red toilets, awful, not fitting in" "big houses, ostentatious"

Impact of Development

'Over development' relates back to the 'natural' theme, and dealt with concerns over the impact of several new developments on Waiheke. Major changes have already taken place on the Island in recent years and the pace of development has stretched resources. Both visitors and residents were also aware that any developments to improve amenities would result in yet more people coming to the Island. The increased commercialisation of activities on the Island was also another area of concern. The following comments expressed all of these sentiments:

"big homes out of scale with landscape" "size and harshness of development"
"buildings intensive human use, modified environment" "touristy"
"drainage, no more housing should be encouraged"
"building development implies tourism" "wild west architecture – not fitting together"

Traditional Values

'Non traditional values' addressed concerns about the changes resulting from overdevelopment and its subsequent impact on the natural environment. These changes have altered both the residents' and visitors' perception of the Island 'lifestyle'. Waiheke has grown beyond its traditional role as a summer holiday destination and place to retire, with the following comments reflecting how attitudes have changed:

"Waiheke's slipping thru fingers" "contrast to 'Island', cars and people"
"too much tourism, crowded losing silence" "town could be anywhere"
"little Island no idea of rate of direction of change" "Greek Island tourism"

Human Element

'High human element' dealt with the visual impact of crowds on the Island, which were regarded as a major problem, especially over summer. Improved facilities ultimately mean more people on the Island, which ironically starts the cycle again, with yet more improvements needed. The impact of crowds has already resulted in comments such as:

"uninterested people" "people pollution"
"volume of people in one spot" – Wharf
"clutter of people queues, frustration bored no entertainment"
"attracting more people to come" "too many people"

4.4 Summary

The consensus of all participants was to preserve the natural aspect of Waiheke Island within the limitations of sustainable development. Participants were passionate about their 'unfriendly' selections, however the passive environmental damage, such as people walking on the beach, still leaves an impact. The old adage of 'what you can't see, won't hurt you' was reinforced by comments like "nothing in the image to show things harming the environment" and "nothing unfriendly".

CHAPTER FIVE

5.0 Discussion and Comments

The importance of visual perception and the concept of beauty was examined in Chapter 2. The development of tools for the measurement of perception was also discussed, focusing on the Q sort method. In Chapter 3, a methodology to address the issue of peoples' perceptions of the environment of Waiheke Island was established, with findings from research detailed in Chapter 4. It is now necessary to integrate these components, and to identify the significance of these results for future management of the Waiheke Island environment. The discussion will examine both the positive and negative aspects of each of the four main themes identified in the qualitative analysis. The perceptions of the international visitors, the New Zealand visitors, and the residents will be addressed separately. First however, the findings are summarised in Table 5.1 showing the key factors from the images which were liked or disliked. The middle section identifies those factors where the respondents' expectations had a major influence on their acceptance of that image.

Table 5.1 **Ranking of Images by Key Factors**

	Disliked	**Accepted**	**Liked**
Residents - commuters	Seasonal influx	Wharf (functional)	Scenery Lifestyle
- permanent residents	Crowds Commercialisation	Prepared to accept change in the interests of economic development	Scenery Lifestyle
- tourist operators	Inefficient infrastructure	Prepared to accept a degree of modification to the environment	People Natural resources - available for exploitation Development and change
- other	Inefficient infrastructure	Development and change	Lifestyle Scenery Visitors (cultural interaction)
International Visitors	High density people, buildings and signage. Commercialisation Inefficient infrastructure Oneroa (poor infrastructure)	Maritime recreation	High natural element Unique character Beaches Landscape to be blended
NZ Visitors	Crowds Commercialisation	Change (exposure to similar trends) Recreational activities Scenery (familiarity)	White sandy beaches Nostalgia (beaches, baches and boats) NZ holidays as they used to be)

5.1 International Visitors Perception of the Environment

The international visitors' perspective was one of hindsight, in that they were able to identify problems concerning environmental issues based on their experiences of similar trends overseas. Consequently, as a group, they provide constructive criticism on issues such as depleting the natural resources and the exploitation of scenic areas. Many visitors, especially those from Europe and the United Kingdom, stressed the importance of appreciating the positive attributes of Waiheke Island. The emphasis that international visitors placed on preserving the natural environment was also identified in similar studies undertaken in New Zealand (Fairweather *et al.*, 1998; Fairweather & Swaffield 1999; Simmons & Fairweather, 2000; Fairweather & Swaffield 2001; Simmons & Fairweather 2001). A major finding from their research was that overseas visitors showed a strong consensus in core environmental preferences.

'Degree of Naturalness'

The international visitor group considered the 'degree of naturalness' very important and selected images accordingly. In fact, when the images were very similar, the slightest degree more of 'naturalness' shown in either image was automatically rated higher. As a group, there was a consensus that any modification to the landscape needed to blend in with the natural environment. In addition, failure to mask or miminise the impact of structures such as storm drains and overhead power lines also detracted from the natural landscape based on this group's opinion. Preserving the natural environment for the future enjoyment of all was a sentiment expressed by the group.

Impact of Development

Places like Waiheke Island are considered a haven from the type of tourism development witnessed in their own local holiday destinations. However, some international visitors now compared Waiheke with that of "Greek Island tourism", where development has been at the detriment of the natural landscape. This group, for example, criticised the rural town of Oneroa, for its 'Wild West architecture' and its lack of character. The consensus of the international visitors group was that there appeared to be no planned development for the town. This was evident, as the present facilities in Oneroa fail to cope with the influx of

people, especially over summer. This aspect was frustrating for international tourists, especially for those who expected to find a more relaxed lifestyle on the Island. The main consensus of the group on development was to go slowly and reassess the use of natural resources.

Traditional Values

The major concern for this group was to preserve the character of Waiheke before it is too late. The presence of relics, as explained by Butler (1992), were of particular importance to international visitors. The individual specialty shops, the Rocky Bay dinghies and small baches were all considered to be part of Waiheke's charm. However, the presence of blatant commercialisation, such as excess signage, was unnecessary from the international visitors' viewpoint, as it infringed on the natural landscape. International visitors came to Waiheke Island specifically for the natural scenery and slower pace of life. They were not interested in shopping malls or staying in high rises, as that was not the holiday experience they sought. Ironically, the infrastructure of the Island was such that the experience has now become more frustrating than pleasurable. That supports Butler's (1992) continuum of change, where the technological factor implied that over time tourists expect the appropriate facilities to be in place.

Human Element

International visitors came to Waiheke Island with certain expectations, but few had anticipated the problem of overcrowding. The Matiatia Wharf, for example, got very congested when passengers were embarking on the ferries, as the loading area was quite narrow. Based on the results of the Q method, however, international visitors were willing to accept crowds as part of the holiday experience in those circumstances. However, as a group, they preferred to see a very low human element when viewing the natural landscapes, especially the white sandy beaches. The density of housing in some beachfront areas was even classed as 'crowding' of the natural landscape by this group. In contrast, visual built elements, such as picnic tables were acceptable on the premise that they were functional and blended in with the natural scenery. Fairweather & Swaffield (1999) also

identified the importance of natural landscapes and the impact that built structures have on people's perception of that landscape.

The international visitors' opinion on the issue of recreational boats and yachts moored at Matiatia Wharf, as well as other local bays, was also interesting. The presence of these recreational boats clearly indicated a high human element in the environment. On the other end of the scale was the cruise ship, which visited Oneroa Bay every two weeks over summer. Although the scheduling of visits was moderate, it too had obviously brought an influx of visitors to Waiheke at the time. Regardless, over half of the international visitor group felt that the scenic value of having these types of boats in the vista counterbalanced the high human element. However, as a group, they were aware of the marine pollution caused by recreational boats, again having encountered the same problem overseas at similar tourist destinations.

Group Consensus

Most of the international visitors interviewed still regarded Waiheke Island as a worthwhile tourist destination. However, most stated that they would continue to come to the Island, in the 'off season' to avoid the busy summer months. As a group, they felt strongly about preserving Waiheke's identity, which included keeping the natural landscape as unmodified as possible.

5.2 Domestic Visitors Perception of the Environment

The way in which this group perceived the environment was difficult to judge. As New Zealanders, they were familiar with the natural scenery of the country. Consequently, locations such as Waiheke Island needed to live up to certain expectations. They were also tourists in their own country, therefore issues such as overcrowding and commercialisation of natural resources was pertinent. In fact, many of the visitors may have experienced similar changes to the development taking place on Waiheke Island in their own regions.

'Degree of Naturalness'

The New Zealand visitors' perception of the environment therefore tended to mirror the residents' viewpoint on most issues. However, as a group, they were more 'middle of the road' in their rankings and tended to slot between the resident and international visitor groups. The New Zealand visitor group appreciated the more natural scenery, especially the white sandy beaches, which make the Island so popular in summer. As a group, they disliked the degree of modification that was evident in downtown Oneroa, similar to the view of the international visitors. Most of the comments made related to the fact that Oneroa, as a major focal point on the Island, failed to blend in with the environment. The groups' consensus was that Waiheke Island should endeavour to retain the highest degree of 'naturalness' possible, in view of the current developments.

Impact of Development

The New Zealand visitor group felt to some extent that they were alienated in their own country, because of the crowds and general development taking place on Waiheke. What was once a quiet summer holiday retreat has now become a major tourist destination. The changes witnessed by the group, especially over the last decade, have not all been seen in a positive light. Development has brought more tourists to Waiheke, which has only further stretched the limited infrastructure and facilities on the Island. Accommodation and living expenses have increased for example, purely because of supply and demand. The summer holiday was the traditional period when people visited the Island, however the quieter winter period was now a preferred option by some. As a group, they would be happy to retain the status quo, however as noted by Butler (1992) they also wanted the modern facilitates. The consensus was that Waiheke Island would remain as their holiday destination but development should be limited.

Traditional Values

The New Zealand visitor group felt that Waiheke Island was still the traditional family holiday location where they could relax and enjoy the natural scenery. The concept of the Kiwi family holiday featured in research by Fairweather *et al.* (1998), where the essential elements were the beach, baches and boating. The New Zealand family experience was also

part of Simmons & Fairweather (2000) research, where they examined how people perceived nature. Based on their research, the New Zealand visitor group appreciated Waiheke Island, both for it natural beauty and as a venue for activities. Consequently, New Zealand visitors, especially family groups, felt a certain amount of nostalgia towards the Island.

Day-trippers from Auckland also felt some nostalgia for relics such as the individual shops and Rocky Bay's dinghies and café. Waiheke Island offered 'a point of difference' from city living, especially the large recreational areas and more relaxed ambience. Visits to Waiheke were considered as 'time out', with an element of continuity expected between visits, similar to that of the Kiwi family group. The consensus of the group was for Waiheke Island to retain its traditional role as a safe holiday destination for future generations to enjoy.

Human Element

The New Zealand visitors felt the strongest about the issue of overcrowding on the Island. The heavily congested wharf scene in image P was a classic example where the group felt alienated in their own country. In fact, the response analysis for P showed that the over 70% of the New Zealand visitors group rated the image at -3. This was the most consolidated consensus on any image in the study. The group's reaction to the overcrowding issue also encompasses their preference for natural scenery and maintaining traditional values as discussed. However, the New Zealand visitors' group was not consistent about all issues involving a high human element. For example, they were more willing to accept the high number of recreational boats in the area, as these were associated with leisure activities. The results of Simmons and Fairweather's (2000) Rotorua study also identified a similar trend, where New Zealand visitors were more tolerant of leisure related activities.

Group Consensus

The type of development taking place on Waiheke appears to be mostly affecting the 'Island experience' for the regular visitors in the New Zealand group. They have witnessed the changes on the Island, in some cases over family generations. Waiheke's close proximity to Auckland means they visit the Island whenever the opportunity allows, especially in the summer. Ironically, these regular visits, even if it was only for a day, also contribute to the issues of overcrowding and other infrastructure problems on the Island.

5.3 Residents' Perception of the Environment

The residents of Waiheke Island were also a diverse group of people making generalisations difficult. The Island community was made up of several different groups who all perceive the environment in a different way. Certain sections of the community were concerned about the changes that were occurring, and wished to see the Island's environment better protected. In contrast, the business community wanted to see development of the Island go ahead, even if that meant the natural environment had to be modified to accommodate tourism development. There was also a section of the community which expressed no real comment. These were the elderly, unemployed and beneficiaries living on the Island, who had limited ability to influence the changes.

'Degree of Naturalness'

The residents who came to Waiheke Island when it was truly considered to be an 'alternative' lifestyle, wished to preserve the natural resources that were left. However, some of the strongest advocates for the preservation of the Island's natural resources were the more recent arrivals. These residents have made a conscious decision to move onto the Island, specifically for the natural scenery and lifestyle, despite the development taking place. It is therefore logical they wished to see steps taken to preserve it. The main priorities for these residents were preserving large areas of native bush, uncluttered beaches and maintaining a relatively unmodified landscape. The residents who commute and work in Auckland also saw no value in changing the environment. In fact, they believed altering the landscape would ultimately impinge on their 'Waiheke' lifestyle. Therefore, all of these

groups within the community wished to see the environment unchanged or remain at status quo, as described by Butler (1992).

In contrast, other members of the community, mainly the business operators, wanted to see Waiheke Island developed or modified into a more attractive tourist destination. However, maintaining a high degree of 'naturalness', as defined by Butler (1992) was also a major consideration for these business operators. Theoretically, it was in their best interests to ensure that the natural landscape remains as pristine as possible. Realistically, a certain degree of modification to the landscape would ultimately be required to capitalise on the natural resources of the Island. As Inskeep (1987) emphasised, this may even enhance the natural features of a location or help to preserve it. However, based on Butler's (1992) continuum of change, there exists a point where the 'degree of naturalness' becomes overshadowed by development pressures. It has become apparent that each separate faction in the community tends to consider the degree of 'naturalness' in terms of their own personal gain.

Impact of Development

The separate or hidden agenda of certain factions within the community concerning the development of the Island has made progress slow. The proposed development for the Matiatia Wharf area for example, has already affected the community, long before its actual commencement. Residents now must pay for the parking facilities by the wharf, or use the Council's new free alternative parking area some distance away. However, the local residents have accepted a certain degree of modification or development. The presence of the large supermarket at Ostend, as well as the new cafes and restaurants in Oneroa for example, have actually enhanced the lifestyle of the local community. The young professionals who commute daily to Auckland certainly considered these new additions to the Island's landscape as a bonus. However, as a group, they were not dependent on tourism for their livelihood and therefore placed a low level of importance on further development.

The number of permanent residents on the Island, however, has increased because of the development that has taken place to date. Increased pressure for urban housing has lead to the subdivision of many properties, with single baches now replaced by town houses. Obviously, in the past, there were self-limiting factors in place that deterred people from living on Waiheke permanently. Inadequate transport to and from the Island was evidently a major contributing factor. A more regular service has, however, virtually eliminated those constraints. Permanent residents were now able to get the best of both worlds, by commuting daily to work, and then returning to enjoy the enviable lifestyle.

Traditional Values

The residents of Waiheke exhibited a strong community identity, with many families' association with the Island going back generations. The status of a 'permanent' resident in the community was one, therefore, that was earned, and not simply bestowed by moving to the Island. This type of close-knit community was needed to cope with the daily influx of people especially over summer, as visitors literally take over the Island. One classic comment made by a resident concerning an image of a tranquil beach, virtually devoid of people was "Waiheke on a good day before the boats come". Page and Lawton's (1997) research also highlighted the need for a community to retain its identity in the face of a daily influx of visitors.

Despite the fact that some residents placed a high degree of importance on tourism, Waiheke Island was still their home. The bystanders, as mentioned, needed to feel like part of the community, and the elderly, unemployed and beneficiaries all made an effort to contribute in their own way. Like any other community, the Island residents wanted a safe environment for the children to grow up in. They also expected the community to provide employment opportunities for themselves and their offspring. The most important aspect to remember was that once the visitors have gone home, they must still be able to function as a community.

Human Element

The resident group again proved difficult to interpret in terms of the significance of the 'human element' in their environment. The same factions emerged with the residents who wanted to preserve the landscape obviously interested in maintaining a low human element. They accepted that a certain amount of passive environmental damage would occur because of normal daily activities, such as walking across sand dunes. The young professional group, liked the rural lifestyle of the Island, therefore a low human element was also important to them. The acceptance of built artifacts in the landscape was similar to the other two groups. Any existing structures needed to be practical and blend in with the environment or else removed. The 'infamous' concrete steps on Palm Beach was a classic example of an unnecessary human element. The Council had dismantled the attached walkway some time ago; therefore the steps had no practical function at all.

In terms of the physical impact of people on the environment, the exact number that constituted a crowd remained open for debate. The reality was that over summer the usual resident population of just over 7000 exploded to more than 32,000 people. The influx of people, combined with Waiheke's diverse topography, has put the small-established pockets of residential housing on the Island, under immense pressure. In fact, residents avoid areas like Oneroa during the 'high season', especially on the weekends. When looked at from a more positive angle, the 'influx' of people to the Island has generated employment opportunities, beyond the traditional agrarian activities. The residents have also benefited from an increased diversity in goods and services, such as bars and cafes. Some more enterprising residents wanted to see a higher 'human element' all year around on the Island. This would help to smooth out the marked seasonal variations in visitor numbers, experienced currently.

Group Consensus

The degree of 'naturalness' was equally important to all the residents, although each faction has a separate agenda. The extent of the development undertaken so far has already altered both the physical landscape and the population dynamics of the Island. The high human element, especially over the summer period, has seen many local residents adapt their

lifestyle to accommodate this. Despite the emphasis placed on development and tourist related activities by some residents, Waiheke Island was still their home first.

5.4 Other Findings

There were a range of issues which arose across all groups in relation to the images and peoples' perception of the environment of Waiheke Island. These were the importance of understanding peoples' perceptions and incorporating those views within the planning framework; the impact of local knowledge on peoples' perception of an image; the importance of past experience on perceptions; and the ability of images to focus peoples' attention on environmental issues. Each of these issues shall now be discussed.

Understanding Peoples' Perceptions

The Q sort method for assessing landscape perception is a vital tool in the determination of both visitors and residents perceptions of the environment. The use of photographs as a surrogate for the landscape experience, or for asking respondents to imagine a landscape, provides a more accurate and in-depth interpretation of the views. Inclusion of these views in any planning strategy is essential. This is especially the case with tourism, as the host community is ultimately responsible for both the tourist experience and the future development of the community. The host communities' attitude towards the tourism can also affect the way in which people perceive the community.

Impact of Tourism on the Waiheke Island Community

Waiheke Island will always be more than a tourist destination, it is a lifestyle choice for the people who live and work there. In fact, this research highlights the very point that certain sections of the Island community are not directly involved in tourism-related activities. Despite this, the long-term success of the tourism ventures on the Island is directly governed by the community's attitude towards these activities. The discussion will now examine the different attitudes of the Waiheke Island community towards tourism. In the literature review the importance of the host community in tourism was emphasised in research by Inskeep (1987); Butler (1992); Dowling (1993); McKercher (1993); Wight (1993); Page & Lawton (1997); Palmer (1997); Kearsley & Higham (1997); Fairweather *et*

al. (1998); Simmons & Fairweather (2000); Fairweather & Swaffield (2001); Simmons & Fairweather (2001).

The host community's attitude towards tourism can be determined by variety of factors. Butler (1992) defined the three most significant factors as environmental, socio-economic and technological. In the course of this discussion, all three factors have played a significant role, however the emphasis was on how tourists perceived the environment. The actual role of the host community is a separate issue, as it affects all members of the community beyond the physical environment in which they live. Waiheke Island residents tend to exhibit the classic 'love-hate relationship' as described by McKercher (1993). Dowling (1993) identified several phases that communities like Waiheke Island experience in response to the impact of tourism. Dowling believes that most communities can now adopt an integrated approach towards tourism, somewhere between McKercher's 'love-hate relationship'.

McKercher's (1993) research did, however, highlight eight fundamental truths about tourism and the host community's relationship with it. These 'truths' also help to describe how the different groups within the Waiheke Island's community responds to change. McKercher (1993) describes the tourist industry as a consumer of resources, one that is capable of depleting those resources, despite the repercussions. As an island community, certain issues such as conserving natural resources and minimising waste are especially pertinent. The influx of people, especially over summer, has greatly influenced how certain sections of the community view tourism. Some residents regard tourists as 'takers', who use the facilities on the Island, consume precious resources such as water, while contributing little in return. Realistically, few visitors give any thought to conserving resources, or minimising waste output when on holiday. As a group, they simply want to be entertained, with the onus on the host community to fulfil their expectations.

Meeting those expectations is the forté of the tourist operators. These people exhibit a positive attitude towards tourism development on Waiheke Island. Tourism affords them a livelihood, therefore a higher degree of importance is naturally placed on meeting the

expectations of the different visitor groups. Some modification to the environment may be required to meet certain tourist expectations, such as improvements to the infrastructure. These types of modifications support both Butler's (1992) continuum of change and Inskeep's (1987) view on the benefits of planned tourism development. Inskeep stated that tourism development had the ability to not only preserve the natural environment, but to enhance it. This point relates back to the importance that tourist operators placed on the degree of 'naturalness', as discussed. However, other factions in the community may view this type of development differently, which accounts for their more negative attitude towards tourism.

A destination's ability to absorb the influx of visitors, clearly effects how residents view tourism activities in their community. Fairweather and Swaffield's (2001) Kaikoura study illustrates that a destination's social carrying capacity is likely to reach critical point, where further development or commercial exploitation of resources, will have a negative impact on how visitor's perceive the area. This again highlights the need for sustainable management of both the physical and visual effects of tourism. Rotorua as a destination community, started to exceed its social carrying capacity in the late 1980s (Simmons & Fairweather, 2000). As a result, environmental issues such as the overuse of geothermal resources threatened the sustainability of the City's tourism industry. However, a greater level of community involvement in the planning processes and better tourism management strategies have now addressed these issues. Improvements included the upgrading of civic amenities, and key attractions in the City. The new townscape includes designated areas for tourism development, which has improved the residents' attitudes towards tourism as they now co-exist with visitors and interact by choice.

Impact of Local Knowledge

It became apparent through the study that the impact of people's knowledge of an area was a significant influence on their perception of that area. For example, the controversy surrounding the closure of the Rocky Bay Store resulted in many people feeling nostalgic towards the image, and perhaps ranking it higher than would have been expected. Simmons and Fairweather (2000) research had also identified that picturesque orientation applied to

built structures as well as nature. This accounts for some of the local residents' nostalgia for the Rocky Bay Store, as they regarded it as part of the picturesque landscape experience.

The incorporation of residents' perceptions using the Q sort method is a relatively new development. Fairweather and Swaffield (1998) Kaikoura study focused only on visitors', although some local resident interviews were undertaken as part of the same case study. It was not possible to directly compare the perceptions of the visitors to the interviews of the residents. In their next study, Fairweather and Swaffield (2002) recognised this exclusion and did perception studies on both locals and visitors, but the definition between the local residents and New Zealand visitors was not clearly made. However, this research was still one of the first studies to highlight that experiences vary among these different groups.

Importance of Past Experience

Previous studies have identified that there were differences between international visitors and local visitors, with international visitors valuing a higher natural element more that other groups (Simmons and Fairweather, 2001). This was a reoccurring observation in this research where a distinct preference for any natural component was ranked higher. However, it was also interesting to note that international visitors brought with them some expectations based on past experiences overseas. There were several comments for example, about Waiheke Island tourism and concern about the rate of change and the perceived lack of planning for change on Waiheke. The international visitors had a sense of "déjà vu" about the development occurring on the Island, having experienced similar changes in their own country.

Focus on Environmental Issues

The use of photographs served to focus peoples' attention on specific environmental issues. Taking a small portion of their normal environment and isolating it from the visual landscape brought their attention to environmental factors. This was both positive and negative. People were, for example, amazed by the beauty of the beach images, and the impressive nature and diversity of the landscape. However, their attention was also drawn to environmental problems, such as the storm water drain on Onetangi Beach and the

inappropriate design of the toilet facilities at Palm Beach. The crowded wharf images were particularly revealing to the local residents who had not viewed it from that perspective previously. With the exception of the wharf there was some trade-off made between functionality and environmentally friendly images. People who perceived some function in the images (for example the dinghies or the picnic table) were more accepting of these features as long as they blended in with the environment.

5.5 Implications for Management

While it is interesting to explore peoples' perceptions of their environment, these findings have some significant implication for the management of Waiheke Island. Some of the implications are immediately apparent, such as increasing awareness of environmental problems and the inadequacy of some infrastructural systems. Peoples' appreciation of the natural scenery was also evident. It is inevitable that there will be change on Waiheke Island, and one of the key areas of growth is likely to be in tourism. For the community to obtain the economic benefits of this activity, there is a need to balance development with maintenance of the environment. This is particularly so for the Island, where the major tourism attraction is the natural feature of the landscape, and where an unplanned increase in tourism numbers could exceed the social carrying capacity. In this latter situation, the numbers of visitors would be so high as to detract from the visitors' experience.

There is a clear need for sustainable management, where the needs of the present are achieved without comprising the ability of future generations to meet their own needs (WCED, 1987). The concept of sustainable management also extends to tourism development, where the focus is on quality (high-spending visitors) verses quantity (number of tourists). Ecotourism is one model which fits a sustainable development focus, and which could be appropriate for Waiheke with its natural assets.

Another component of sustainable development is community understanding and ownership of such a strategy. Often host communities emphasise on the number of visitors coming, rather that the value they are obtaining from the visitor. The 'Essentially Waiheke' Strategy (2000) also identified the significance of a sustainable focus and the importance of

community input. This study has shown that both residents and visitors are willing to express their views on the perception of the environment, and that the Q sort method is a useful tool for assessing these views.

5.6 Summary

This research confirms that there are variations in the perception of the Waiheke Island environment by different populations. International visitors were more likely to be appreciative of natural elements in the landscape, but more critical of commercialisation which detracts from these physical attributes. New Zealand visitors were less polarised in their views, since they had expectations of what the scenery would be like in the images. They were perhaps, more complacent about the landscape imagery. The high human element of the wharf images re-emphasised to them the negative aspects of tourism on the Island.

The Waiheke Island residents showed considerable polarisation, enjoying the beautiful scenery and the lifestyle, but being very aware of potential changes which could result and impacts on the environment. The research has identified the need for higher community involvement in any decision-making, and the need for balance between development and maintenance of the environment. The use if the Q sort methodology with photographs provided an effective mechanism for the interpretation of peoples' perceptions of the Waiheke Island environment.

CHAPTER SIX

6.0 Conclusions and Recommendations

This chapter revisits the aims and objectives of the study and reiterates the systematic, replicable nature of the research process. Findings from the study are presented, and the implications of these for management of Waiheke Island are discussed. Conclusions and recommendations for future areas of research are suggested.

New Zealand's physical landscape is widely recognised as the country's greatest natural resource and is a major motivation behind international visitation. The need to maintain the quality of the environment recognised as paramount by New Zealand tourism industry. However, there is a scarcity of information in New Zealand on people's perception of their environment despite the development of international assessment tools. It is ironic that in a country that relies so heavily on its natural resources, this issue had not been addressed. In recent years, a few regional studies have been done to establish an integrated framework that can be applied prior to development. Key tourist destinations such as Rotorua, Kaikoura and Westland have benefited from these types if studies. Waiheke Island is a developing tourist destination, which is forecast to increase dramatically due to its proximity to Auckland City. It is therefore an appropriate time to evaluate how people perceive the landscape. The specific research question addressed in this study is:

What are the perceptions of residents and visitors to the Waiheke Island environment?

There were three key objectives:

to quantify residents' perceptions

to quantify visitors' perceptions

to enhance the quantitative data obtained by more in-depth qualitative method

Exploring the concept of beauty and how it influences everyday life, has shed some light on why understanding visual perception is so important. "We are visual creatures in a visual world..." (R. Kaplan, 1975, p.129). The meaning behind these words encapsulates many of the reasons why this type of research is essential. The use of visual perception in research methods for example, has literally opened up another world. Previously, only verbal instruments, such as surveys, provided an insight into how people perceived changes in their environment. However, these objective techniques failed to capture data with any degree of richness or depth. The adoption of more subjective methods has facilitated a higher degree of human interaction throughout the assessment process.

To facilitate human interaction in the assessment process, there needs to be some fundamental changes to research design. The five conceptual models, as defined by Zube *et al.* (1982), clearly illustrated a relationship exists between the degree of human involvement and level of subjectivity of the model. The key, however, is to find the right combination which best suits the research objectives and design. The use of psychophysical and physiological models are predominantly used in natural resource management (Jones *et al.*, 2000). This study also incorporated both quantitative and qualitative research tools to produce data which had both richness and depth. The combination of these two methods also ensured that both scientific rigour and statistical validity requirements were addressed (Page & Meyer, 2001). In meeting these requirements, it also implies that the research was both replicable and objective in nature.

Landscape assessment techniques soon identified the inadequacies of the objective methods. Physical surveys of the environment, for example, were not subjective enough to measure the aesthetic quality of the landscape. Assessment of the visual quality of the landscape in fact involves three main aspects, described by (Goodwin *et al.*, 2000) as the physical, biological and cultural processes. The interrelationship between these three processes determines the both the quality and character of the landscape. Research carried out by Butler (1992) further enhanced on these interrelationships when he examined how the degree of modification affects the actual physical landscape. Butler also introduced the concept of the 'tourism landscape' and the phases of modification involved.

The importance of Butler's (1992) work in terms of interpreting the changes occurring on Waiheke Island proved pivotal to this research. Butler's work not only identified the theory behind these changes but has also highlighted how further modification may impact on Waiheke's natural landscape. Butler used a visual continuum to clearly illustrate how the degree of modification effects the physical environment. A high degree of modification for example, will result in the total transformation of an area. This research identified the perception of change according to the three different sample groups. The findings of this research will therefore help to quantify Waiheke's position in terms of Butler's continuum of change.

The research conducted on Waiheke Island involved three sample population groups, which comprised of 52 local Waiheke residents, 19 international visitors and 11 New Zealand domestic visitors. This discussion is based on the themes of the 'degree of naturalness'; 'impact of development'; 'traditional values' and 'human element' as identified in the course of this study. These themes highlight the different perceptions of all three separate groups, concerning the natural landscape and how this relates to tourism on Waiheke Island.

6.1 International Visitors

The international visitors' group showed a strong preference for a high natural element in the landscape. This concurs with other landscape assessment studies, where international visitors regarded the natural element as an essential component of the landscape experience. The international visitors saw the preservation of the unique character of Waiheke Island as paramount. They had witnessed degradation of natural resources in their own tourism areas and could envisage Waiheke Island following a similar path. Consequently, one aspect that they felt strongly about was the over commercialisation of the Island. However, they accepted that development was inevitable, but stressed that it should be planned and that future development should blend in with the natural environment.

6.2 New Zealand Visitors

The New Zealand visitors group were more accepting of changes that have occurred on Waiheke Island, with many experiencing similar trends in their own regions. Regular visitors to Waiheke viewed the Island with a certain degree of nostalgia, with many families having a long-standing association with the Island. For these visitors in particular, the New Zealand family holiday concept of beaches, baches and boats was strongly linked with the Island. Fairweather and Swaffield (1998) identified a similar trend in their Kaikoura study, which they termed the 'Kiwi Family Holiday' experience. The New Zealand visitors' group also had certain expectations concerning the natural landscape based on their own experience of this country's scenic diversity. The main area of concern was the high human element on the Island, with this group in particular finding the crowded wharf scenes as very offensive.

6.3 Waiheke Island Residents

The Waiheke residents' viewed the landscape as part of the lifestyle choice associated with the Island. Throughout this study mention was made of the different groups who make up the Island community. The residents who commute to work in Auckland are interested maintaining a natural landscape and see development as impinging on their lifestyle choice. In contrast, tourist operators would like to see further development take place and the promotion of Waiheke as a tourist destination. The main reason for this is the employment opportunities that tourism would generate on the Island. Permanent residents are willing to accept a certain amount of change for the economic benefits, but not at the determent of the natural landscape. However, some of the residents such as elderly, unemployed and beneficiaries living on the Island have a limited ability to influence the changes occurring around them. The importance of the physical landscape is therefore seen from several different perspectives from within the Island community.

6.4 Key Implications

Waiheke Island is now at a point in its development where strategic planning is crucial. There is a definite need for sustainable management of the physical resources on the Island, with both the residents' and visitors' groups showing a preference for a high natural element in the environment. Previous destination community studies have emphasised the importance of a greater level of community involvement in the planning process, if sustainable tourism is to be successful. (Page & Lawton, 1997; Simmons & Fairweather, 1998; Simmons & Fairweather, 2000; Simmons & Fairweather, 2001). It was shown that communities who were more involved in the planning process felt they had better control over future development. This sense of control also altered the community's attitude towards tourism and they were able to see the long-term benefits of sustainable development. This links back to the visitors' perception of Waiheke, with the host community's attitude towards tourism greatly influencing their 'Island' experience (Page & Lawton, 1997).

To implement these types of planning strategies, an integrated framework is needed which can facilitate the changing dynamics of the Island. Studies of other major destination communities in New Zealand have been used to formulate the type of framework, which can be utilised in places like Waiheke Island (Simmons & Fairweather, 2000; Simmons & Fairweather, 2001; Fairweather & Swaffield, 2002).

6.5 Benefits of this Research

This research clearly extends the database of landscape perception assessments. This is particularly important in New Zealand, given the dependence of the tourism industry on the quality of the natural environment. Further, this is the first time research of this nature has been undertaken on an island, and it will provide baseline data for potential development strategies of the Island. The existence of this baseline data will be useful in future years to monitor the impact of any developments on the environment of Waiheke Island. This research is also the first time that the Q sort method with photographs has been used with both visitors and residents, allowing a direct comparison between the perceptions of the

groups. The research design was developed to be portable and compact, and this equipment could be replicated in other sites.

6.6 Recommendations and Future Research

This study reinforces the usefulness of the Q sort method with photographs for understanding peoples' perceptions of Waiheke Island as a destination image. While the study presents some significant findings with clear implications for management, it has also identified areas where implementation and future research could further enhance the database. These are identified in this final section.

1. It is important that the information obtained in research of this nature is used in the development of any planning strategy. Until peoples' perceptions of the environment are understood, it is difficult to adequately manage that environment.

2. Sustainable development is no longer just a desirable concept. It is imperative that any develop address sustainability issues in an attempt to maintain the quality of the environment. This is particularly relevant for Waiheke Island, with considerable pressure for more urban development and for economic activity such as tourism. Any development will impact on the environment and it is important that these impacts are both minimised and mitigated.

3. There is a need to monitor the social carrying capacity of Waiheke Island, both in terms of the residents and the visitors. This research identified a profound negative reaction to crowding, which suggests that the carrying capacity could be being exceeded in some locations.

6.7 Further Research

It would be interesting to repeat this research as a longitudinal study, examining how perceptions of the environment on Waiheke Island change over time. The landscape assessment techniques could also be used in the future as computer generated images, to determine peoples' perceptions to various development scenarios. The infrastructure on the Island was clearly identified as an area where further research is required. This would include assessing the existing amenities in relation to the current needs of the Island population and to project future demands. A study on the associated benefits and costs of promoting ecotourism on Waiheke Island would also be useful to help determine future management strategies.

6.8 Concluding Statement

The diversity of landscapes in New Zealand has been recognised as one of the country's greatest natural resources. Waiheke Island provides an example of this diversity at its best, which is why sustainable management practices are needed to preserve the environment for future generations to enjoy.

APPENDICES

APPENDIX A

DEMOGRAPHIC STRUCTURE OF WAIHEKE ISLAND RURAL POPULATION 1986- 1996

DEMOGRAPHIC OF WAIHEKE ISLAND, RURAL POPULATION 1986- 1996

Waiheke Island Rural Towns :	**Onetangi**	**Ostend**	**Oneroa**
Usually Resident (UR) Population			
1986 Census U R Population Count	480	621	675
1991 Census U R Population Count	543	678	819
1996 Census U R Population Count	1566	1890	2145
People Gainfully employed			
1986 Census U R Population Count	105	174	414
1991 Census U R Population Count	168	189	501
1996 Census U R Population Count	252	267	813
% of UR Pop'n Gainfully Employed			
1986 Census U R Population % Count	26%	32%	27%
1991 Census U R Population % Count	30%	28%	26%
1996 Census U R Population % Count	40%	32%	38%
% Gainfully Employed Changed			
1986 - 1996	140%	53%	96%
1986 - 1991	60%	9%	21%
1991 - 1996	50%	41%	62%
Jobs held in 1996			
One job	213	231	678
More than one job	33	33	108
Not Specified	6	6	21
Occupation: 1986			
Administrators & Managers	6	6	18
Professional & Assoc. Professional	18	36	42
Clerks	15	18	54
Service & Sales Workers	33	48	102
Agriculture & Fishery Workers	9	12	27
Tradesman / Machine Operators	36	54	156
Occupation: 1996			
Administrators & Managers	36	30	120
Professional & Assoc. Professional	69	60	204
Clerks	21	33	96
Service & Sales Workers	33	39	120
Agriculture & Fishery Workers	15	21	42
Tradesman / Machine Operators	63	72	174

Demographic Structure of Auckland Regions, Rural Population 1986- 1996 Data Source : Dept of Statistics NZ

APPENDIX B

CARD CHARTS

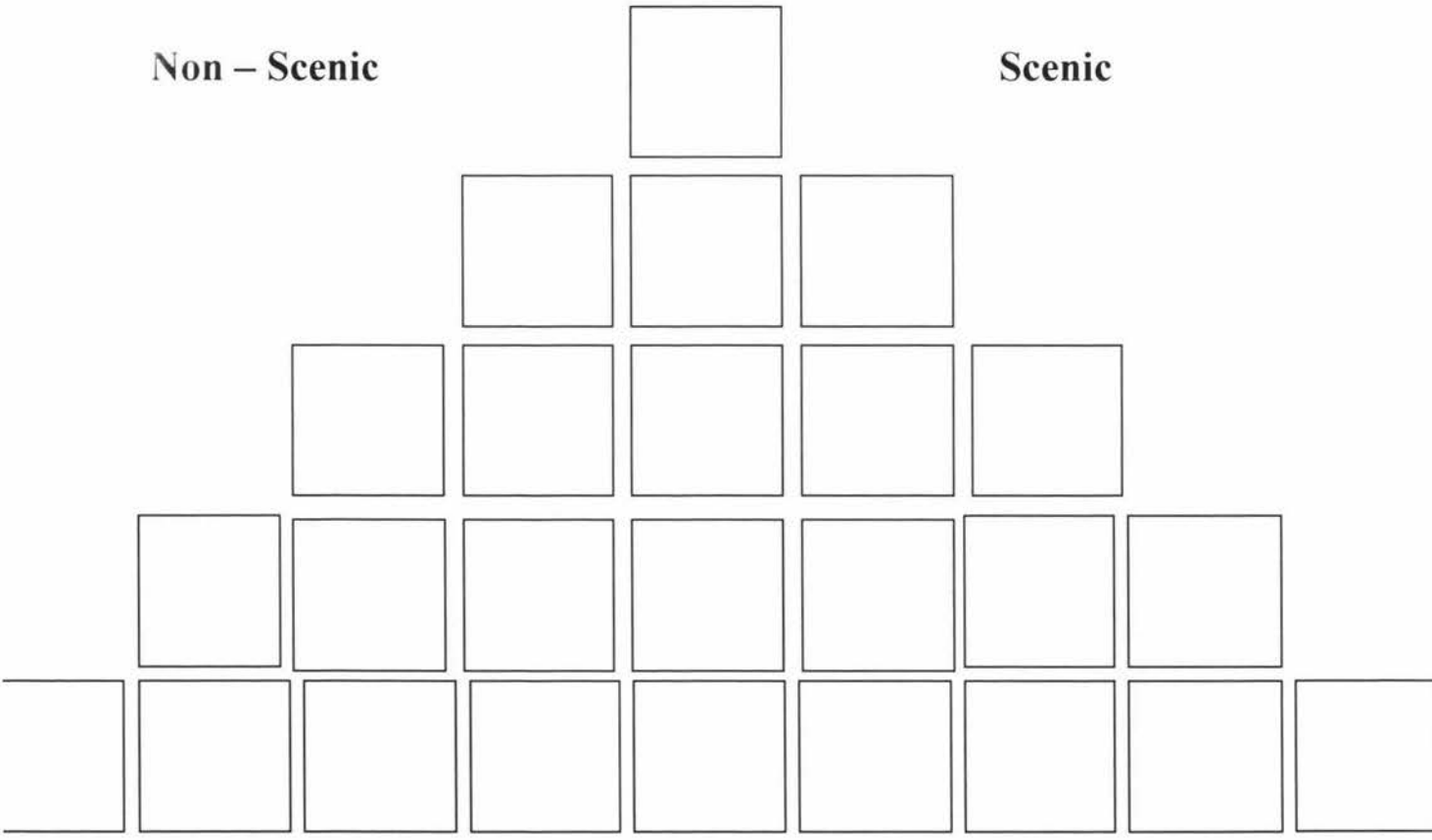
Data Collection – Waiheke Island

Participant No: **Date:**

Interview Site:

First Sort – Scenic Rating

Non – Scenic **Scenic**



2 3 4 5 4 3 2

(Number of Photographs per category)

(Adapted Fairweather & Swaffield ,1999)

Data Collection – Waiheke Island

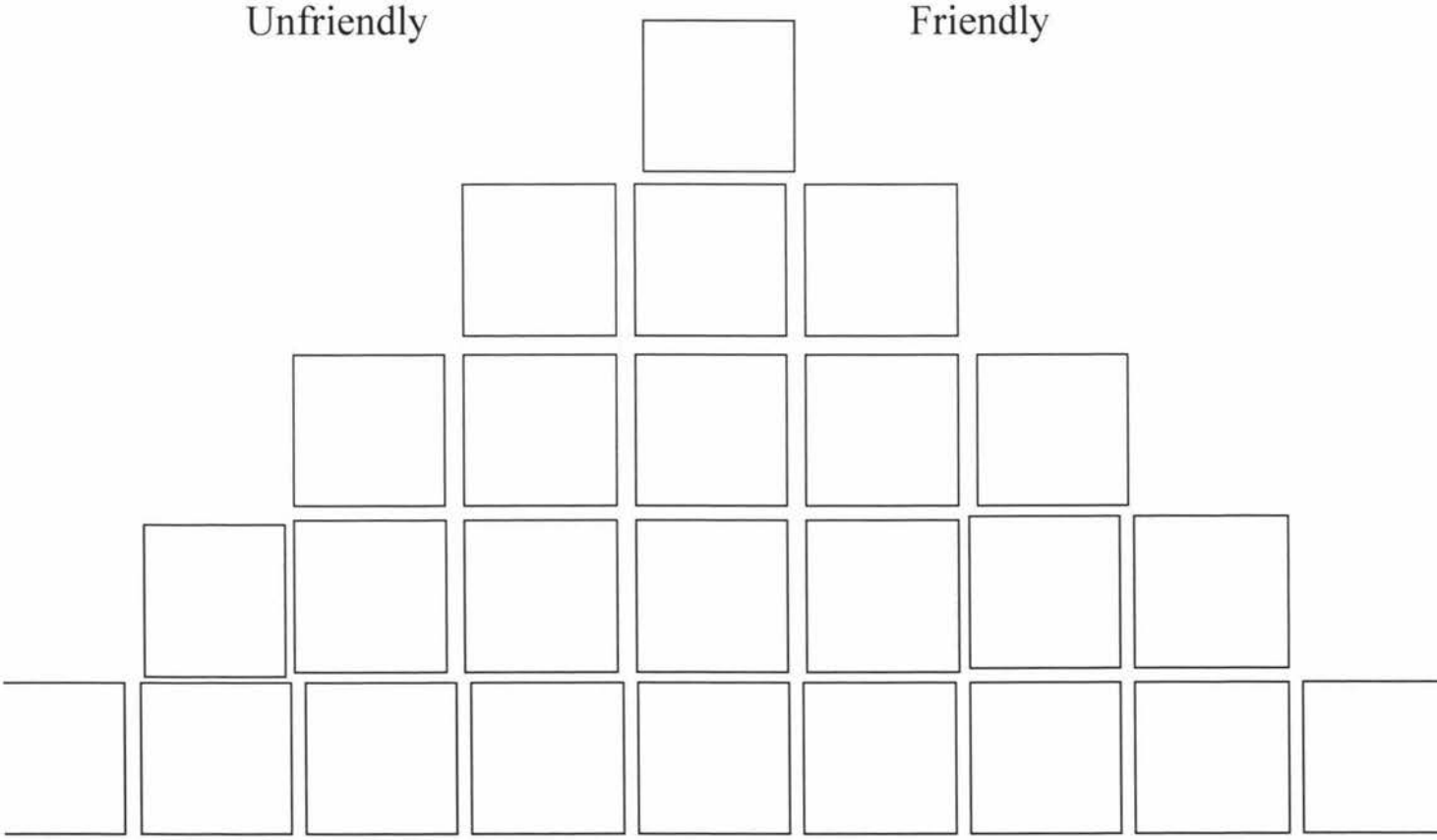
Participant No: **Date:**

Interview Site:

Second Sort – Environmental Rating

Environmentally Unfriendly

Environmentally Friendly



2 3 4 5 4 3 2

(Number of Photographs per category)
(Adapted Fairweather & Swaffield ,1999)

APPENDIX C

PHOTOGRAPH SELECTION

APPENDIX C1

FINAL SELECTION FOR Q SORT

Q SET PHOTOGRAPH ALLOCATION

Working Titles	Selection	Allocated (35)	Category (25)
Rocky Bay -Across Bay View	1	I	4
Rocky Bay - General Store	2	H	4
Onetangi Beach Storm Water Drain	4	J	2
Onetangi Beach (Kayak)	6	K	1
Onetangi Beach Dunes (Regrowth)	7	X	1
Onetangi Beach Dunes (Road)	8	Z	1
Onetangi Beach Dunes (Path)	10	L	1
Palm Beach Sea Gulls (Picnic Table)	13	B	2
Palm Beach Dunes (Structures)	14	W	2
Palm Beach Facilities (Carpark)	15	C	2
Palm Beach Housing (Pink Hse)	16	D	2
Palm Beach Housing (Grey Hse)	17	E	2
Palm Beach Yacht / Agricultural Land	18	F	1
Matiatia Wharf – Tourist Activities (Vendor)	20	Q	3
Matiatia Wharf – Beach Waterfront	21	R	3
Matiatia Wharf – Queuing for Ferry Service	23	P	3
Matiatia Wharf – Loading onto Ferries	24	M	3
Matiatia Wharf – Moored Yachts	25	N	4
Onetangi Store- Road Repairs	26	S	4
Oneroa - Tourist Yacht	27	U	3
Onetangi Store – Signage	29	T	4
Oneroa Shopping Centre – Vegetable Store	32	Y	4
Oneroa Shopping Centre - Road	33	V	3
Palm Beach Pampas grass	34	O	1
Rocky Bay Waterfront – Dinghies	35	G	4

APPENDIX C2

FINAL SELECTION

GROUPED

IN FOUR

CATEGORIES

Natural Landscape

K	Onetangi Beach (Kayak)
X	Onetangi Beach Dunes (Regrowth)
Z	Onetangi Beach Dunes (Road)
L	Onetangi Beach Dunes (Path)
O	Palm Beach Pampas grass
I	Rocky Bay -Across Bay View

Landuse

B	Palm Beach Sea Gulls (Picnic Table)
F	Palm Beach Yacht / Agricultural Land
E	Palm Beach Housing (Grey Hse)
W	Palm Beach Dunes (Structures)
J	Onetangi Beach Storm Water Drain
C	Palm Beach Facilities (Carpark)
D	Palm Beach Housing (Pink Hse)

Activities

R	Matiatia Wharf – Beach Waterfront
Q	Matiatia Wharf – Tourist Activities (Vendor)
U	Oneroa - Tourist Yacht
V	Oneroa Shopping Centre - Road
M	Matiatia Wharf – Loading onto Ferries
P	Matiatia Wharf – Loading onto Ferries

Cultural / Historical

H	Rocky Bay - General Store
N	Matiatia Wharf – Moored Yachts
S	Onetangi Store- Road Repairs
T	Onetangi Store – Signage
Y	Oneroa Shopping Centre – Vegetable Store
G	Rocky Bay Waterfront – Dinghies

APPENDIX C3

FINAL Q SET

CATEGORIES

AND

COMMENTS

Landuse

B

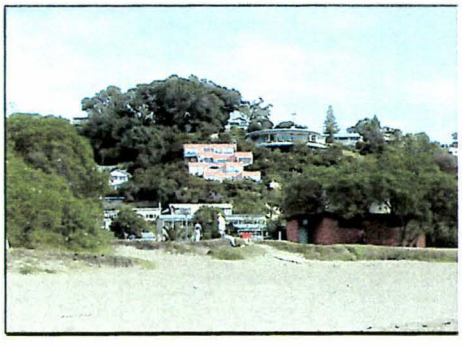
Visual Pollution
Damage of Beachfront
Changed Bird behaviour
Rubbish on Beach
Concentrated use of one area
Vegetation damaged
No proper provision of access to table

Landuse

C

Storm Water runoff
Environmental toilet block
Damage to beach frontage
No established tracks to beach
Car Parking
Polluted stream

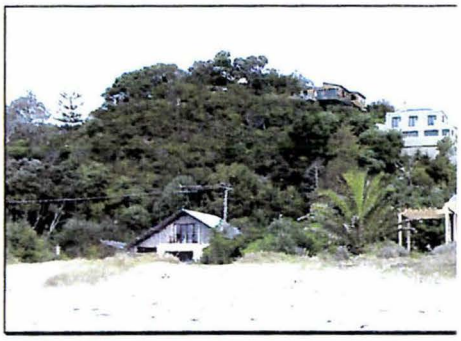
Landuse



D

Visual
Structures on the beachfront
Toilet block on the beach
Dune damage
Vegetation damage
No structured access
Housing unsuitable for beachfront
Aesthetics - pink house in bush

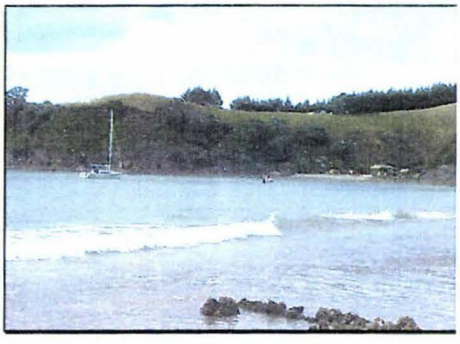
Landuse



E

Dune damage
Garden species introduced
Structures on the beach
General access to beach
Visual structures - telephone lines

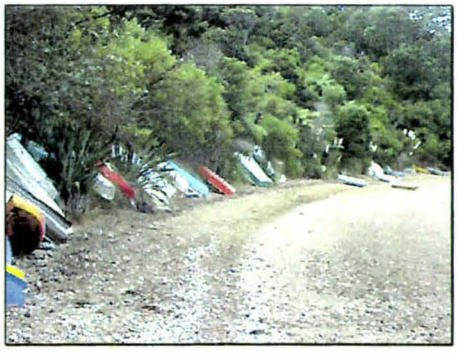
Landuse



F

Visual
Agricultural land use
Buildings on the beach
Yacht pollution in the harbour
Soil erosion
Foreshore damage / rubbish etc
Access to buildings?
Storage for what type of materials

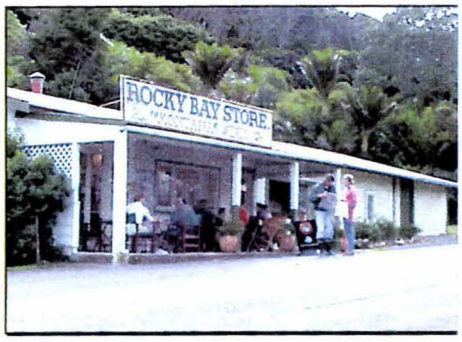
Cultural



G

Visual
Damage to foreshore
Damage to bush area
Damage to beach
Heavy recreational area
Reflects number of yachts in the area

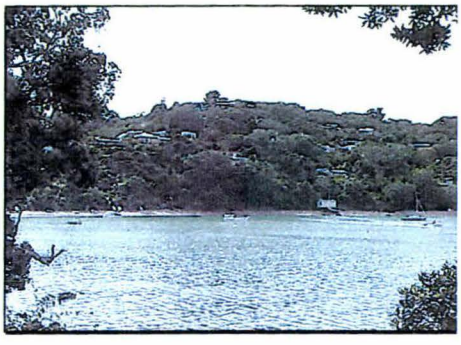
Cultural



H

Visual Pollution
Focal Point of the Bay
Turn around for buses
Noise Pollution
Increased traffic to isolated cafe

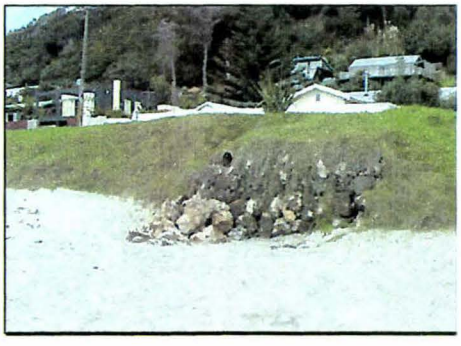
Natural



I

Mooring for yachts
Housing developments
Pollution in the Bay
Visual Pollution
Altered currents boat ramps

Landuse



J

Visual Storm water drain
Runoff straight onto beach
Proximity of houses
Proximity of road
Rocks on beach to camouflage drain
Erosion of Dunes
Visual pollution - facilities

Natural

K

Dune erosion
Recreational Use - kayak
Visual Pollution
Housing proximity to beach

Natural

L

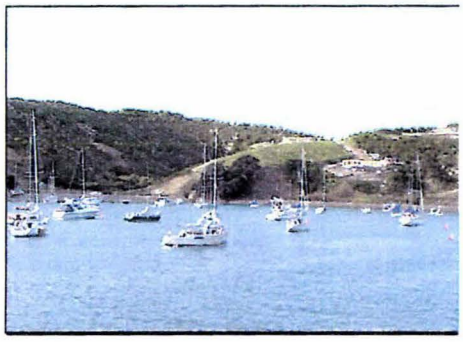
Dune erosion
Non use of tracks
Vegetation damage
Popular Beach in the summer
Palm Beach

Activities

M

Visual
Crowd Control
Structures on the wharf
Altered sea currents
Ferry Pollution
Silt build up

Cultural



N

Visual
Pollution by yachts / ferries
Housing developments scar the hillside
Possible future soil erosion
Road access to beach
Future development in the area
Altered land use

Natural

O

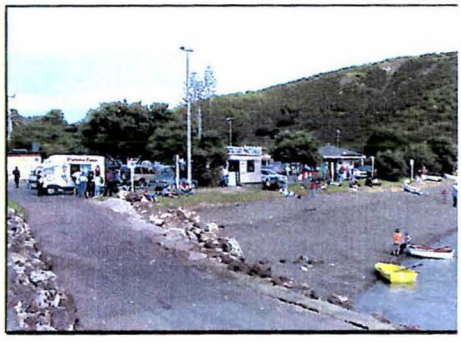
Path going no where
People encouraged to explore path
Regeneration hindered
Hill side erosion
Introduced species pampas

Activities

P

Visual - Waiting area
Signage on the wharf
Crowd control
Associated facilities
Structures on the wharf
Ticketing procedure
Spoils the "Island" effect

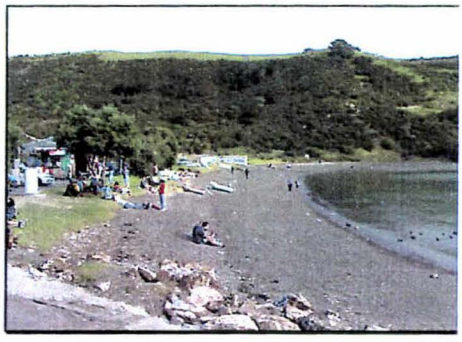
Activities



Q

Visual pollution
Structures on the beach foreshore
Tourist related activities
Unsupervised use of bikes, cars
Noise / Rubbish pollution
Concentrated groups in one area
Damage to foreshore vegetation
Wharf altering current
Ferry impact on beach erosion

Activities



R

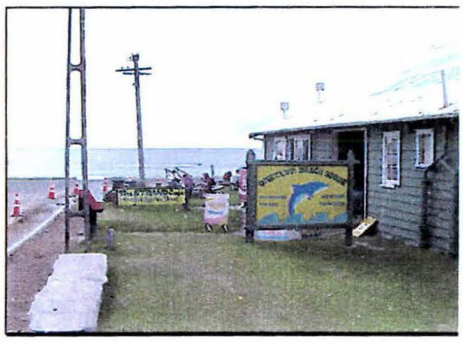
Concentrated Use of foreshore
Visual Pollution - Structures
Tourist activities on the foreshore
Damage to foreshore vegetation
Associated rubbish disposal
Pollution of bay from ferries
Altered wave patterns - Ferry wash on foreshore

Cultural

S

Visual
Over Commercialized area
Outside structures
Excessive signage
Infrastructure overhead power lines
Development of roading
Pick up point for buses
Damage of beach foreshore
Issues of rubbish disposal

Cultural



T

Visual
Overuse of signage
Visual impact of power lines
Damage to vegetation
Concentrated area of commercialization
Bus stop
Rubbish disposal
Speed Boat - recreational use

Activities

U

Cruise ship in every two weeks in the season
Several smaller boats servicing the vessel
Pollution in the harbour
Damage to the foreshore
Increased pressure on infrastructure from such a large group concentrated in one area at one time

Activities

V

Visual
Built up area
Housing - on hill area
Parking
Traffic flow
Commercialization

Landuse

W

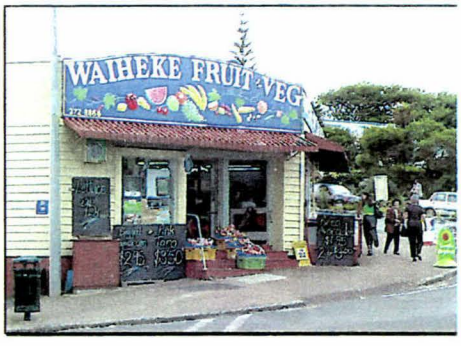
Visual Pollution
Structures on the Beach
Dune Erosion
Trampling of vegetation
Recreational Use of area
Palm Beach

Natural

X

Dune Erosion
Vegetation damage
Non use of provided walkways
Road proximity
Housing Development in the background

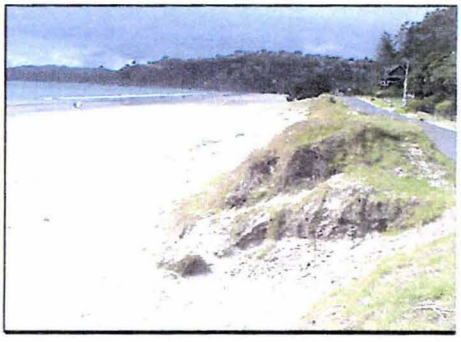
Cultural



Y

Visual
Overuse of signage
Blocking the footpath

Natural



Z

Dune erosion
Road proximity
Vegetation damage
Non restricted Access to beaches

APPENDIX D

INTERVIEW FORMS

PARTICIPANT RESPONSE FORM

Card No.		Comments: Top Six 'Environmentally Friendly'
	1	
	2	
	3	
	4	
	5	
	6	
Card No.		Comments: Top Six 'Environmentally Unfriendly'
	1	
	2	
	3	
	4	
	5	
	6	

DEMOGRAPHIC DETAILS:

Participant No. ☐

Visitors Only: Country of Origin: .....

Reason for Visit / Duration: (tick one)

Part of Holiday ☐ Family/ Relatives ☐ Business Related ☐ Local Resident Day trip ☐

Other..... **Duration of visit: No. of day/s** ☐

If staying overnight - Indicate type of Accommodation: (Circle)

Backpacker / Hotel / B&B / Motel / Camping / Private Residence

Other: ..... Name / Location: .....

Permanent Resident / Seasonal Resident / Bach Owner:

Location: ..... **No. of Years**: ☐

Residency: Fulltime ☐ No. of Days per Week ☐ No. of Days per Month ☐

Ferry Usage: Sailing's per Week ☐ Sailing's per Month ☐

Statistical Data:

Gender: Male / Female **Occupation:**.....

Age Group: (Circle) 15-24 25-34 35-44 45-54 55-64 65+

APPENDIX E

COVERING LETTERS

Fullers Group Limited
P.O. Box 1346
Auckland

Dear Mr Bradley

Re: Environmental Impact Study of Tourism

I am writing to request your Company's assistance, with my Masters Project at Massey University, which focuses on Waiheke Island. As my study involves both the local residents, and visitors to Waiheke, I will require some transport assistance to the Island, in order to carry out my research. Any help given by your Company would of cause be acknowledged in my thesis, and naturally, I would be more than happy to use any promotional material, that you may wish to provide.

The primary objective of my research is to focus on evaluating both visitors, and permanent residents' perception, of environmental impact of tourism on the Island. This type of 'snap shot' (time) study is essential, when evaluating the effectiveness, of the current environmental policies, and to help provide a framework for future management strategies. This study will also provide the basis for any further research or longitudinal studies in this area.

The methodology of this study will be the Q method, which involves participants sorting, and ranking, a series of photographs, taken from various locations around Waiheke. The end result will be indicative, of the level of perceived environmental impact, portrayed in each photo. (A full research proposal is available on request).

Presently, I am envisaging commencing my first interviews in late June, and will conduct two to three sessions per month, through to September, depending on response rate achieved. Whilst most interviews will be land based, I would also like to conduct some interviews, on board your vessels. I envisage that each interview will take approximately 20-25 minutes, with only brief demographic details being required from your passengers (no names or addresses).

I look forward to your response concerning your participation in this project, given that as a long standing member of the Island's business community, you already appreciate Waiheke's diverse attributes, and would wish to protect the 'essence' of Waiheke, whilst planning for its future development.

Please feel free to contact my supervisor Ms Kaye Thorn, Department of Management and International Business, Massey University (Albany), if you have any questions regarding this letter.

Regards

Suzanne Histen

Contact Details
[redacted]

Establishment Address Details

P.O. Box
Waiheke Island

Dear Sir/ Madam

Re: Environmental Impact Study of Tourism

I am writing to request your assistance, with my Masters Project at Massey University, which focuses on Waiheke Island. As a member of the Island's business community, you will no doubt already appreciate Waiheke's diverse attributes, and have a vested interest in its future.

The primary objective of my research is to focus on evaluating both visitors, and permanent residents' perception, of environmental impact of tourism on the Island. This type of 'snap shot' (time) study is essential, when evaluating the effectiveness, of the current environmental policies, and to help provide a framework for future management strategies. In addition, this study will provide the basis for any further research or longitudinal studies in this area.

The methodology of this study will be the Q method, which involves participants sorting, and ranking, a series of photographs, taken from various locations around Waiheke. The end result will be indicative, of the level of perceived environmental impact, portrayed in each photo. For further details concerning the methodology of this study, a full research proposal is available on request.

Presently, I am envisaging commencing my first interviews in late June, and will conduct two sessions per month, through to September, depending on response rate achieved. As these interviews will take place at various locations during this period, if you wish to participate, scheduling of appropriate times will be solely at your discretion, and arranged in advance. I envisage that each interview will take approximately 20-25 minutes, with only the use of a small table for sorting the photographs, being required by way of assistance. Please note only brief demographic details will be required from your clientele (no name or address).

I look forward to your response concerning your participation in this project, bearing in mind, that the main objective of this study, is to help identify, and protect the 'essence' of Waiheke, whilst planning for its future development.

Please feel free to contact my supervisor, Ms Kaye Thorn, Department of Management and International Business, Massey University (Albany), if you have any questions regarding this letter.

Regards

Suzanne Histen

Contact Details
[redacted]

APPENDIX F

SAMPLE FORM

PROCEDURE Q SORT

Data Collection – Waiheke Island

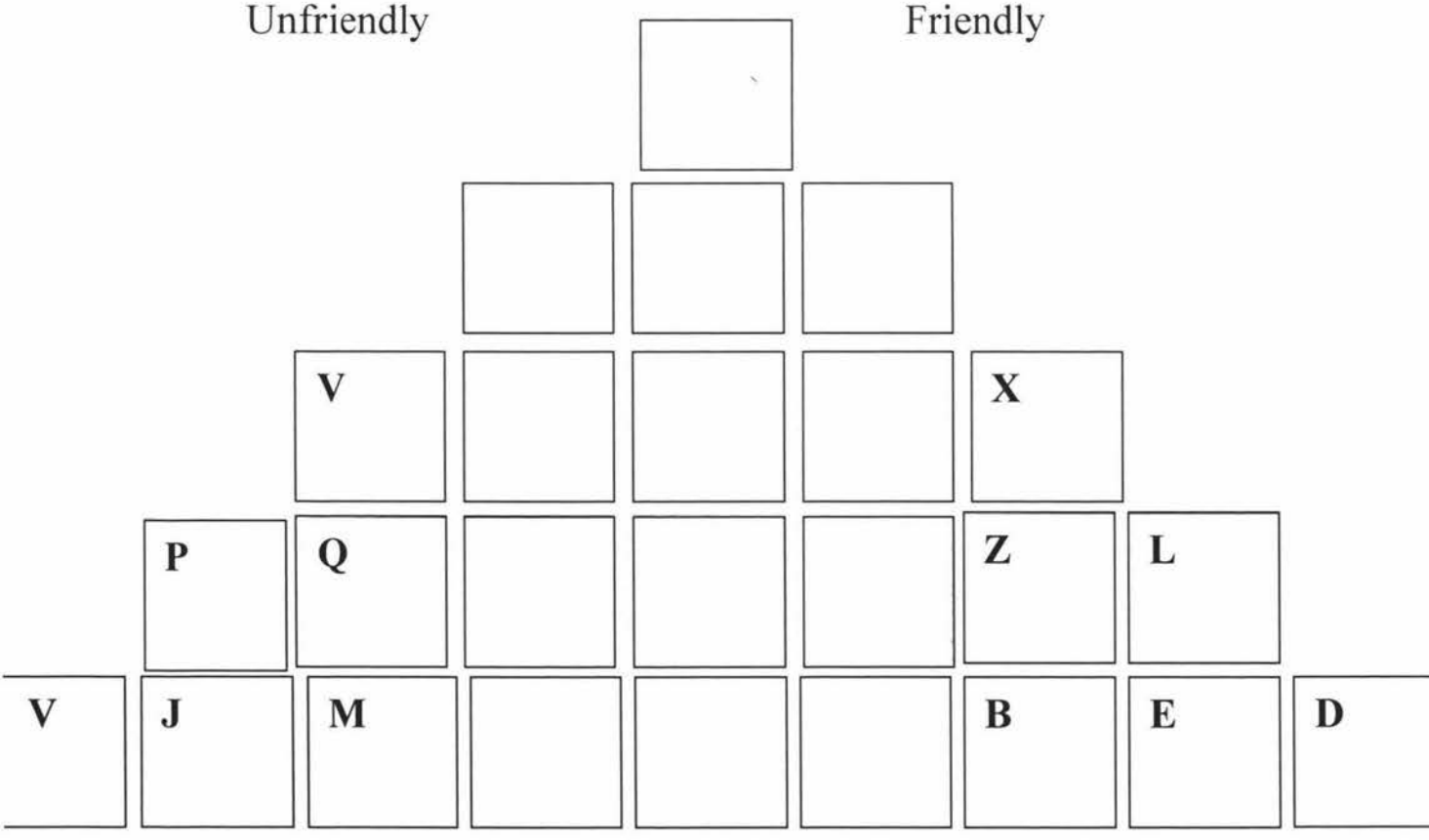
Participant No: 80 **Date: 28/8/02**

Interview Site: Oneroa

Second Sort – Environmental Rating

Environmentally Unfriendly

Environmentally Friendly



2 3 4 5 4 3 2

(Number of Photographs per category)
(Adapted Fairweather & Swaffield, 1999)

PARTICIPANT 'RESPONSE FORM' – Sample

		Participant No: 080 Date: 28/8/02
Card No.		**1 Comments: Environmentally friendly**
D	1	Recycle water in toilets
L	2	Some sand dunes left, clear
E	3	Clear, bush area, development hasn't destroyed it all
X	4	Native bush sand dunes natural
Z	5	Road there but stops erosion, native trees
B	6	Rocks, wood for seat, natural
Card No.		**2 Comments: Environmentally unfriendly**
V	1	No native plantings, cars, people
P	2	People, tourists don't care, rubbish, ferries
J	3	Drainage sewage pipe, no native trees
Y	4	Rubbish, people
Q	5	People, rubbish, boats, cut into rocks
M	6	People rubbish

APPENDIX G

FREQUENCY TABLES

25 IMAGES

Frequency Tables (9 pages)

B

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 1	5	6.1	6.1	6.1
	Neutral	6	7.3	7.3	13.4
	Env.Fr. Grp 1	14	17.1	17.1	30.5
	Env.Fr. Grp 2	22	26.8	26.8	57.3
	Env.Fr. Grp 3	19	23.2	23.2	80.5
	Env.Fr. Grp 4	16	19.5	19.5	100.0
	Total	82	100.0	100.0	

C

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 4	4	4.9	4.9	4.9
	Env.Unfr. Grp 3	5	6.1	6.1	11.0
	Env.Unfr. Grp 2	6	7.3	7.3	18.3
	Env.Unfr. Grp 1	8	9.8	9.8	28.0
	Neutral	21	25.6	25.6	53.7
	Env.Fr. Grp 1	24	29.3	29.3	82.9
	Env.Fr. Grp 2	6	7.3	7.3	90.2
	Env.Fr. Grp 3	6	7.3	7.3	97.6
	Env.Fr. Grp 4	2	2.4	2.4	100.0
	Total	82	100.0	100.0	

D

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 4	5	6.1	6.1	6.1
	Env.Unfr. Grp 3	8	9.8	9.8	15.9
	Env.Unfr. Grp 2	15	18.3	18.3	34.1
	Env.Unfr. Grp 1	27	32.9	32.9	67.1
	Neutral	18	22.0	22.0	89.0
	Env.Fr. Grp 1	7	8.5	8.5	97.6
	Env.Fr. Grp 2	1	1.2	1.2	98.8
	Env.Fr. Grp 4	1	1.2	1.2	100.0
	Total	82	100.0	100.0	

E

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 4	1	1.2	1.2	1.2
	Env.Unfr. Grp 3	3	3.7	3.7	4.9
	Env.Unfr. Grp 2	9	11.0	11.0	15.9
	Env.Unfr. Grp 1	17	20.7	20.7	36.6
	Neutral	28	34.1	34.1	70.7
	Env.Fr. Grp 1	18	22.0	22.0	92.7
	Env.Fr. Grp 2	5	6.1	6.1	98.8
	Env.Fr. Grp 3	1	1.2	1.2	100.0
	Total	82	100.0	100.0	

F

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 3	1	1.2	1.2	1.2
	Env.Unfr. Grp 2	2	2.4	2.4	3.7
	Env.Unfr. Grp 1	4	4.9	4.9	8.5
	Neutral	9	11.0	11.0	19.5
	Env.Fr. Grp 1	31	37.8	37.8	57.3
	Env.Fr. Grp 2	25	30.5	30.5	87.8
	Env.Fr. Grp 3	6	7.3	7.3	95.1
	Env.Fr. Grp 4	4	4.9	4.9	100.0
	Total	82	100.0	100.0	

G

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 3	2	2.4	2.4	2.4
	Env.Unfr. Grp 2	2	2.4	2.4	4.9
	Env.Unfr. Grp 1	7	8.5	8.5	13.4
	Neutral	17	20.7	20.7	34.1
	Env.Fr. Grp 1	23	28.0	28.0	62.2
	Env.Fr. Grp 2	18	22.0	22.0	84.1
	Env.Fr. Grp 3	10	12.2	12.2	96.3
	Env.Fr. Grp 4	3	3.7	3.7	100.0
	Total	82	100.0	100.0	

H

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 2	3	3.7	3.7	3.7
	Env.Unfr. Grp 1	19	23.2	23.2	26.8
	Neutral	28	34.1	34.1	61.0
	Env.Fr. Grp 1	19	23.2	23.2	84.1
	Env.Fr. Grp 2	5	6.1	6.1	90.2
	Env.Fr. Grp 3	5	6.1	6.1	96.3
	Env.Fr. Grp 4	3	3.7	3.7	100.0
	Total	82	100.0	100.0	

I

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 2	2	2.4	2.4	2.4
	Env.Unfr. Grp 1	3	3.7	3.7	6.1
	Neutral	8	9.8	9.8	15.9
	Env.Fr. Grp 1	27	32.9	32.9	48.8
	Env.Fr. Grp 2	25	30.5	30.5	79.3
	Env.Fr. Grp 3	10	12.2	12.2	91.5
	Env.Fr. Grp 4	7	8.5	8.5	100.0
	Total	82	100.0	100.0	

J

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 4	9	11.0	11.0	11.0
	Env.Unfr. Grp 3	13	15.9	15.9	26.8
	Env.Unfr. Grp 2	16	19.5	19.5	46.3
	Env.Unfr. Grp 1	20	24.4	24.4	70.7
	Neutral	13	15.9	15.9	86.6
	Env.Fr. Grp 1	10	12.2	12.2	98.8
	Env.Fr. Grp 3	1	1.2	1.2	100.0
	Total	82	100.0	100.0	

K

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 2	2	2.4	2.4	2.4
	Neutral	16	19.5	19.5	22.0
	Env.Fr. Grp 1	24	29.3	29.3	51.2
	Env.Fr. Grp 2	27	32.9	32.9	84.1
	Env.Fr. Grp 3	12	14.6	14.6	98.8
	Env.Fr. Grp 4	1	1.2	1.2	100.0
	Total	82	100.0	100.0	

L

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 4	1	1.2	1.2	1.2
	Env.Unfr. Grp 2	2	2.4	2.4	3.7
	Env.Unfr. Grp 1	2	2.4	2.4	6.1
	Neutral	6	7.3	7.3	13.4
	Env.Fr. Grp 1	4	4.9	4.9	18.3
	Env.Fr. Grp 2	12	14.6	14.6	32.9
	Env.Fr. Grp 3	24	29.3	29.3	62.2
	Env.Fr. Grp 4	31	37.8	37.8	100.0
	Total	82	100.0	100.0	

M

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 4	7	8.5	8.5	8.5
	Env.Unfr. Grp 3	34	41.5	41.5	50.0
	Env.Unfr. Grp 2	23	28.0	28.0	78.0
	Env.Unfr. Grp 1	12	14.6	14.6	92.7
	Neutral	5	6.1	6.1	98.8
	Env.Fr. Grp 1	1	1.2	1.2	100.0
	Total	82	100.0	100.0	

N

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 4	6	7.3	7.3	7.3
	Env.Unfr. Grp 3	6	7.3	7.3	14.6
	Env.Unfr. Grp 2	10	12.2	12.2	26.8
	Env.Unfr. Grp 1	20	24.4	24.4	51.2
	Neutral	22	26.8	26.8	78.0
	Env.Fr. Grp 1	12	14.6	14.6	92.7
	Env.Fr. Grp 2	3	3.7	3.7	96.3
	Env.Fr. Grp 3	3	3.7	3.7	100.0
	Total	82	100.0	100.0	

O

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 3	2	2.4	2.4	2.4
	Env.Unfr. Grp 2	6	7.3	7.3	9.8
	Env.Unfr. Grp 1	3	3.7	3.7	13.4
	Neutral	16	19.5	19.5	32.9
	Env.Fr. Grp 1	17	20.7	20.7	53.7
	Env.Fr. Grp 2	20	24.4	24.4	78.0
	Env.Fr. Grp 3	14	17.1	17.1	95.1
	Env.Fr. Grp 4	4	4.9	4.9	100.0
	Total	82	100.0	100.0	

P

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 4	15	18.3	18.3	18.3
	Env.Unfr. Grp 3	33	40.2	40.2	58.5
	Env.Unfr. Grp 2	17	20.7	20.7	79.3
	Env.Unfr. Grp 1	9	11.0	11.0	90.2
	Neutral	3	3.7	3.7	93.9
	Env.Fr. Grp 1	3	3.7	3.7	97.6
	Env.Fr. Grp 2	1	1.2	1.2	98.8
	Env.Fr. Grp 3	1	1.2	1.2	100.0
	Total	82	100.0	100.0	

Q

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 4	1	1.2	1.2	1.2
	Env.Unfr. Grp 3	7	8.5	8.5	9.8
	Env.Unfr. Grp 2	26	31.7	31.7	41.5
	Env.Unfr. Grp 1	33	40.2	40.2	81.7
	Neutral	11	13.4	13.4	95.1
	Env.Fr. Grp 1	2	2.4	2.4	97.6
	Env.Fr. Grp 2	2	2.4	2.4	100.0
	Total	82	100.0	100.0	

R

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 4	3	3.7	3.7	3.7
	Env.Unfr. Grp 2	4	4.9	4.9	8.5
	Env.Unfr. Grp 1	24	29.3	29.3	37.8
	Neutral	35	42.7	42.7	80.5
	Env.Fr. Grp 1	14	17.1	17.1	97.6
	Env.Fr. Grp 2	2	2.4	2.4	100.0
	Total	82	100.0	100.0	

S

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 4	3	3.7	3.7	3.7
	Env.Unfr. Grp 3	11	13.4	13.4	17.1
	Env.Unfr. Grp 2	29	35.4	35.4	52.4
	Env.Unfr. Grp 1	21	25.6	25.6	78.0
	Neutral	16	19.5	19.5	97.6
	Env.Fr. Grp 1	1	1.2	1.2	98.8
	Env.Fr. Grp 2	1	1.2	1.2	100.0
	Total	82	100.0	100.0	

T

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 4	1	1.2	1.2	1.2
	Env.Unfr. Grp 3	9	11.0	11.0	12.2
	Env.Unfr. Grp 2	24	29.3	29.3	41.5
	Env.Unfr. Grp 1	25	30.5	30.5	72.0
	Neutral	21	25.6	25.6	97.6
	Env.Fr. Grp 1	1	1.2	1.2	98.8
	Env.Fr. Grp 2	1	1.2	1.2	100.0
	Total	82	100.0	100.0	

U

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 4	5	6.1	6.1	6.1
	Env.Unfr. Grp 3	5	6.1	6.1	12.2
	Env.Unfr. Grp 2	13	15.9	15.9	28.0
	Env.Unfr. Grp 1	18	22.0	22.0	50.0
	Neutral	22	26.8	26.8	76.8
	Env.Fr. Grp 1	8	9.8	9.8	86.6
	Env.Fr. Grp 2	4	4.9	4.9	91.5
	Env.Fr. Grp 3	4	4.9	4.9	96.3
	Env.Fr. Grp 4	3	3.7	3.7	100.0
	Total	82	100.0	100.0	

V

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 4	20	24.4	24.4	24.4
	Env.Unfr. Grp 3	22	26.8	26.8	51.2
	Env.Unfr. Grp 2	16	19.5	19.5	70.7
	Env.Unfr. Grp 1	12	14.6	14.6	85.4
	Neutral	7	8.5	8.5	93.9
	Env.Fr. Grp 1	4	4.9	4.9	98.8
	Env.Fr. Grp 2	1	1.2	1.2	100.0
	Total	82	100.0	100.0	

W

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 4	1	1.2	1.2	1.2
	Env.Unfr. Grp 3	2	2.4	2.4	3.7
	Env.Unfr. Grp 2	9	11.0	11.0	14.6
	Env.Unfr. Grp 1	15	18.3	18.3	32.9
	Neutral	29	35.4	35.4	68.3
	Env.Fr. Grp 1	21	25.6	25.6	93.9
	Env.Fr. Grp 2	4	4.9	4.9	98.8
	Env.Fr. Grp 3	1	1.2	1.2	100.0
	Total	82	100.0	100.0	

X

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 1	2	2.4	2.4	2.4
	Neutral	4	4.9	4.9	7.3
	Env.Fr. Grp 1	12	14.6	14.6	22.0
	Env.Fr. Grp 2	22	26.8	26.8	48.8
	Env.Fr. Grp 3	37	45.1	45.1	93.9
	Env.Fr. Grp 4	5	6.1	6.1	100.0
	Total	82	100.0	100.0	

Y

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 2	11	13.4	13.4	13.4
	Env.Unfr. Grp 1	18	22.0	22.0	35.4
	Neutral	34	41.5	41.5	76.8
	Env.Fr. Grp 1	11	13.4	13.4	90.2
	Env.Fr. Grp 2	6	7.3	7.3	97.6
	Env.Fr. Grp 3	1	1.2	1.2	98.8
	Env.Fr. Grp 4	1	1.2	1.2	100.0
	Total	82	100.0	100.0	

z

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Env.Unfr. Grp 1	5	6.1	6.1	6.1
	Neutral	16	19.5	19.5	25.6
	Env.Fr. Grp 1	18	22.0	22.0	47.6
	Env.Fr. Grp 2	32	39.0	39.0	86.6
	Env.Fr. Grp 3	10	12.2	12.2	98.8
	Env.Fr. Grp 4	1	1.2	1.2	100.0
	Total	82	100.0	100.0	

APPENDIX H

STATISTICAL DATA

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.190	12.761	12.761	3.190	12.761	12.761	2.023	8.092	8.092
2	2.610	10.440	23.201	2.610	10.440	23.201	1.963	7.853	15.945
3	2.103	8.410	31.611	2.103	8.410	31.611	1.864	7.458	23.403
4	1.814	7.255	38.866	1.814	7.255	38.866	1.834	7.337	30.740
5	1.591	6.366	45.232	1.591	6.366	45.232	1.774	7.096	37.836
6	1.504	6.017	51.249	1.504	6.017	51.249	1.746	6.983	44.819
7	1.415	5.659	56.908	1.415	5.659	56.908	1.740	6.959	51.778
8	1.362	5.448	62.355	1.362	5.448	62.355	1.710	6.841	58.619
9	1.156	4.624	66.980	1.156	4.624	66.980	1.623	6.490	65.109
10	1.013	4.054	71.033	1.013	4.054	71.033	1.481	5.924	71.033
11	.900	3.599	74.632						
12	.806	3.225	77.857						
13	.782	3.128	80.985						
14	.707	2.826	83.811						
15	.577	2.309	86.119						
16	.569	2.278	88.397						
17	.526	2.103	90.501						
18	.481	1.924	92.424						
19	.444	1.774	94.199						
20	.399	1.595	95.794						
21	.358	1.433	97.227						
22	.252	1.010	98.236						
23	.236	.946	99.182						
24	.197	.788	99.970						
25	7.569E-03	3.028E-02	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix [a]

	Component									
	1	2	3	4	5	6	7	8	9	10
B	.117	-.170	-.618	.149	.040	-.356	.101	-.147	-9.3E-02	-.138
C	-7.9E-03	-1.8E-02	-2.7E-02	7.8E-02	-.144	-.858	-.150	3.2E-02	-.128	.117
D	-.252	-5.3E-02	.107	-.200	-.094	-6.0E-02	-.153	7.8E-02	.777	3.8E-03
E	.120	6.0E-03	-1.5E-03	.157	.146	.116	8.8E-03	-.102	.811	-.155
F	-.165	.272	.683	-2.9E-02	-.169	2.70E-02	-.234	-.174	-7.4E-02	3.2E-02
G	-.191	-5.0E-02	6.09E-02	7.0E-02	-.210	.138	.699	2.0E-02	-.135	.143
H	-9.6E-02	-.390	-5.2E-02	8.6E-02	-.739	7.12E-02	-.111	.126	-.224	9.2E-02
I	.128	-9.2E-02	.442	-.129	-.182	.154	.138	-.360	9.5E-02	-.357
J	-.198	-.120	.150	.567	.092	-.396	-.139	-.320	-.127	-8.6E-02
K	8.4E-02	.172	-2.5E-02	.152	.201	-8.2E-02	.655	.123	1.1E-02	-.235
L	-.137	.792	7.27E-03	.107	.151	7.99E-02	-.121	.121	-8.5E-02	-.183
M	.827	-2.8E-02	-2.4E-02	.153	-.030	3.62E-02	3.8E-02	.170	-2.7E-02	-5.8E-02
N	-.157	-.161	.127	-.786	.083	-.102	-9.1E-02	-6.5E-02	-8.0E-03	5.9E-03
O	-.106	.242	-.772	3.7E-02	-.054	.178	-.316	-2.7E-02	-6.7E-02	-1.4E-02
P	.822	-2.8E-02	-3.9E-02	-.110	-.055	.104	-.135	-5.0E-02	-6.1E-02	.207
Q	.108	-.242	1.20E-04	-.138	.108	-8.4E-03	3.3E-02	3.2E-02	-.178	.690
R	-.374	2.5E-02	7.04E-02	.121	-.064	7.64E-02	.373	-.387	1.0E-03	.503
S	8.5E-02	2.3E-02	-.120	8.0E-02	-.106	-5.0E-02	.207	.813	.105	-4.8E-03
T	6.4E-02	-1.7E-02	.195	.220	.241	5.64E-02	-.101	.617	-.321	-.141
U	4.3E-02	1.2E-02	.108	-.725	-.137	3.43E-02	-.160	-.273	-7.4E-03	4.2E-02
V	-.187	-.698	1.09E-02	.114	.052	.338	-.325	1.3E-02	3.1E-02	5.1E-02
W	-.263	8.5E-02	-.135	-1.4E-02	.291	5.42E-02	.370	.133	-7.0E-02	-.588
X	-.112	.611	.162	.193	.430	.239	9.1E-02	-.130	.114	-7.8E-02
Y	.287	-9.4E-02	.112	.154	-.282	.636	-.189	-8.0E-02	-.214	.118
Z	-.128	-1.2E-02	-.197	.110	.727	2.43E-02	-.105	.132	-.106	7.5E-02

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 14 iterations.

APPENDIX H1

QUALITATIVE DATA

Positive themes - Environmentally Friendly

PEOPLE	Few people, only one person
	People enjoying themselves on the water (3)
	Boats only evidence of human's (8)
	One person in the shot
	Few people and dogs, peaceful
	Secluded spot (25)
	Natural people friendly (7)
HUMAN ELEMENT BOATS	few boats, not too many boats
	Dinghies
	Boats not threatening
	No motorised boats (4)
	Sailing boats
	Colour of boats looks fresh (14)
	Picture of Waiheke (dinghies)
NATURAL / TRADITIONAL VALUES	sand clean, quiet, natural
	No cars in beach images
	No visual rubbish
	Beach free of people and commercial activities (48)
	Uncluttered
	Clear water
	Nice unspoilt, uncrowded
	Natural coastline (3)
	Fun beach, holiday beach (3)
	Beach looks pristine
	Nice clean beach (9)
	Nice vacant beach (10)
	Sparkling clean water, green bush (16)
	Beautiful beach , long walking beach (68)
	nothing in the image harming the environment
	Nothing unfriendly (54)
	No man made structures
	Simplicity (53)
	Unspoilt (49)
	Serene view (48)
	Gorgeous scenery
	Open & spacious
	Nice spot, safe for children (23)
	Natural environment maintained (4)
	no rubbish
	perception of space (4)
	peaceful location
	Forestation blended in well
	Appeals to walker
	Plant life & birds (40)
	Empty landscape
	Regenerating bush
	Bush Healthy
	Natural foreground
	Coastal sea side typical NZ (3)
	Natural no development on beach (5)
	Natural , peace, tranquillity (27)
	Nikau palms
	Tree lined cliffs (8)
	Vista , tree cover (15)
	Pure nature (18)
	Settling on the eye (26)
	Bird life
	Sand & sea kayak user friendly
	Waiheke at its best (66)

HOUSING	blends in with bush
BUILDINGS	Low density (51)
	Tried hard to blend in
	Organic toilets
	Bright, friendly, clean: rubbish bins visible (Fruit & Veg) (26)
BALANCED	original 'kiwiana' dinghies on beach
	no building especially new ones
DEVELOPMENT	little or no evidence of human infrastructure which may create pollution (56)
	Rustic picnic spot
	Headland without buildings
	Individual buildings unique (29)
	Nice Romantic picnic place
	Typical Waiheke countryside (5)
	Fairy grotto (picnic area) (8)
	Historic (Rocky Bay Store) needs to be saved (10)
	Nice & peaceful (10)
	Modified environment unspoilt beaches, low impact- human artefacts (15)
	Happy combination- low density housing / boats and vegetation
	Waiheke on a good day before the boats come (41)
	Reclaiming by nature (bush regeneration)
	Minimum interference by man

Negative Themes - Environmentally Unfriendly

PEOPLE	too many people (52)
	Attracting more people to come (50)
	Uninterested people (2)
	People pollution (22)
	Clutter of people queues, frustration bored no entertainment (3)
	People more pollution if recycle OK (42)
	Volume of people in one spot – (45)
	People not environmentally friendly – rental cars place etc (11)
UNNATURAL	erosion
	Roads to close to beach
	Dune damage- trampling
	Sand built up
	Intrusion buildings on beach (8)
	drain exposed on beach, exposed , drain onto beach
	Creek Palm Beach known to be 'smelly'
	Aesthetically unpleasant (48)
	Impinging on nature (56)
	Visual overhead cables
	No vegetation (46)
	Pampas grass (toi toi) weeds
	Storm water drain – no workmanship

HOUSING	Too close to beach Not blending in – 'pink house' Big homes out of scale with landscape (49) Encroachment of large flash houses on beach (48) Impinging – design of buildings Capitalism (32) Little boxes over looking one another (housing) (41) Big houses ostentatious (68)
OVER DEVELOPMENT	Too Commercial Tacky signage Not observing 'ridgeline' rule Size and harshness of development (49) Abundant evidence of human infrastructure – waste creation Steel cages (2) - wharf Overly diverse streetscape (12) 'Touristy' (14) Gaudy buildings Greek Island tourism (29) Wild West architecture – not fitting together (29) Too much tourism crowded losing silence (29) Building development implies tourism (44) Roadworks

	Town could be anywhere – Oneroa (44) Uninviting town scene (3) Fruit & Veg. Store people, cars not natural area (11) Buildings intensive human use, modified environment (15) Lot of clearing for development (45) 'Waiheke' slipping thru fingers (68) Little Island no idea of rate of direction of change (70) Drainage no more housing should be encouraged (75) Contrast to 'Island' cars and people (62) Lack of design (12)
OVER DEVELOPMENT	Polluted creek, smelly Stagnant water tidal, summer sewage more cars – increase in traffic to ferries Traffic congestion Too many cars Parking problems Noise pollution from cars Car fumes Greenhouse effect (32)

UNNATURAL	Too many signs, flashy, signage – Onetangi store
	Wharf structure
	'Pink house' – gross architecture (58)
	Too much clutter (52)
	Toilets on beach
	Untidy buildings
	Overhead lines, power lines
	Big roof signage
	Signage too big why? only shop! (18
	Eye sore – buildings on beach (8)
	Signage ghastly, no foresight (8)
	Detailing – lack of sensitivity – signage (15)
	Store needs a paint job & to be done up (Onetangi) (10)
	Oneroa buildings blocking views (7)
	Horrible toilet block, ugly buildings
	garish house 'pink' (26)
	Onetangi. Store 'woolshed' does nothing for beachfront (35)
HUMAN ELEMENTS	
BOATS	visual pollution
	Sewage and rubbish
	Discharge
	Big boat imagery
	Swarms of boats, copper bottom of large boat (39)
	Fumes, diesel boats
	Boats where people are swimming (58)

NON TRADITIONAL	
	lack of facilities
VALUES	Taking 'wharf tax' no signs of improvement
	Not putting anything back into community
	Waiheke unwelcoming Needs natural
	Chaos on wharf (17)
	Not a nice entrance to Waiheke (13)
	No provision for fast loading, queues, disorganised (3)
	Over commercialisation at entrance to landscape (3)
	Structures are harsh – non appealing (5)
	Over crowding, overloading facilities (9)
	Wharf – Totalitarism (15)
	Wharf structures lack of care (15)
	Facilities stress on environment – manmade – wharf (16)
	Boats, pollution, large buildings, ugly hillside (26)
	Nasty corrugated iron and concrete, doesn't blend (35)
	Ugly not attractive

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