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The Effect of Visualisation on the Resource Consent Process:

A Case Study in Christchurch City

A Dissertation
submitted in partial fulfilment
of the requirements for the Degree of
Master of Environmental Policy
at
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by
Benjamin M Baird

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Abstract

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By Ben Baird

Visualisations are becoming increasingly prevalent with the growth in use and capabilities of technology. Currently visualisations can be included in the resource consent process but are without guidelines on their use. This exacerbates the tension between the potential of visualisations to inform and mislead decision-makers. The role of visualisation in environmental policy and resource consent processes may be significant areas in which this tension is apparent. Such issues were explored predominantly in the early 2000s, but the improvement in visualisations since then to create hyper-real physical renderings of space, as well as increased accessibility of visual software, may have increased the risk that they are, in fact, misleading planners who have to make decisions on the significance or other aspects of projects. This research explores and assesses how visualisations are created by architects and then interpreted by planners through a literature review and interviews within Christchurch City.

Keywords: *Visualisation, Technology, Environmental, Resource Consent, Planning, Architects*

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Chapter 1

Introduction

This dissertation seeks to understand how visualisations are created and understood within the resource consent process in New Zealand. The purpose is to understand how architects produce visualisations and the differences between how planners, in turn, interpret them. It begins with an introduction to the problem, an understanding of the theoretical background, a summary and discussion of the results.

It has always been intriguing viewing drawings of the future, seeing how previous generations interpreted their future, our present. A classic example would be the *Back to the Future* film series. In Part 2, the main character Marty McFly has to travel to the future to save his future son; that future date is next year (2015). In their future there are hover-boards, and ever since that film kids have dreamed, demanded, and eventually been let down, by the promise of hover-boards (Hanson, 2013). Simultaneously, the birth of computer games has shown these generations the promise of computer graphics. The most applicable game is 'SimCity', which I grew up playing, whose gameplay is strategically managing and growing a city. Furthermore, it is the games evolution, SimCity 2000, 3000, 4 and 2013, that has whet the appetite of these generations for better graphics, especially in terms of cities – their buildings and systems.

This anticipation of the future is also evident around actual cities and development, most notably as roadside posters on empty lots outlining the promise of new developments. Grand designs are presented, the sun is shining, people are happy, and the traffic is light. The interesting thing is when it goes beyond what is actually built. An example that I wanted to explore was 'The Terrace' development. The Terrace is situated along Oxford Terrace in Christchurch City and, prior to the 2010-2011 earthquakes was a popular bar and restaurant area. The imagery for The Terrace differed from the imagery used in the Avon River Precinct (the Governments project) information, as seen in Figure 1, for the same strip of land. One of these projects will be incorrect and could this lead to a confused or underwhelmed public? Was it meant to address the public or was it more about attracting investment?



Figure 1: Contrasting Images of The Terrace

The image (Figure 1), shows a comparison between The Terrace (The Terrace, n.d.) and the Avon River Precinct (CCDU, n.d.) projects revealing a stark contrast in the representation of the riverbank and, to a lesser extent, the fronting buildings. Furthermore, there is a contrast between the government imagery as seen in Figure 2 below (CCDU, n.d.).



Figure 2: Contrasting Image found in the same Central City Development Unit (CCDU) video

Issues also arise when what is created does not match the promise of any of these images. This research proposes that as technology improves visualisation, so too does the potential of the visualisations to not match the realisation. Furthermore, the planning framework may lack the ability to protect the council and the public from this difference.

An internet article titled ‘Is the Internet’s Appetite for Sexy Renderings Hurting Architecture?’ by Jenny Xie (2013) encapsulates this anticipation and subsequent disappointment, when the visualisation and realisation do not match. Xie cites an example called ‘Marks House’, the winner of a public competition for a summer pavilion in Flint, Michigan. The response to this project has been ‘fairly negative’ in part because of ‘just how different the finished product turned out compared to the original concept

renderings' (Xie, 2013). This issue is not just in art installations, it is also seen in subdivision planning.

New housing developments do their best to present some romantic version including innovative ideas creating better living but it is only when 'roll-out takes place that questions begin to be asked about where the innovation might have gone' (Montgomery & Page, 2013). These examples highlight the 'disconnect' between the finished product and the idea presented, when the visualisation and realisation do not match. Here the issue is even more pertinent as people invest into a dream that may never be delivered. However, where does the problem lie? Is the designer deliberately misleading or are the public and the council misunderstanding the information and how should this transaction be safeguarded?

This is not a conspiracy theory; that designers are producing higher-quality visualisations in an attempt to mislead the public. Rather, that this may be happening subconsciously, that objects in the mirror are closer than they appear, but without the warning (Smallman & St. John, 2005, p. 12). This is compounded by, as Sheppard (2001, p. 192) describes, 'the wild west' in terms of visualisation use in the planning process. Currently architects are responsible for 'providing an honest and neutral visual representation ... by seeking to avoid bias in responses', thus providing legitimacy (Sheppard, 2001, p.196).

Furthermore, this misunderstanding between designers and the public stems from the introduction of technology into the process. Before computer renderings, graphics were hand-drawn, and therefore cannot 'be mistaken for anything but illustrations' (Xie, 2013). So the rendering was a hyper-reality and justifiably viewed as just an idea. However, following an increase in the use and ability of technology, computer images are more accessible and more realistic and therefore the public may in fact perceive these as fact rather than illustrations.

Additionally, during an artistic rendering, everything can be contrived. As Xie (2013) describes it 'adding beautiful furniture, ... picking a flattering angle that is hard to physically photograph, ... to producing lighting conditions that only exist in a fantasy world,' and finally 'inserting trees or hip young people doing yoga' (Xie, 2013). The designers continue a tradition of illustrations with the aid of the technology available while the public are potentially misled by a hyper-realistic depiction. Bresi (1995, p. 19)

found that the difference between the visualisation and the real world experience is as vast as between the plan and what is built. Sheppard (2001, p. 188) is also concerned that the effect of poor decision-making is that unworthy projects are approved and good design is declined and planners and the public get 'that which they did not expect'. Despite this, these renderings have become an effective tool in communicating and engaging the public.

As these images are becoming more accessible for the non-architecturally literate, it is helping conceptualise ideas or planning rules and improve community involvement. However, there needs to also be communication of the potential misleading elements. It is true that these renderings never come with a promise that what you see will be what you get and that these designs are marketing tools so in order for visualisation to reach its full potential 'we should at least be savvy shoppers' (Xie, 2013). This communication could, though, come from city planners. Montgomery & Page (2013) echo this point in their critique of suburban development; 'planners and planning students need to be wary of that which is trumpeted initially as innovative design'. It is the validation of visualisations that is essential for them to be used as evaluation tools for understanding potential changes to the environment (Lange, 2001, p. 169).

Sheppard (2001, p. 188) states there is insufficient research to determine the influence of technology as well as the role of visualisation in planning and their influence. This debate is also encapsulated in *Planning Quarterly*. Coggan (2007) exudes excitement at the potential of technology within the planning process; with this technology, 'there is no question that it is realistic and accurate' (p. 26). He states that it can be used in the process by members of council or the Environment Court for various scenarios such as subdivision and wind farms. They can 'take the visuals to the survey point and see for themselves that the base data is an accurate reflection of what they can see with the naked eye' (p. 26). However, Carrie (2007) urges restraint with regards to technology. 'I would caution about the appropriateness of the technology ... and any reliance that the Court or the planning profession might place on its validity for recognizing the variability of appropriate cognitive visual responses in the community to any potential change in a receiving environment' (p. 29).

Currently there is a lack of research in this area, especially in New Zealand, with regards to how images are created and presented. Council and the public are 'sold' images

without any ability to understand how the images are created (under what assumptions) and how they fit within the current area. However, with no ability for recourse if the visualisation and realisation differ, this leaves the council and public vulnerable to manipulation. This research is important now because this exchange is becoming more prevalent. This is exacerbated in Canterbury following the earthquakes. As the town is flattened, new ideas of areas and buildings are graphically created to present its new future. Yet, there is no control or ability for action when the idea presented does not match the actual building created. Recently the Canterbury Earthquake Recovery Authority (CERA) stated a new 'innovative digital model' would help 'visualise the significant changes to the central city landscape' (CERA, 2014). CERA see the potential in technology and visualisation in 'creating a strong foundation for 3D visualization of the city' (CERA, 2014). CERA state that 'architects and their clients will contribute 3D models of 'to be built' developments to accompany the models of remaining buildings' with the hope that these models can 'design better buildings and outdoor spaces. With the models, they can visualise the developments around their designs and simulate environmental effects' (CERA, 2014). The excitement at this proposal needs to be tempered with caution at the potential for manipulation.

The aim of this research is to understand how visualisation technology is used within the planning process, particularly how architects compose and planners perceive visualisations, and how the public interest is protected. This research commences with a review of the relevant theories and concepts, then investigates through a case study approach the potential use including manipulation, of visualisation in the planning process and seeks to understand the current practice for council. Following this, key strengths and weaknesses of the current adoption of visualisation within the planning process are explained.

Chapter 2

Theoretical Background

Visualisation is an exciting tool; a picture is worth a thousand words. Visualisation has increasing potential through technological advancement, and for the improvement of interaction between the council, the public and the developers. It 'offers a method for seeing the unseen' (Averbukh, 2001, p. 227). Visualisations are becoming an increasing part of everyday life (Lange, 2001, p. 179). This can be seen in billboards around town, as well as part of the consenting process. However, visualisations have been criticised in their limited ability and vulnerability to manipulation. The concern for visualisations is seen in the planning discipline's hesitant embrace of visualisation as a communication tool demonstrating the real world's three dimensions in a simplified representation (Lange, 2001, p. 179). This debate, and articles written on the topic, seems to have peaked in the early 2000s and since then there has been limited research. This may match the rise in the use of technology. The reduction in research may be because the issues have been resolved, or the focus of technological research has shifted, potentially to social media, or the issues are still outstanding, but simply are not discussed anymore.

Throughout this research, the use of the word visualisation will refer to the use of Computer Aided Design (CAD) drawings or other static images used to represent potential future situations. This research will not look at the effect of the use of maps or films but rather the use of realistic drawings or a photo-drawing mix to portray the future building on a specific site.

The following review focuses on the potential, and the technology used in visualisation before moving to a critical discussion of its limitations and nature.

2.1 The Potential and Promise of Visualisation

There have been many forms of visualisations around for centuries, but only recently has there been an increase in the use of visualisations within professional practice (Sheppard, 2001, p. 184). Visualisation has a tremendous ability to improve interaction,

not only between experts but with planners and the public, with the potential for improved understanding and decision-making (Appleton & Lovett, 2003, p. 117). This is because it can translate information better and present multiple options while saving time (Lewis, Casello, & Groulx, 2012, p. 86). Furthermore, this potentially could be significant in increasing public engagement. This is because quicker, more understandable information helps foster consensus building, with visualisations as the interactive tool (Seebohm, n.d., p. 175). Pietsch (2000, p. 521) suggests that visualisation's potential is in its ability to translate conventional plans and elevations into something that is understood by everybody. In other words, visualisation is a 'means of translating technocratic information to a common graphic language' (Lewis, Casello, & Groulx, 2012, p. 85). This is becoming critical because, as Coggan (2007, p. 27) states, it is essential to consult with people early on, as time is valuable. Wissen et al. (2008, pp. 184-185) see visualisations as having potential in communicating and understanding environments through showing and modelling visual and non-visual information. This is done by overlaying map information allowing problems to become visible and providing a common language for discussion. Furthermore, traditional tools, such as maps and diagrams, are regularly misunderstood or incomprehensible for the public (Liben, 2009, p. 310), as map comprehension requires understanding how cartographic decisions are made. Better communication leads to better interaction and allows exploration of the underlying data.

Additionally, Lewis, et al. (2012, p. 100) suggest that visualisation can create better paths to consensus and implementation by engaging communities. This is through improved communication and dialogue throughout the decision-making process (Pietsch, 2000, p. 522; Lewis et al., 2012, p. 85). Visualisation provides this 'common language' (Lewis et al., 2012, p. 88) by transforming 'the symbolic into the geometric' (Lagendorf, 1992, p. 723), which engages everyone through development and reviewing projects (Lewis, 2012, p. 551). Coggan (2007, p. 26) highlights that visualisation allows everyone to see the same information. Visualisation does not only improve communication and dialogue but it may also improve the quality and the participation levels of the public and experts. Lange (2001, pp. 179-180) and Pietsch (2000, p. 528) concur, suggesting that several scenarios and options seen side-by-side promote conversation and provide ways of seeing that are the closest to the direct human

experience. This is especially important as the demand for public involvement increases in planning decisions (Pietsch, 2000, p. 521).

In addition to improving understanding, visualisation helps promote creative problem solving (Lagendorf, 1992, p. 723). Visualisation can 'encourage experimentation and openness to the opportunities afforded by a city' (Pietsch, 2000, p. 528). In Christchurch, the Canterbury Earthquake Recovery Authority (CERA) provides an open license virtual database for developers and the public to use; this is so the models and visualisations can be improved and seen by the public (CERA, 2014). Levy (1995, pp. 356-357) describes an approach where committees examine visualisations, alternatives are discussed and examined and this helps identify and discuss concerns. In this scenario, visualisations gave a sense of place, and a comprehension of the environment. This allows the depiction of technical information; property boundaries, gradients etc. and alternatives (Lewis, 2012, pp. 551-552), which increases the level of participation in the planning process (Lewis et al., 2012, p. 85).

However, planners firstly must become accustomed to visualisations and the 'experimentation and adaption' (Lagendorf, 1992, p. 737) involved within the visualisation process. This would allow planners to 'control and coordinate' what and how information is used (Lagendorf, 1992, p. 735). It would also lead to improved participatory decision-making, as the ability for the public to visualise the project proposed within what they know is vital (Coggan, 2007, p. 27). Visualisations already have an established role in planning research and practice (Lewis, 2012) allowing the public to see the relationship between individual parcels, and how these fit the context (Rabie, 1991, p. 65). However, Coggan (2007, p. 26) argues this involvement is only successful if implemented early in the process, as it helps interpret and visualise the future, even if the design is less accurate (Lewis, 2012, p. 553). There is not a need for visualisations to be used earlier but also at the end of the process, after more decisions have been made (Seebohm, n.d., p. 184), and the visualisation can be more accurate.

Some consider that visualisations will continue their relentless unhindered fervour for better realism (Lewis et al., 2012, p. 101) and that this technological advancement will create 'opportunities that may be of great consequence to planners and to society more generally' (Lagendorf, 1992, p. 724). Visualisations allow the creation of information bases, where data can be stored and variables adjusted to solve wide-ranging problems,

'which can extend beyond the boundaries of a single project' (Levy, 1995, p. 344). Daniel and Mietner (2001, pp. 61-62) also agree that visualisations can provide good options when based on data. The assumption is that visualisation's effectiveness is based on data and is therefore objective, allowing decisions to be made (Lewis, 2012, p. 553). Furthermore, it is still cheaper than taking all people to the particular site. Coggan (2007, p. 27) summarises the potential as results will improve as quicker and better visualisations are introduced into the planning process. However, Coggan did not use or offer criteria in order to judge the quality and accuracy of visualisations so his claims of successful results need to be tempered with caution. Visualisation's success is linked to the similarity between a person's response to an image and to the real environment. This has demanded greater sophistication and become a focus of visualisation research and development (Lewis, 2012, p. 553).

Visualisation's promise lies in its ability to entice and improve community interaction through translation of technical information into visual representation, as well as its potential to present multiple options simultaneously allowing for public involvement earlier in the process (Lewis, 2012, pp. 552-553). In other words, visualisation needs to be 'understood from multiple viewpoints with a variety of information' by improving 'the understanding of complex information, and improves communication' (Lagendorf, 1992, p. 723). Improvement in technology is often heralded as the mechanism in which this growth in understanding and collaboration between planners, architects and the public can happen and lead to more successful environmental change (Lewis, 2012, p. 562). However, its success depends on its implementation within the planning process, as well as the experience and expertise of the users (Lewis et al., 2012, p. 100).

2.2 The Technology Advancement of Visualisation

As mentioned earlier, improving technology is expanding the use of visualisation. The advancement of computer power (including data space, memory space and processing power), as well as the improvement in graphic rendering software (for example, Photoshop), has led to more realistic visualisations. This has allowed complex environmental visualisations to be more common in planning and architectural processes (Lewis et al., 2012, p. 89). Computer visualisations can now handle greater

scale and complexity of situations, which allows greater graphical representation of traditional plans and elevations that assist in understanding (Lagendorf, 1992, p. 730). This advancement has had a substantial effect on planners and architects ability to assess effects and design elements (Coggan, 2007, p. 26). Bresi (1995, p. 16) suggests that visualisations are objective, allowing people to see patterns from the representation of data, to show the potential and resolve disputes, because of the 'dead hand' of the computer. Bresi argues that this shifts the discussion from ideologies to ideas, because the computer presents without prejudice.

In addition, the growth of personal computing and the improvement in user-friendly graphic editing tools (Lewis et al., 2012, p. 89) has increased the exposure and hence, demand for visualisations. Daniel and Meitner (2001, p. 64) predicted the continual advances in computer technology would increase use. Levy (1995, p. 343) agrees saying the lower costs and higher performance has increased the reach of visualisations within planning and architectural firms. Furthermore, research has shown that, in fact, visualisation is guiding technological change. This increase in technology has, in turn, fed the need for a better technological capacity (Lagendorf, 1992, p. 725). The appetite of the public has been exacerbated by the increased ability of visualisation in popular culture, which is shifting the emphasis towards a futuristic ideal. Smallman and St John (2005, p. 7) suggest that the pace of technological growth actually perpetuates the belief that more photo-realistic visualisations lead to more accurate results. Developers are therefore focused on maximising realism rather than effectiveness (p. 10). This growth in technology has given the ability for visualisations to merge the designed with actual landscapes (Pietsch, 2000, p. 529). Daniel and Mietner (2001, p. 65) state that high-resolution visualisations can represent landscapes and are indistinguishable from photographs.

Technology has tremendous potential for visualisation within planning. However, the rate of growth and access to information are becoming barriers to progress and further, may be manipulatable. Appleton and Lovett (2003, p. 117) express concern that the process should not be driven by the ability of technology. Lewis (2012, p. 563) suggests that the desire for better participation and communication cannot be addressed solely through more sophisticated visualisations.

2.3 The Critiques of Visualisation

The rapid technological advances and associated boosterism tends to obscure the significant inherent limitations. Some researchers remain unconvinced about the benefit of being able to visualise projects (Averbukh, 2001). Despite early claims that improved computer power and subsequent sophistication has improved visualisation, the question has now moved from the limits of technology to how to measure the perceived accuracy (or control of manipulability) of a wide range of visualisations, from the abstract to the realistic photo style techniques (Lewis et al., 2012, p. 91). Sheppard (2001, p. 192) believes that the increased use of visualisations in public decision-making processes will lead to more debate over their authenticity resulting from 'differences between the visualisation and the built designs'.

Averbukh (2001, p. 227) suggests that visualisations by design is a manipulation of the real world and therefore can only be considered a metaphor, a tool to allow the communication of complex ideas. Lange (2001, p. 165) argues that detailed visualisations do not necessarily correlate with accuracy or realism. Realism is, in fact, more about connecting users with visualisations rather than visual correctness (Lewis, 2012, p. 561). Furthermore, visualisations are still, and arguably can only be, a conceptualised version of reality; as textures, subtlety of colours, shadows and reflections are all lost on paper. It is the idea that scuffmarks and chipped paint are part of the visual experience. Visualisations can only capture one moment, one day of a season whereas the real environment is dynamic and continuously changing (Lange, 2001, p. 180). Daniel and Meitner (2001, pp. 61-63) are also concerned that it is assumed the visualisation can elicit the same judgements as if the person was actually there; a photograph focuses on the picturesque rather than how it connects to people's lives. Visualisations are depictions that can be manipulated to highlight important aspects that can end up influencing decision-making (Lewis, 2012, p. 552).

Technology advancement has been demonstrably beneficial but it has its limitations. It has been argued that the technological advancement of visualisation could subsequently limit the accessibility to visualisations. Lewis (2012, pp. 551-552) is concerned that technology is overtaking understanding, thus creating space for potential misleading. Furthermore, Lange (2001, p. 163) argues that visualisations are only loosely linked to planning processes and are thought of as expensive supplementary documentation,

with the purpose of selling the final product. This allows visualisations to be created that are not 'entirely technical in nature' (Lewis, 2012, p. 554). This shifts the control within the process, from the planners to the architects (Rabie, 1991, p. 62). Technological improvements along with the change in the visualisation production process places 'virtual reality beyond the reach of local planning authorities' (Pietsch, 2000, p. 533), as planners do not encounter the creation of visualisations.

These inherent problems may be the reason that the 'implementation of visualisation on a routine basis within planning remains limited' (Pietsch, 2000, p. 521). This could be because there is a frustrating gap between what visualisation can do, and how it is applied (Lewis et al, 2012, p. 85). This gap is further exacerbated by the 'complexity of the planning problems involved; certain ideas in the philosophy of modernism in architecture; the multiplicity and discordant character of our democratic society' (Rabie, 1991, p. 57). Levy (1995, p. 345) asks for a bigger commitment to the improvement of interaction of visualisations with the audience to allow for greater public involvement, but who is the audience? As Levy suggests, revisions are generally done privately and presented to the client, not the public (p. 344). Improvement in quality may have negative consequences that may 'alienate the intended audience' (Lewis et al., 2012, p. 95). The desire for more accurate visualisations may in fact be contrary to the designer's needs. Additionally, Sheppard (2001, p. 187) is concerned about the level of funding and influence of clients over visualisation design, leaving the architect no safety of professional standards to negotiate from. Furthermore, preparers of visualisations need to understand the power they have to influence emotions. Lewis' (2012, p. 560) research showed that 'presentation style variation is associated significantly with perceptions of visualisation credibility, apparent realism and environmental design preference'.

Additionally, the access to data has improved through changes in the way users engage with technology, especially in terms of storage and communication (Lagendorf, 1992, p. 724). This has led to a greater diversity of information that helps users 'understand the past and present and to project the future' (Lagendorf, 1992, p. 724). This, however, raises the question of how to decide what information is critical for decision-making, a way to choose, consolidate and understand the data, e.g. Lagendorf (1992, p. 727). This could prove to become the more demanding yet equally, more crucial issue facing

visualisation. Lewis et al. (2012, p. 91) reiterates that visualisations need to be used in a way that users are aware of the benefits and limitations of visualisation. They sum this up succinctly; 'no matter how much control the user is afforded, interactive visualization applications remain a 'black box' into which ideas, preferences, and choices are conveyed' (Lewis et al., 2012, p. 99).

It is important that planners and the public are aware that visualisations incorporate designer's values that may not necessarily represent the real world. Duncan (2008) suggests that objectivity is lost if the developers' formative value frameworks are not systematically identified. Duncan argues that the ability for something to be objective (i.e. represent the real world) it needs to be value free which, when dealing with modelling (or visualisations), is impossible due to the assumptions required to establish a model (or visualisation). Therefore people inform science as much as science informs people. Moreover, Smallman and St. John (2005, p. 6) propose that science is disjointed in its understanding of the implied principle of visualisations; that the more realistic a visualisation is, the better. They describe it as 'naive realism', commenting that there is a 'misplaced faith in people's ability to extract information from realistic displays' (p. 7). Lewis (2012, p. 562) states that visualisations will continue 'to push a priori messages.' This is exacerbated by the fact that planners, historically, have relied on architects' plans and elevations for urban design concepts (Levy, 1995, p. 344). This difference is exemplified in architects' training – they are taught to present 'in the most favourable light' rather than planners objectively using it as a tool (Sheppard, 2001). This allows architects the freedom of imagery. Furthermore, the identification of values does not rest solely with planners. The public should be encouraged to 'become more critical and analytical' (Lewis, 2012, p. 563). The public is aware that visualisations can potentially mislead but require a way of deciphering images; more information about assumptions and decisions will help this process and make sure architects are less abstract and more upfront (Lewis, 2012, p. 563). This goes against the assumed understanding that the public can see beyond embellishment and can interpret the image correctly (Lewis, 2012, p. 554).

As early as the 1990s, Lagendorf (1992, p. 735) questioned whether planners even gain from this 'more accurate, complete, and deeper understanding' that technology has offered. It may be the experience and knowledge planners have that is the limitation

rather than the technology advancement in and of itself. Sheppard (2001, p. 183) asks whether we need improved knowledge and control over visualisations rather than improved technology. His concern is that the increase in accessibility – through the drop in cost and increased familiarity from younger generations – jeopardises the process. Sheppard suggests that there is a need for control because of the influence, potential misuse and lack of control over it (pp. 184-6) - the ‘persuasive power of visualisations has not been lost on the entertainment, business, and advertising industries’ (Sheppard, 2001, p. 186). Lewis et al. (2012, p. 86) contend the focus is on technology and its rapid evolution rather than how it can be used to help the planning process. Rabie (1991, p. 60) similarly was concerned that adaptation of visualisations has not been ‘adequate or appropriate’. Rabie (1991) suggests its development is not coherent. Pietsch (2000, p. 522, 534) too, is worried that the established pursuit of technology to provide validity diminishes the focus on the creation of a clear vision for how best to use it.

Since 1991, the concern is about how to adequately apply technology (visualisation in particular) to the planning process. This can be seen in visualisations that ‘largely overlook how the proposed building will engage with the existing urban context’ (Xie, 2013). Carrie (2007) highlights this in an example;

This wind farm scene has the predominantly dark areas of imagery on the right foreground rocks. This naturally emphasizes the foreground area of the image at the expense of the wind farm and background hills which are far more lacking in differential contrast. This leads to the wind turbines having ‘less visual impact (or intrusiveness)’ than what is ‘likely to be experienced’. Furthermore, perspective by the human eye has been approximated to the focal length of 25mm film camera lens of about 50mm (pp. 27-28).

Humans rely on visual cues that prime our information absorption; therefore understanding how visualisation is compiled is essential. Carrie’s example shows how assumptions become visual cues for understanding. The influence can be through view, lighting, weather and seasons (Sheppard, 2001, p. 187). Wissen et al. (2008, p. 186) sees the understanding of visualisations shaped by a combination of information and the user’s cognition. Bresi (1995, p. 19) further argues that style can affect visualisation; nostalgic, traditional styles garner more public support. They found that people react

negatively to visualisations in which they do not like the design. Smallman and St. John (2005, pp. 8-9) also found that in perspective views within visualisations, depth compresses faster than widths distorting the image. Furthermore, the range of distance is generally greater than the visualisations scope leading to further distortion. Appleton and Lovett (2003, p. 130) suggest that not all visualisation elements are equal in terms of viewer importance and therefore visualisations should focus on the foreground. Halbur and Haugh (2010) describe the fervent clamour to create ‘vibrant and active’ visualisations by cutting and pasting young, happy people in the shot. However, they concede that people help show scale. Halbur and Haugh (2010) suggest that visualisations are about enticing customers into purchasing or investing and those decisions are design not people driven. Halbur and Haugh (2010) and Kidd (1998) ultimately think that a trained eye can see through these tricks and understand where the problems are, and users will take them with a grain of salt. However, an inexperienced user may not be conscious of the potential manipulation.

An explanation of the use of camera techniques by Kidd (1998) to convey meaning led to the development of questions about the composition of visualisations. These are: view, angle, background, context, lighting, focus, and colour. These techniques are explained in Table 1.

View	The camera’s point of view becomes that of the viewers (Kidd, 1998). Interpretation is inextricably linked to viewpoint (Seebohm, n.d., p. 178)
Angle	Angle ‘has strong psychological implications’ as it distinguishes power and authority. For example, looking up makes it seem ‘more important, more powerful, and more authoritative’ than looking down (Kidd, 1998).
Background	Upward shots show sky, clouds walls rather than floors and dirt when looking down
Context	Different perception depths can distort visualisations. A wide-angle lens emphasizes foreground objects that create illusions of relational distance (Kidd, 1998).
Lighting	Lighting directs attention, attracting the eye, while back lighting can ‘create a halo effect’ (Kidd, 1998).
Focus	Focus can also be adjusted; soft focus has a cinematic, imaginative appeal (Kidd, 1998) while it can be directed by the direction of the persons in the visualisation.
Colour	Colour also is significant. People are repeatedly drawn to certain colours that can influence the meaning through symbolism or historical meanings, especially in terms of temperature, space, time and weight (Kidd, 1998). For example, hot summer days have ‘heavy yellow gold tones, with hints of fire.’

Table 1: Visual Image Symbolism

Therefore, it has been argued that these high quality visualisations should be seen as 'a declaration of intention' rather than a statement of what is there or to be there (Rabie, 1991, p. 64). With this assumed the problem then becomes the selection of information used within this process; how to fill in an image to make it readable rather than using all information available. Visualisation is affected by what information is selected and this 'can be affected by ad hoc or intentional misinformation' (Lewis et al., 2012, p. 92). This problem highlights that beyond just information, 'social, political, and economic pressures' exist and these can 'distort the way visualisation technology is employed and perceived in decision-making contexts' (Lewis et al., 2012, p. 90). Moreover, the information chosen and the assumptions made create 'an aura of certainty rather than one potential outcome among many' (Lewis et al., 2012, p. 93). The concern is when manipulation undermines objectivity leading to confusion and uncertainty, which is ignored or contested (Lewis, 2012, p. 553). The issue of accuracy is linked, therefore, to who creates the visualisation and therefore, the preparer is 'central to the whole process ... which raises concerns about how those individuals mediate inputs through their own perspectives such as colour, populating and lighting the environment' (Lewis et al., 2012, p. 92). It is exacerbated by the fact that these decisions occur 'quite intuitively, hence erratically, via the designer's expertise and sensibility' (Rabie, 1991, p. 60).

Visualisation, rather than being objective, become subjective and therefore can be potentially manipulated by users for their own benefit. Furthermore, actual public benefits may be lost in the architect's interpretation (Lewis, 2012, p. 554). They can 'be manipulated in several ways to show features of importance or future conditions, based on land management decisions' (Lewis et al., 2012, p. 88). This is challenged by Carrie (2007, p. 27) who suggests that humans vary in the way they 'process visual perceptions and experiences'. Smallman and St. John (2005, p. 8) echo this argument by stating it as a neurological issue. The brain, actually, is working to maintain the illusion of visualisation by making subconscious assumptions from the lack of information. This leads to imperfect, distorted approximations of reality, with the assumptions left unobserved. The authors argue that technological application needs to match how the human eye interprets and interacts with settings. Carrie (2007, p. 27) suggests that 'not all elements of a scene are given the same level of perceptual emphasis as that of a peripheral view'. This suggests that a setting is not as clear-cut and absolute as the

visualisation presents but rather visualisations are used to 'elicit emotional effects' (Lewis et al., 2012, p. 95). Here Lewis et al. (2012) highlight the subjectivity of visualisation as an aspect that is often overlooked in the planning process. Bresi (1995, p. 19) believes selecting specific databases and approximating can help save costs but acknowledges that this makes the process subjective. Furthermore, visualisations only present from one point of view and so they solve some problems but not all of them. Additionally, Sheppard (2001, p. 190) is concerned with the seemingly interchangeability of modelled landscapes and pure fantasy, that the representation of what is there is indistinguishable from the fictional additions.

Lewis et al (2012, p. 95) suggest that visualisations need to be openly scrutinised until an established practice is enforced or in other words, there is 'a need for planning authorities to be able to check its validity' (Pietsch, 2000, p. 525). Legendorf (1992, p. 736) sees this process enabling 'disputing parties tie into the consultants' computer model and carefully examine the assumptions'. Coggan (2007, p. 25) believes that investing 'in a high level of accuracy for visual simulations in order to consult with the community is becoming more essential, particularly for potentially controversial topics'. However, this raises another concern other than its lack of application, and that is, how to measure accuracy. A process of investigating each aspect of a visualisation and trying to understand the assumptions is a comprehensive yet time consuming process.

There is a concern that while it is impossible to assure accuracy 'there is a danger in permitting major inaccuracies' (p. 195). Appleton and Lovett (2003, p. 127) are concerned that important elements may be tougher to simulate and detrimental to the project, so these aspects are downplayed or left out. Seebohm's (n.d., p. 175) research shows that visualisations are not objective and by focusing instead on interpretation, it is hoped to counter this assumption. Interpretation is independent of the data and so visualisation is, therefore art, 'which depends primarily on the user than on the system software and hardware' (Seebohm, n.d., p. 184). Levy (1995, pp. 343-344) states it as misunderstanding, that visualisations can hide or distort information; 'the acts of creating a concept, testing its feasibility, and producing detailed drawings have become less distinctive' (Levy, 1995, p. 344).

Smallman and St John (2005, p. 12) present some approaches to overcoming these issues: simplify and caricature reality, supplement perception, and describing

assumptions and errors in the visualisation. This means that the perception is better understood and legitimate.

The questions around application, accuracy and subjectivity points to the lack of understanding within the planning sector. Planners must interact, enabling them 'to move beyond the role of subjects to become active investigators in the development of alternative environmental futures' (Lewis et al., 2012, p. 96). Rabie (1991, p. 70) believes that the computer could be considered 'a bridge between the perceptual experiences and expectations of different groups participating in the elaboration of an urban project and therefore, planners must embrace technology'. There is, therefore, an important balance to achieve between selecting essential (environmental) information whilst not oversimplifying but also not confusing or clouding essential information within unessential elements. This is the context that planners need to work within (Pietsch, 2000, p. 524). Forester (1982, p. 71) presents criteria to help reduce potential manipulation. This involves the information and communication in the process being: '(1) clear and comprehensible, (2) sincere and trustworthy, (3) appropriate and legitimate, and (4) accurate and true'. An educated planner, then, 'expects, anticipates, and works to counteract misinformation hampering publicly accessible, informed and participatory planning' (Forester, 1982, p. 76). However, in New Zealand, this seems to not happen. There have been the two articles discussed above (Coggan and Carrie) in the Planning Quarterly, with one critiquing the other. Moreover, whilst studying my masters at Lincoln as a planning student I have received no training in how visualisations are used and how to critique them.

In sum, visualisation is an 'aid in documenting, exploring, and analysing our multidimensional world' (Lagendorf, 1992, p. 737), to create alternatives and facilitate interaction by contributing to conflict resolution and decision-making (Lagendorf, 1992, p. 737). However, a lack of understanding by planners may hinder the effectiveness of visualisation to help decision-making (Lewis, 2012, p. 552). Furthermore, Lewis et al (2012, p. 101) stress that 'commensurate attention' should also be given to how users interact with visualisations, which begs the question who are the intended users and are they aware of the process involved in the creation of visualisations.

2.4 The Gaps in Knowledge about Visualisation

Researchers seem to be in consensus regarding one thing; the need for more research. Lewis et al. (2012) asks for 'additional research to explore and develop a fuller appreciation of visualisation effectiveness' (p. 101) as there is a lack of professionally recognised standards for visualisations (Lewis, 2012, p. 552). Specifically, the criticisms and limitations of visualisation stated previously require future research. Rabie (1991), for example, has called for an extension of simulations 'with an expert system based on the resolution of building code regulations' (p. 67). Lange (2001, p. 163) says there has been limited research into the validation of visualisations in terms of realism. Lewis (2012, p. 553) states that some researchers are shifting in recognition that there needs to be a balance of information. There is also unconvincing evidence of whether visualisations perception is valid and further research is needed (Lewis, Casello, & Groulx, 2012, p. 97). Furthermore, there is limited research about the effect on visualisation's users and whether they 'provide accurate and defensible representations that inform' rather than confuse or mislead users (Lewis, Casello, & Groulx, 2012, p. 90). There has been positive uses of visualisation within the decision-making process but 'too many questions remain unanswered for it to become a routine part of the planning process' (Pietsch, 2000, p. 534). There is little evidence in seeing how visualisations are used within the planning process (Lewis, 2012, p. 551) or in other words the continued 'incoherence and lack of cohesion which have characterised much recent urban development' (Rabie, 1991, p. 57) requires more research.

Pietsch (2000) states there is 'an unclear vision' for the best use of visualisations (p. 534). This requires more research and understanding around the production of visualisations and how they are 'perceived in planning practice' (Lewis, Casello, & Groulx, 2012, p. 90). This is observed in the relationship of modern buildings with its neighbours. Rabie describes this as an 'impoverishment of urban dialogue', that is each building is never considered in its context leading to disparity. (Rabie, 1991, p. 59). Lewis et al (2012) express concern about the focus of current research; 'the bulk of published research appears to be driven by a technical thrust or focus on technological adaptations' rather than 'users' needs (i.e. planners and the public) and the determinants of effective and ethical visualization use' (p. 86). Appleton and Lovett (2003, p. 118) state that there has been little research into the effect of increasing

realism on viewer's interpretation, 'realistic images may imply defensibility and accuracy ... but potential limitations can actually be camouflaged' by designers assumptions. Smallman and St John (2005, p. 6) ask how visualisations should be compiled more effectively and intuitively. In other words, 'there have been few investigations of its use in the assessment procedure of local authorities' (Pietsch, 2000, p. 522).

2.5 The Challenge of Visualisation

Sheppard (2001, p. 188) posits that two designers working with the same software and data would present two different visualisations. Visualisation, in order to be effective, needs to overcome the issues surrounding it. This is the challenge of visualisation, to balance the pressures created by technology. Pietsch (2000) states it as visualisation needs to be 'flexible, simple, quickly rendered, and to a degree of detail accepted by the participants in the planning process' (p. 535). Lewis et al (2012) suggest that these issues are not the end of visualisations use; that by making the objectives and transparency explicit the users can be 'fully aware of both visualization's benefits and shortcomings' (p. 91) for a more informed decision. Sheppard (2001, p. 183) proposes the development of a code of ethics to govern visualisation designers who 'conjure up and interpret imagery' as a way forward. Levy (1995) stresses that if visualisations are to become part of the planning process then there needs to be a consideration to how the users and public interact with the visualisations.

There needs to be a realisation that more information and detail does not equate to greater understanding (Pietsch, 2000, p. 524). Further, the technical aspects of visualisation must be 'considered within the broader social, economic, aesthetic and cultural perceptions' (Carrie, 2007, p. 29). In other words for effective visualisation there needs to be active collaboration, with the 'users technical, financial, and administrative capacities in mind' (Lewis, Casello, & Groulx, 2012, p. 101).

Can the traditional approach by established architects be modified easily (Sheppard, 2001, p. 192)? Lewis et al (2012, p. 101) argue that effective visualisation is 'as much about policies, procedures, and professional standards as it is about computational ability'. Visualisation needs to be understood as a tool for communication that involves

people who understand that values and their own subjective interpretations are part of the visualisation design process. The focus should not be on presenting 'visual outputs with levels of detail and realism that are unsuited to the objectives or stage of the project' (Lewis, Casello, & Groulx, 2012, p. 101), but rather embrace the idea of visualisation being a simplified representation of future reality. These images can become a stylistic interpretation that inadvertently can embody architects interests; it is therefore unsuitable to chase higher levels of detail and realism (Lewis, 2012, p. 552). Visualisation has the ability to be misused and overawe planners and the public but the extent to which this happens is unknown (Lewis, 2012, p. 554).

2.6 Summary of Issues

The following is a summary of issues that the literature research highlight:

- There is concern about how visualisation has been developed and how it is used.
- There is debate as to whether visualisations will lead to better outcomes, decisions and collaborations.
- Visualisations present a 'common language' of interpretation but is this really the case?
- The literature suggests it improves communication with the public but is that the intended audience?
- Visualisations are not as straightforward or objective as initially considered.
- There is potential for manipulation and use of symbolic imagery
- There is unease regarding how influential visualisations are within the planning profession.

In the following chapter, a methodology is developed to address the issues identified above. The methodology outlines the research question, and the approach and rationale of the research.

Chapter 3

Methodology

The purpose of this research is to understand how architects produce visualisations and the differences between how planners interpret them. This chapter explains the structure, approach and limitations of the research, concluding with an exploration of a framework to organise and compare questions and results.

Following the theoretical background, which provides an overview of the current understanding of this topic, the research will follow a case study approach. Yin (2003, p. 2) identifies that this method 'allows investigators to retain the holistic and meaningful characteristics of real-life events'; this is important as visualisations are depicting real-life structures. Furthermore, this approach is suitable for my research as it allows the exploration of examples that will work in parallel with my literature review. This is the strength of case studies, to deal with 'a full variety of evidence' (Yin, 2003, p. 8).

This research focused geographically around Christchurch. This is because of its proximity to my study, making it easier to undertake qualitative interviews. Furthermore, Christchurch is facing unprecedented change and re-building following the Canterbury Earthquakes. This has led to more visualisations because of the new development happening and furthermore, a legislative change in the normal speed of consenting (CERA, n.d.). These factors combined make Christchurch an ideal case study for understanding the effect of visualisation within the planning process.

The interview process focused on several examples of visualisations and explored how the creator assembled it, especially with regards to visual composition, and then compared it to how it is perceived by council planners. Furthermore, a framework was established in order to understand and critique visualisations. Interviews took place face-to-face and asked for their respective professional responses. Professional responses and the use of pseudonyms in collating responses meant there were no ethics issues. I spoke to seven people from the architect industry and contacted six planners, as outlined in Table 2, for their interpretations of different visualisations developed by the interviewed architects over a period of seven weeks. Respondents were given a range of questions before the interview in order to begin thinking about responses.

Most interviewee's were happy and intrigued by the topic, willing to engage and the intricacies and tensions of visualisation interpretation. However, a few were less willing to engage, sticking to the prepared questions or stating their position rather than discussing it. Interviews generally took an hour with some thirty minutes while others an hour and twenty minutes. Interviews were recorded, then transcribed and sent to each interviewee for approval. They took place at their workplace or a cafe nearby and were either around 10am or 3pm. Speaking out of their workplace helped the interview seem more of a discussion and made it easier to talk about the questions. It could have also been beneficial speaking away from superiors or co-workers. The time chosen was a less stressful part of the day to allow for more discussion.

Architects		Planners	
Landscape Architects	One	Council – Resource Consent	Three
Commercial Architects	Three	Council – Policy	Two
Residential Architects	Three	Private Sector	One

Table 2: What part of the industry the Architects and Planners were from

Architects were interviewed first as it allowed the development of questions for planners and to obtain visualisation examples to help the dialogue. People from the council were those involved in making consent decisions. The architects are people designing these images and were chosen on the basis that they could explain how they are put together. The process of choosing interviewee's was through snowball sampling. This is a process by which one contact refers another, and so on (Vogt, 2005, p. 300). This was helpful as it allowed the identification of specialists in visualisations to be found. Furthermore, 'snowball sampling is used most frequently to conduct qualitative research, primarily through interviews' (Atkinson & Flint, 2001, Snowball Sampling Section). It also involved a mix of convenience (the most accessible) and judgement (most productive) sampling. This is the least costly in terms of 'time, effort and money' (Marshall, 1996, p. 523). This method was selected, rather than questionnaires or phone

interviews because of the need to discuss and work around physical images, which is easier face-to-face. This is supported by the case study approach as it allows 'significant opportunities for extensive analysis, enhancing the insights into a single case' (Yin, 2003, p. 46). These allow the exploration of the ideas and explore and interpret the inferences of what is being asked (Yin, 2003, p. 61). This sample size was also appropriate as responses became repetitive or focused on a common theme, demonstrating an adequately answered question (Marshall, 1996, p. 523).

The following summarises the research steps undertaken.

1. Research began by exploring the theoretical background to the problem and understanding what other researchers had concluded.
2. Questions or gaps in knowledge identified, particularly to the Christchurch setting.
3. Potential interviewees were contacted by email to arrange a face-to-face interview.
4. Interviews were conducted over seven weeks with architects, and then planners.
5. Data was collated and summarised.
6. Data analysed.
7. Conclusions and points of discussion extrapolated.

This research is a limited glimpse of the use and effect of visualisations within Christchurch because it does not incorporate all architects or planners, rather a select few. Although research is limited to Christchurch, it can be used to infer a more national problem, which could be confirmed through future research. A comparison to non-disaster related visualisation and design is not necessary at this level of study but could be an area of future research.

3.1 Research Aims and Objectives

The level of building work in Christchurch following the earthquakes has increased the amount of graphic renderings of proposed buildings touted. This increase raises concerns about the level of control the council have over what is visualised. In this research the council represents the public interest in the decision-making process. The

aim of this dissertation is to understand how visualisation technology is used within the planning process and how the public interest is protected.

This research aim addresses the following issues:

1. Exploring how the current New Zealand planning process, the Resource Management Act's, directs the use of visualisations, especially the use of resource consents.
2. Evaluate current practices, if any, used to manage the issue of visualisations.
3. Identify key strengths and weaknesses in current planning practice's use of visualisations

3.2 Background

To explore how visualisation are directed within the planning process, an overview of the Resource Consent process for Christchurch was researched and, as outlined in the Resource Management Act (1991) (RMA) is summarised in Figure 3 as:

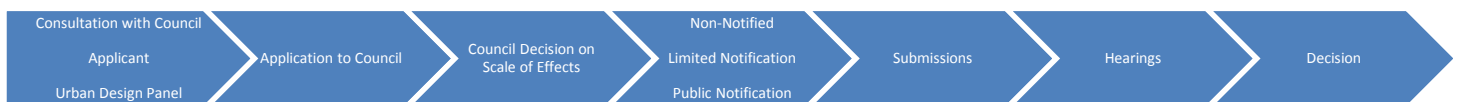


Figure 3: Simplified RMA Resource Consent Process for Christchurch (Ministry for the Environment, n.d.)

The Urban Design Panel, in Christchurch, provides expert advice and recommendations on the design of the project to help improve how the project fits within its context. This panel is made up of architects, landscape architects, urban designers, planners and property professionals. Applications are then submitted and the council decides whether to notify the application depending on the scale of effects. This decision is where the impact of visualisation is most critical, as the visualisation can emphasise or diminish the effect on its surrounding environment. This dissertation explores the use

of visualisations within applications and how these may impact the council's decision on whether or not to notify (step 3).

The decision to notify is outlined through 95 to 95G in the RMA. Section 95A determines how the council shall decide how to notify, namely, if the adverse effects on the environment are more than minor. Quality Planning (Quality Planning, n.d.) outlines some aspects to consider for assessing whether effects are more than minor:

- the cumulative nature of any effect over time, or in combination with other effects
- the probability of occurrence
- temporary effects, including adverse effects associated with construction work
- the scale and consequences (or potential) of the effect
- the duration of the effect
- the permitted baseline
- the frequency or timing of any effect
- whether the effect relates to a S6 (Matters of National Importance) or S7 (Other Matters).
- the area affected
- the sensitivity of surrounding uses to that effect
- reverse sensitivity issues
- whether the effect is to be mitigated or avoided by a condition contained in the application or offered by the applicant in the application, which the applicant has agreed to.

3.3 Framework for Assessing Visualisation

A framework for assessing visualisations was developed based on Forester's (1982) work. Forester (1982) stated criteria that would help reduce manipulation. These criteria were categorised into Comprehensible; Trustworthy; Legitimate and Accurate. This will help critique and shape research questions and comparisons. Other researchers have discussed criteria also with their ideas largely refining Forester's.

3.3.1 Comprehensible

Lewis et al (2012, p. 94) describes 'comprehensible' as being that the image contains enough information 'to render a clear and reliable judgement of the project depicted'. Sheppard (2001) sees this as all details being clearly communicated. This also needs to be in balance with maintaining user's attention. Averbukh suggests that visualisation is built upon comparison and 'adequacy in visualisation should be the main parameter of evaluation' (Averbukh, 2001, p. 235). However, Smallman and St John (2005, p. 6) state that designers believe that the more realistic a visualisation is, the less interpretation is needed.

3.3.2 Trustworthy

Forester (1982) spoke of visualisations being sincere and trustworthy. Lewis et al (2012, p. 94) refer to it as 'credible and defensible'. In other words, the presenter of the visualisation 'must be able to demonstrate how it was produced' (Lewis et al, 2012, p. 94). This requires some sort of disclosure with each image but how effective would this be? How to approach this is less clear and gets to the crux of the visualisation issue. Is it important that people understand all the variables involved or that some assumptions have been made? Can we really expect the producers to outline their own flaws and assumptions when this could harm the effectiveness?

Trustworthiness does not require less uncertainty but rather disclosed uncertainty. This means multiple, yet differing visualisations composed using the same data, could still be trusted (Lewis et al., 2012, p. 100). The difference between disclosed and undisclosed uncertainty is exemplified in the tension caused when using photographs for validation of visualisations. Rather than conflicts 'between the visually rich photographs and the highly abstract, but visually impoverished, computer model' leading to confusion, disclosed uncertainty can provide a level of trustworthiness (Pietsch, 2000, p. 526).

3.3.3 Legitimate

'Appropriateness and Legitimacy' refers to the rationale behind the visualisation. This is done through the disclosing of information; the 'written and verbal means' documenting 'methods, rationales, assumptions' (Lewis et al., 2012, p. 100). Legitimacy also refers to consultation with end-users 'to identify their current practices, technical capacity and limitations and needs and visions for visualization technology' (Lewis et al., 2012, p. 100). Sheppard (2001) expects visualisations to be defensible through making assumptions transparent. This is so visualisation reflects current interpretation and practices for consistency. Lewis et al (2012, p. 101) suggests that a level of 'scepticism is warranted and should be encouraged on the part of visualization interpreters when it is unclear how their values, ideas, and design preferences' have been calculated but not disclosed. An easy improvement could be to present do-nothing cases that presently are rarely done (Lewis et al., 2012, p. 95).

3.3.4 Accurate

'Accuracy' is trickier to define and strikes at the purpose of visualisation. Is visualisation accuracy to get as 'close to the real view as possible' (Lewis et al., 2012, p. 94) or is to balance 'the interrelation of abstraction, accuracy and realism' (Pietsch, 2000, p. 525). Sheppard (2001) defines 'accuracy' as simulating the actual or expected appearance as closely as possible. Furthermore the issue relates to how much information is presented to the public, too much and it may begin to have a detrimental effect on interpretation. Pietsch (2000) debates how far this should go, for example should the street tree be the correct variety for its location (Pietsch, 2000, p. 532)? Pietsch (2000) continues by relaying an example pertinent to accuracy; 'if a proposal is modelled without street trees, is it inaccurate or are the trees simply irrelevant to other issues under evaluation' (Pietsch, 2000, pp. 532-533). However, context, Smallman and St. John (2005, p. 10) suggest, is generally left to be assumed rather than depicted.

In summary, comprehensibility, trustworthiness, legitimacy, and accuracy have generally been acknowledged as important and these concepts will be drawn on to develop an evaluative framework and assorted questions that can be used in interviews

with those who develop visualisations and those who may be provided with these during decision-making.

Table 3 shows how the questions were developed from the issues found and summarised from the literature.

Issues	Architects Questions	Planners Questions
There is concern about how has visualisation been developed and how it is used.	How do you approach Resource Consent visualisations? How has visualisation changed over time?	Do you have a checklist for legitimacy?
There is debate as to whether visualisations will lead to better outcomes, decisions and collaborations.	Do you think planners can be influenced by design?	Do these visualisations help picture the application?
Visualisations present a 'common language' of interpretation but is this really the case?	Do planners understand the process of rendering visualisations? Do you consider planning elements?	Do you see visualisations playing a part in helping the public understand development? Do you think architects understand planning rules? What aspects are important for you, the planner? What aspects of the visualisation are important to architects?
The literature suggests it improves communication with the public but is that the intended audience?	Who is the intended audience?	Who is the intended audience?
Visualisations are not as straightforward or objective as initially considered.	How about the context of the visualisation? Should a visualisation be artistic or realistic? Is there benefit to accurate visualisations?	Is context important in decision-making? Are you aware of how visualisations are composed and how architects consider angle, light, colour, contrast etc.? Do you consider visualisations artistic or realistic? Do you think visualisations are as most flattering or worst case scenarios? Do you think visualisations represent the final build? Is there a process of evaluation post-build?
There is potential for manipulation and use of symbolic imagery	How would you represent the day? How is the angle chosen? How would you represent transport? How would you treat the landscape?	To what extent can visualisations mislead the public? Do you disregard artistic aspects?
There is unease regarding how influential visualisations are within the planning profession.	Is there potential for misinterpretation from the public?	Can the council control images used in the public? Do any of them affect your perception of the project? Do you have discretion in infringement violations or are you bound by the rules?

Table 3: Questions arising from Literature issues

Following are two tables showing how each question for the architects (Table 4) and the planners (Table 5) addresses Foresters framework.

Architect's Questions relating to Forester's Framework														
	Audience		Composition						Planning			General		
	Intended Audience	Resource Consent Visualisations	Day	Angle	Transport	Landscape	Context	Artistic / Realistic	Do Planners understand	Consider Planning Elements	Influence Planners	Misinterpretation from Public	Benefit to accuracy	Evolution of Visualisation
Comprehensive			✓	✓	✓	✓	✓		✓		✓	✓	✓	
Trustworthy			✓	✓	✓	✓	✓			✓		✓		✓
Legitimate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Accurate							✓	✓	✓	✓	✓	✓	✓	

Table 4: Summary of Architect's questions relating to Forester's Framework

Planner's Questions relating to Forester's Framework																	
	Audience	General			Composition					Planning		Control			Public		
	Intended Audience	Images Used	Assist	Affect	Realistic or Artistic	Architect Aspects	Planner Aspects	Is Context Important	Best or Worst Case	Architects Understand Rules	Planners aware of Aspects	Represent Final	Rule Bound	Checklist	Image help Public	Aid or Hinder	Council Control Images
Comprehensive								✓		✓	✓	✓					
Trustworthy						✓	✓	✓		✓	✓		✓	✓	✓	✓	✓
Legitimate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
Accurate		✓	✓	✓	✓	✓	✓	✓		✓		✓		✓		✓	

Table 5: Summary of Planner's questions relating to Foresters Framework

Chapter 4

Results

Below is a summary of the results following the interview process. All names have been changed to keep the interviewee's anonymous. Interview responses were printed, manually separated, and then collated by themes identified as Audience, Composition, Planning and General.

4.1 Architect's Responses

The following is a summary of the interviews with various architects. The architects ranged from small residential focused to large corporate buildings as well as landscape architects. The responses are categorised by the sub-headings: audience, composition, planning, and general.

4.1.1 Audience

Who is the intended audience?

Generally, visualisations are developed for the client. The client sometimes uses them internally or for marketing, while some are added to resource consent applications. Kelly suggested that architects may have designed them for clients but they end up used in the public, which may be misleading.

How do you approach Resource Consent visualisations?

Architects seem to down play visualisations for resource consent. Mostly, architects report they modify the image to remove superfluous information to produce a more stale design. This is because as Taylor suggested there is a fear that 'planners can't see it objectively anymore.' Chris would also not bother about people or cars and focus on 'height, space, shading, landscaping and vegetation.' Taylor said 'we just give them the facts and we expect the planner to understand the plan.' Kelly would just use the same

visualisation to save time and money. Sam would do enough to get resource consent; the visualisations are presented in the best possible light to market the project to the planner.

Generally it depends on the consent non-compliances, for example, Jo said that ‘if it is part of the conditions, then colour may be important to model.’ Alex agrees stating ‘what you produce is dependent on what the issue is...we put enough detail in to get it approved.’

Alex pointed out an interesting tension; planners want as much detail as they can; however the detail is determined by the resource consent conditions. Alex continues by saying this helps maintain the future scope of design.

The following table (Table 6) summarises particular key answers from specific architects. Each question was asked to all interviewees.

Audience		
	<i>Who is the intended audience?</i>	<i>How do you approach Resource Consent visualisations?</i>
Architect 1 – Alex	Generally, the client.	Give as little information to allow for building modifications
Architect 2 – Jessie	Generally, the client.	Generally, Downplay
Architect 3 – Jo	Generally, the client.	Generally, Downplay
Architect 4 – Taylor	Generally, the client.	Downplay Resource Consent images to allow objectivity
Architect 5 – Kelly	Client but Public sometimes outside the control of the architect	Generally, Downplay
Architect 6 – Chris	Generally, the client.	Remove additional information in image for Resource Consent
Architect 7 - Sam	Generally, the client.	Enough to get Resource Consent

Table 6: Summary of Architect Results - Audience

4.1.2 Composition

How would you represent the day?

Respondents generally considered a sunny day as appropriate with the sun displayed correctly. Also, seasonal variations were not important unless requested. Kelly said 'we are not trying to overdramatise any of it', while another said it is about getting the clearest day to have the least impact. However, Jessie said that it is 'all selected as to be the most flattering to the project and what best reveals the design intent'. Another interesting response from Chris was about adding 'emotion in the clouds' that dramatises the image.

How is the angle chosen?

Respondents all said that the angle is from eye level and from a street view. Some also stated that adding in landmarks or street views helped provide context. Most agreed that an image looking down on the building is meaningless as it is not a viewing angle. Sometimes, though eye height can be a challenge 'to fit on a sheet and not skew the perspective'. Taylor said that it is important to trust the client's understanding of the job; 'I often send images trying to capture a whole side but end up giving too much information and in reality they will not see it from there.'

How would you represent transport?

The use of transport seemed to rely on each person's preference. Taylor said 'it is just a difference between architects; it could be subconscious but are not designed to manipulate'. Sam said 'you need to be appropriate for the street'. Chris uses cars for scale and providing context; 'the things around it are factual and it is important to show how it will interact'. Jo says transport helps it look more real, keeping 'the building in context'.

However, Kelly said that transport is too time intensive and the client and planners know what is happening already. Alex says it is about the building not the cars and that putting in cars means 'the building gets lost in the background'.

Additionally, Sam spoke of finding it hard to get stock images of old cars while Chris uses middle of the road cars to lessen the detracting.

How would you treat the landscape?

The use of trees and landscaping in visualisations varies across answers. Some use whatever trees they like whilst others look at existing trees or try to match what landscaping will happen. Taylor uses a 'New Zealand native tree catalogue' but it probably never reflects the final landscape. Sam uses trees but makes them 'see through because generally trees here are deciduous'.

However, Kelly tries to use existing trees to 'allow for better transition' between the building and the context. Jo considers the shape, form and growth of the tree and tries to match that - 'landscaping needs to be simulated to specification, as exact as possible'.

How about the context of the visualisation?

The use of context in visualisations also varied across respondents. Kelly says 'it is not a conscious choice [to not show the context], we are just emphasising our building'. However, as already stated in the transport question, context can be important; Sam says 'the most important aspect is appropriateness and how it fits within the neighbourhood.' Jessie stated that it provides overview and 'a sense of real world impact.' Alex and Chris both said that they would work within existing or proposed street design and with neighbours landscaping. Chris would show the building 'as it would look on a daily basis', and the models used would represent the people using it'. Alex spoke of one time 'designers, as a joke, used Barack Obama as a receptionist in a presentation and it side-tracked the whole presentation'.

Should a visualisation be artistic or realistic?

Generally the architects interviewed spoke of being as accurate as possible. However, Chris said that they would stay on the artistic side of things because if 'you give someone an image that looks realistic, it makes the project seem set in stone, whereas an artistic image allows potential.' Sam said it is about 'communicating some of the

benefits, because you want to help your client convince whomever they need to'. Jo said that architects are trying to sell the design intent and are therefore more artistic. Alex keeps them artistic as they do not 'want to get involved in too much detail in a project that might not go ahead; we try to do the least amount of design as we can to get the consent'.

Following is a table (Table 7) that summarises some of the key thoughts from each architect in connection to the questions relating to composition. Each question was asked to all interviewees.

Composition						
	<i>How would you represent the day?</i>	<i>How is the angle chosen?</i>	<i>How would you represent transport?</i>	<i>How would you treat the landscape?</i>	<i>How about the context of the visualisation?</i>	<i>Should a visualisation be artistic or realistic?</i>
Architect 1 – Alex	Generally, a sunny day	Generally, eye level	Detracts from building	Generally, differs between project	Will find proposed context to incorporate when possible	Artistic allows the project to still develop
Architect 2 – Jessie	Most flattering to building	Generally, eye level	Generally, if appropriate	Generally, differs between project	Provides overview	Generally, as accurate as possible
Architect 3 – Jo	Generally, a sunny day	Generally, eye level	Makes it seem real	Trees, shape and size matched as close as can be	Generally, differs between project	Artistic as architects are trying to sell their design
Architect 4 – Taylor	Generally, a sunny day	Trust the client can understand	Not conscious manipulation	Native tree catalogue	Generally, differs between project	Artistic allows project to evolve
Architect 5 – Kelly	Wont overdramatise	Generally, eye level	Too time intensive and not needed	Existing trees create transition	Not conscious just focused on building	Generally, as accurate as possible
Architect 6 – Chris	Add emotion through cloud and colours	Generally, eye level	Can provide scale and context	Generally, differs between project	Work within an everyday context	Generally, as accurate as possible
Architect 7 - Sam	Generally, a sunny day	Generally, eye level	Appropriate for the street	See through to represent deciduous	Appropriateness for neighbourhood	Communicating benefits

Table 7: Summary of Architect Results - Composition

4.1.3 Visualisation Examples

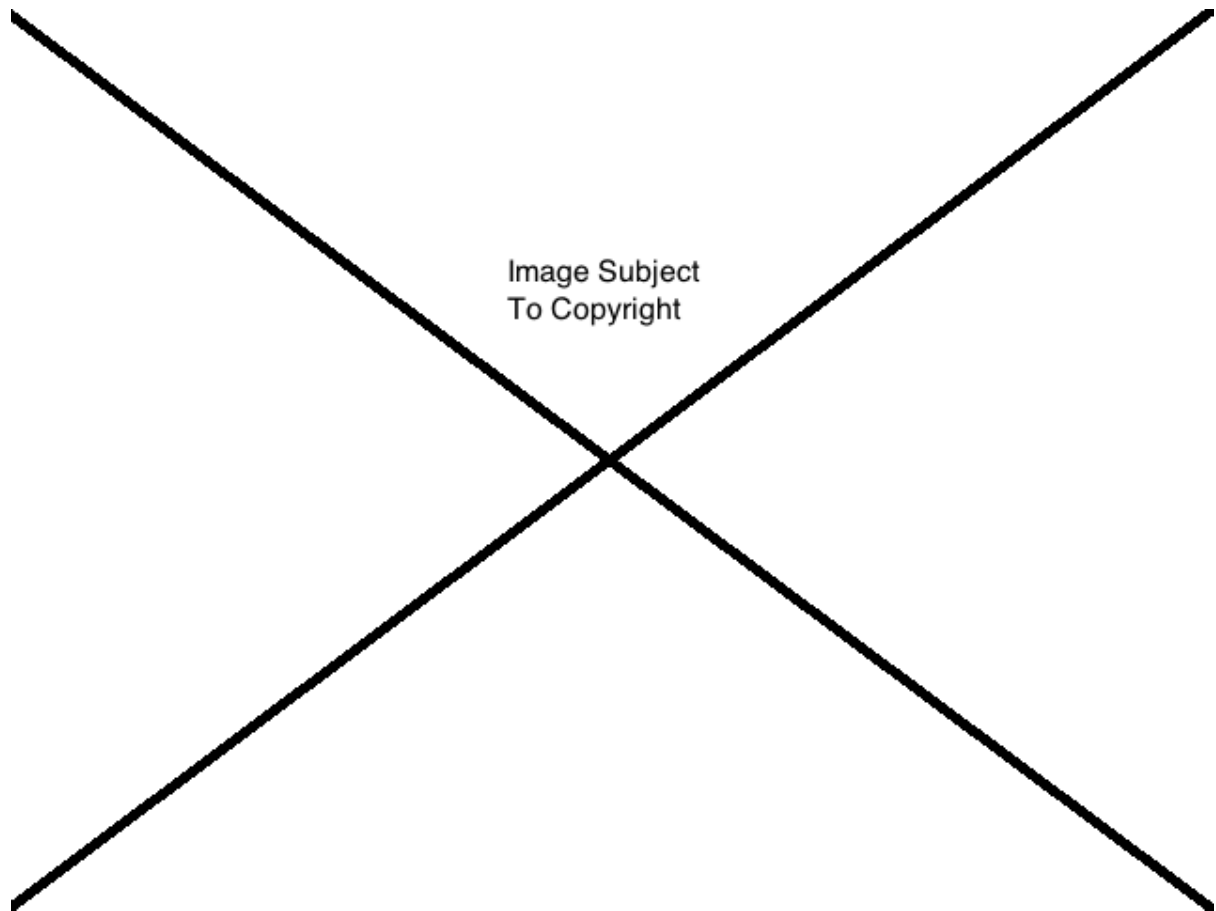


Figure 4: *Visualisation example from CCDU's Government Accommodation Project (CCDU, n.d.)*

In this example (Figure 4), three different visualisations are shown in the one image. The first visualisation shows very limited context, that is, no surrounding buildings, fake cars and one tree. This makes determining the legitimacy of the viewpoint tricky. However, the illustrative (and therefore less realistic) composition makes it easier to identify it as a drawing and not reflecting real life.

The second visualisation shows more detail yet fails to capture the actual streetscape.

The third visualisation shows more emotive aspects. The lighting and moving car presents a vibrant and enticing building. The use of more realistic aspects, such as the car, gives the impression of resembling the final outcome. However, it lacks the realistic qualities of the street.

4.1.4 Planning

Do planners understand the process of rendering visualisations?

Generally architects suggested that planners understand how images are created. Taylor agreed, arguing that understanding must be built from having 'to deal with them every day' and if they did not, they can request more information. Sam suggests that the use of visualisations helps the planner to clearly understand the design and supports informed decision-making; therefore it is in their best interest to understand the creation of visualisations.

However, Alex argued that it is not important, as 'they are more concerned with the dimensions and the precision, not how the building looks.' Jessie would represent the impact of a non-complying effect 'as favourably as possible' to help gain the planner's support. Alex suggests that 'planners do not fully appreciate the economic viability of a project and that frustrates developers and owners'.

Do you consider planning elements?

Generally architects consider planning elements at the start of the design process and work within them. Taylor said 'we try to minimise or mitigate the adverse effects as much as we can, as early as we can.'

Do you think planners can be influenced by good design?

The response from architects was that planners are not influenced by good design and that they stick to the rules. Taylor said 'I have never considered that they would look at a cool image and let it through on that basis alone.' Chris even suggested that planners do not even look at visualisations. Kelly said that 'planners have got the ability to look past the flashy stuff'. Taylor suggested that because of the rules, the planner is responsible to make a well-supported decision, which 'reduces the possibility of subjectivity.' Sam stated that architects could help by providing supporting evidence. Kelly said any good design may allow concessions, 'but they are more trade-offs with other aspects.' Architects, however, were also concerned that the rules become 'the be all and end all' and that the subjective qualities are lost. Alex agrees, that even though

rules are discretionary, if they set a precedent then planners are reluctant to take that option, so the influence is minimised.

Following is a table (Table 8) that summarises some of the key thoughts from each architect in connection to the questions relating to planning. Each question was asked to all interviewees.

Planning			
	<i>Do Planners understand the process of rendering visualisations?</i>	<i>Do you consider planning elements?</i>	<i>Do you think planners can be influenced by good design?</i>
Architect 1 – Alex	Not really concerned with the image	Generally, at the start	Planners are scared to set new precedence
Architect 2 – Jessie	Potentially no. Images made in best possible light	Generally, at the start	Generally, planners stick to the rules
Architect 3 – Jo	Generally, planners understand	Generally, at the start	Generally, planners stick to the rules
Architect 4 – Taylor	Need to deal with them daily	Minimise them as early as we can	Never thought of it that way
Architect 5 – Kelly	Generally, planners understand	Generally, at the start	Planners look past the flashy stuff
Architect 6 – Chris	Generally, planners understand	Generally, at the start	Not sure if they even look at images
Architect 7 - Sam	Helps them make decisions so it is in their interest to know	Generally, at the start	Generally, planners stick to the rules

Table 8: Summary of Architect Results - Planning

4.1.5 General

Is there potential for misinterpretation from the public?

One respondent, Kelly, spoke of a concern that once the visualisations are created, with the intention for the client's own understanding; the client could use them in marketing their building. This could allow for the public to be misled because the context is not shown and the public may not understand that they are marketing tools. Jo agreed, saying that both 'architects and planners are steering the client to show the worst-case scenario, not manipulating images for their benefit because someone at the council, or the hearing, or the public, will question it'. Alex however, responded that 'you are trying to show the building in the best possible light, we have had projects with small budgets so you are doing your best within this constraint. You do massage a bit with some artistic license'

Is there benefit to accurate visualisations?

Jo said that accurate images help frame the debate; that 'no one really knew what the outcome would be or understood the full consent, so our work helped both sides be able to come together'.

How have visualisations changed over time?

Visualisation use and complexity has increased over time, from crude hand-drawn images to 3D modelling; as well as the cost and time decreasing. The benefit for the architect as Kelly pointed out was that you would quickly know whether the building would work. Taylor agrees, saying this is 'the nice thing about working in 3D; you can generate these with a click of a button.' However, some architects are less up to date than others and the level of quality is influenced by the amount of time and cost involved in composing visualisations. Furthermore, as Chris pointed out 'people are expecting visualisations more now' and as Sam said 'people are beginning to see the value of images' and it is becoming more 'important to communicate your projects, mainly for commercial benefit'. Sam said that architects are 'trying to sell something worth a lot, sometimes millions, off a picture'.

Following is a table (Table 9) summarising some of the key answers from architects relating to questions categorised as general. Each question was asked to all interviewees.

General			
	<i>Is there potential for misinterpretation from the public?</i>	<i>Is there benefit to accurate visualisations?</i>	<i>How have visualisations changed over time?</i>
Architect 1 – Alex	Trying to show the best possible case to help projects approval with artistic license.	Generally, yes	General increase in complexity
Architect 2 – Jessie	Generally agree though not intentionally.	Generally, yes	General increase in complexity
Architect 3 – Jo	Little as if questioned then images need to be robust	Help frame the debate	General increase in complexity
Architect 4 – Taylor	Generally agree though not intentionally.	Generally, yes	General increase in complexity
Architect 5 – Kelly	Possibly as images could be used for unintended purposes, may confuse	Generally, yes	Quickly show what you are trying to do
Architect 6 – Chris	Generally agree though not intentionally.	Generally, yes	People expect them more
Architect 7 - Sam	Generally agree though not intentionally.	Generally, yes	Images have huge value for communication

Table 9: Summary of Architect Results – General

4.1.6 Summary of Architects' Results

Generally, architects understand that visualisations are aimed at clients and treat visualisations accompanying resource consent applications differently. Architects generally approached composition in a similar manner though they differed in their thoughts on showing context. Architects expressed confidence in Planners' ability to understand how images are created and used and are not influenced by good design. This table (Table 10) summarises the Architects responses.

Summary of Results - Architects			
Audience	Composition	Planning	General
<ul style="list-style-type: none"> • Visualisations are composed for the Client • Resource Consent visualisations have aspects removed to make images more objective 	<ul style="list-style-type: none"> • Sunny Day • Street view and from eye height • Architects did not agree on context • Transport down to architect's preference • Landscaping also a varied response • Context varied • Accurate but still with artistic elements 	<ul style="list-style-type: none"> • Considered that planners understand how images are created • Planning elements considered at beginning of project development • Planners are not influenced by good design 	<ul style="list-style-type: none"> • Potential manipulation of public perception through unintended use or artistic license but not by all • Realistic images help frame the debate • Visualisation use and complexity has increased over time, though not all are up to date

Table 10: *Summary of Architect Results*

4.2 Planner's Responses

The following is a summary of the planner's interviews. The planners were mainly from the resource consent area as this was the area of focus. The responses are categorised by the same sub-headings as the architects: audience, composition, planning, and general.

4.2.1 Audience

Who do you think is the intended audience of visualisations?

Planners generally presumed that the client is the intended audience rather than themselves. Robin thinks this is fair as visualisations are not essential for resource consents. Jules says visualisations are not only designed for the client but also made to look good for them and helps them understand the project. Billy states that visualisations seem like a front-page marketing tool. Jules stated that if visualisations may be intended for the planner but only when they have initially requested it. Lee said if an architect submitted a visualisation as part of an application then they would take into account the planner viewing it, and make sure that everything in their application is beneficial to them, as well as accurate.

The following table (Table 11) summarises some of the key responses from planners to whom they regard as the intended audience of visualisations. Each question was asked to all interviewees.

Audience	
	<i>Who do you think is the intended audience of visualisations?</i>
Planner 1 – Billy	They are like front-page marketing material
Planner 2 – Francis	Generally, for the client
Planner 3 – Kim	Generally, for the client
Planner 4 – Lee	The planner must be considered if they are submitting as part of an application
Planner 5 – Jules	Designed for the client to impress them and help them understand the project
Planner 6 – Robin	Visualisations are not essential for Resource Consent, so why design them for it?

Table 11: Summary of Planners Results - Audience

4.2.2 Composition

Do you consider these visualisations as realistic or as artistic impressions?

Planners considered visualisations to have artistic elements to them, however maintaining some level of accuracy, and images used currently need to be considered 'with a grain of salt'. Lee said they would not show the building down the track when the landscaping is not maintained. Jules argues that lighting and reflectivity are all aspects that need to be set up in the design and therefore are artistic. When you see them in real life, they tend to look dull and flat compared to the visualisation.

Planners differed on the level of accuracy seen. Robin stated that accuracy is important but at such an early stage of the process you need to accept the fact that they may change. Jules states that it is unreasonable to expect photo-realism because of time and cost. Kim says it is obvious when visualisations are marketing material rather than accurate visualisations. Francis points out that some visualisations may show elements that are not in their sphere of influence, so visualisations need to be taken with a grain of salt. Somewhere on the visualisation, it should say 'artist impression only'.

So if something is not in the plan but in the image, you would consider those the architects 'artistic' impression and disregard them?

Generally planners, if encountering something on the plan that is not on the visualisation, and vice versa, would request clarification. Kim said that sometimes the visualisations would not be updated because of cost so those discrepancies can be identified and disregarded. Lee said this is important, for example something was in the image that was not on the plan but was part of the project. It was not a case of intentional deception as the focus was on the building not the surrounding area and so was overlooked by the architect.

What aspects of the visualisation are important for the architect?

Most planners were unsure on what aspects were important to the architect. Robin suggested aspects that impress their client were probably design and

practicality. Billy presumed that the aspects that planners and architects were interested were similar.

What aspects are important for you, the planner?

Most planners consider the context – how it fits with the environment and the street – the most important aspects of a visualisation. Aspects such as materials are only considered if there is a specific urban design requirement. Furthermore landscaping is important. Lee mentioned that circulation of traffic and pedestrians are also a consideration. Jules said this means that visualisations need to be shot from ‘boring’ angles, ie. how people would interact with it.

Is context important in decision-making?

The buildings context or surrounding environment is important and is an aspect that plans and elevations lack. Billy suggests that good visualisations would show the actual setting. Lee says sometimes key issues are how the building and landscaping work within their context. This is a difference between architects and planners; architects want to show the project from its most impacting view whereas planners need to see how people interact with it.

The context is more important than how the building looks. Jules says there would be few buildings seen in isolation. Kim says visualisations shown with context are handy as they help to see how the project fits together and a sense of scale.

Do you think visualisations should show the building in its most flattering light or as a worst-case scenario?

Planners commonly would prefer both. Though Billy presumed that the architect would not be keen on a worst case visualisation. Robin was hesitant at suggesting a worst-case as it may become focused on and exploited throughout the process. However, an image that was as realistic as possible would be best.

Do you think architects understand planning rules?

Planners considered that some architects understood the rules and that this increased with experience. Jules thinks that related to the education of architects; that they do not experience working on projects within the confines of the planning rules. Billy said that it is their job to be at least, aware of them and it helps when meeting together. Robin hoped that they would ask if they were unsure about them. Kim and Jules think they understand the rules but potentially not the reason behind them. Lee suggests that while architects may understand the rules, they may be directed and compromised by the client to push and maximise their return. Billy summarised it as 'they find it frustrating to work within the rules while we are trying to convey why we need certain things and what it is for'.

Are you aware of how visualisations are composed and how architects consider angle, light, colour, contrast etc.?

Billy admits that they do not understand visualisation composition as much as they should. Robin says they are vaguely aware but would not hesitate from asking for clarification. Lee is unaware of all the tricks but is aware that there are tricks used so are always cautious in interpretation. Jules says it comes down to planner's interests; they are competent but realise it is not a normal skill to have. Kim is also aware of the use of sun, reflection and inserting of stock images, but looks past it to the structure. Francis finds the use of stock images bothering, 'it is always the nice fancy cars'. The treatment of transportation does provide a sense of scale. Billy said not knowing the angle makes the visualisation unhelpful. Kim said that even if the visualisation is over the top, some material is better than no material – it helps get a feel for the project.

Planners are not concerned though as this is not part of their role. Kim says throughout the process, visualisations will be seen by the right people and is only a small part of the process. Furthermore, Jules states that there are levels of scrutiny so any misinterpretation will be identified.

Table 12 shows some specific comments from planners in regard to composition related questions. Each question was asked to all interviewees.

Composition								
	<i>Realistic v Artistic?</i>	<i>Plans or Visualisation important?</i>	<i>Aspects important to Architect?</i>	<i>Aspects important to Planner?</i>	<i>How important is the Context?</i>	<i>Best or Worst Case Scenario's?</i>	<i>Do architects understand planning rules?</i>	<i>Do Planners understand visualisation elements?</i>
Planner 1 – Billy	Generally have artistic elements	Generally both	Planners and Architects similar	Generally, the context	Show the Actual Setting	Architects would not want to do worse case	Said it is their job to understand	Do not fully understand composition as much as they should
Planner 2 – Francis	Show some elements that are in their sphere of influence	Generally both	Generally unsure	Generally, the context	Generally, very important	Generally, both	Generally, they understand	Always interesting that images are always flash
Planner 3 – Kim	Obvious when images are marketing rather than accurate	Images may not be updated because of cost	Generally unsure	Generally, the context	Help see the project in context and scale	Generally, both	Understand the rules but not the reason	Looks past elements to structure
Planner 4 – Lee	Will not show the building dilapidated	Both are important	Generally unsure	Traffic Circulation	How building and landscape work within context	Generally, both	May have to compromise for client	Unaware of all tricks but aware that there are
Planner 5 – Jules	Elements subjective	Generally both	Generally unsure	How people would interact with it	Angle helps Few projects are in isolation	Generally, both	Depends on education	Down to planners interests
Planner 6 - Robin	Accuracy important but at early stages expect changes	Generally both	Anything that impresses clients	Generally, the context	Generally, very important	Worse case may become focus and exploited	Hope would ask if they are unsure	Vaguely aware

Table 12: Summary of Planners Results - Composition

4.2.3 Planning

Are there many images used in resource consent?

Planners recognise that it is becoming more common that visualisations accompany resource consent applications despite the fact they are not required. Furthermore, the likelihood of images used increases as the applications complexity increases. Kim says that because the city plan is prescriptive then applicants have a certain level of confidence in what is appropriate.

Jules says that architects are hesitant not to submit as they have spent so long on them and want them to be seen. Visualisations are increasingly helpful for understanding what you are looking at, though many downplay the context, which is annoying. It helps architects to debate ideas with planners and works as a communication tool.

Often though the quality and accuracy of the visualisations vary. This is because of cost or that the plans have changed but the image has not been updated. If the visualisation is confusing it may hinder the progress of application. Robin said if you request a visualisation then you need to make sure it is crucial to decision-making. These images may need to be used in hearing processes and so need to be of a higher defensible standard.

Do these visualisations help picture the application?

All planners agreed that visualisations help understand the application. Billy says certain aspects are not fully understood from plans. Kim says the visualisation allows seeing the effect on the context and promotes discussion, though a site visit is better. Francis said that visualisations become what you draw over, which allows the testing of different ideas.

Jules though doubts whether visualisations will help with non-compliance issues. Francis said that you could still make a decision without them. Kim said they would not rely on them and if necessary, do their own modelling to test things.

Do any of them affect your perception of the project?

Planners disagreed about whether visualisations affect perception. Billy and Robin think it can. Billy thinks potentially on a subconscious level. Robin thinks though the effect is minimal as it is only a small aspect of the application.

Jules and Lee do not think there is a substantial effect. The level of effort and quality may influence. Jules and Lee state that most non-compliance issues have assessment matters so this minimises the potential effect.

Do you think it represents the final build? Do you check?

Planners said that the visualisation does not necessarily reflect the final build as the resource consent process happens early in the process and things change along the way. Kim says that this is an important aspect as things inevitably change along the way.

Planners also said that the enforcement team will check but are looking at resource consent conditions not whether it looks like the visualisations. Potentially, this could be concerning as there is always a difference between real life and the visualisation; it is only at the end you can see how imposing the building will be.

Do you have discretion in infringement violations or are bound by the rules?

In terms of allowing projects with infringements because of architectural quality, Lee says architects try this all the time. This is a poor argument and assessment of effects. Their argument would need to be built on the permitted baseline idea, arguing what they are allowed to build is worse than what they are deciding to do. Billy says it comes down to the effect rather than design. The danger that you may set a precedent means that planners need to have sound reasons and evidence to defend their decision.

Do you have a checklist of things to look for in an image that gives you confidence in the legitimacy of the project?

Planners stated that there is no official checklist for helping understand visualisations. Jules said that even with plans and elevations planners rely on the applicant to be honest and accurate. Kim suggests planners remind themselves of the assessment

matters and scope of discretion available to help understand the project rather than compositional elements. Robin says that it is outside the professional scope of a planner, 'I trust the architect to provide technical and professional advice'.

Table 13 reflects some interesting individual responses relating to planning questions. Each question was asked to all interviewees.

Planning						
	<i>Images used in Resource Consent?</i>	<i>Do they help you picture the application?</i>	<i>Do they affect your perception?</i>	<i>Does it represent the final build and do you check?</i>	<i>Do you have discretion in decision-making?</i>	<i>Do you have a checklist to help legitimise images?</i>
Planner 1 – Billy	Generally, yes	Certain aspects are not fully understood from plan	Subconsciously	Does not necessarily	Always about effect not design	Generally, no
Planner 2 – Francis	Generally, yes	Can make a decision without them	Unsure	Does not necessarily	Generally, it is more of a prescribed process	Generally, no
Planner 3 – Kim	City Plan prescriptive	Allows effects to be seen and discussed	Unsure	Visualisation does not necessarily reflect as things change	Generally, it is more of a prescribed process	Assessment matters can help
Planner 4 – Lee	Generally, yes	Generally, yes	Not substantially	Does not necessarily	Architects try all the time to convince	Generally, no
Planner 5 – Jules	Architects like to have their work seen	Will not help non-compliance issues	No, but the effort shown may influence	Does not necessarily	Generally, it is more of a prescribed process	Rely on applicant to be honest and accurate
Planner 6 - Robin	Request only with good reason	Generally, yes	Probably but minimal	Does not necessarily	Generally, it is more of a prescribed process	Outside scope of planner and rely on technical help

Table 13: Summary of Planners Results - Planning

4.2.4 General

Do you see visualisations playing a part in helping the public understand development?

Planners consider that visualisations help the public understand proposed projects, as they are easier to understand than plans and elevations. However, visualisations do have the potential to confuse. Robin said it helps engage people in the process. However, there is concern when the public perceives they have technical knowledge but they do not, can misinterpret visualisations.

To what extent can visualisations mislead the public?

Jules thinks there is potential to mislead, as it is easy to believe what you see in a picture. They portray an idea and there is the potential that people will buy into that. Architects could argue that what is pictured could be true and that it just has not happened yet. Kim agrees and says that if you look at the particular objects and people within the visualisation that you can see it is a marketing tool and it is about selling a vision. Francis is concerned the extensive use by CERA in portraying and explaining their desired outcomes through sophisticated visualisations, could lead to problems in the future. Robin agrees and says for larger scale projects there are a lot of factors, some uncontrollable, which may lead to visualisations differing from the reality. Francis is concerned that the visualisations will not be able to articulate the changes to buildings and how people interact with them, which could lead to a disconnect between what people perceive and reality.

Kim said concern over the artistic nature of visualisations is limited, as the public understands that it is an artistic impression and not reality. Lee says that people are more interested in progress than the promise presented in a visualisation.

Can the council control images used in the public?

Currently the council has no ability to control the content of public signs, in terms of accuracy of visualisations and most planners were hesitant in

suggesting any type of control. Robin proposes that more information, such as constraints and effects, and larger disclaimers can help add clarity for the public. Jules said if it is showing unconsented development as fact, then there may be potential but is hesitant to control abstract artistic impressions.

The following table (Table 14) highlights some of the key responses to the questions categorised as general. Each question was asked to all interviewees.

General			
	<i>Do they help the public?</i>	<i>Can they mislead the public?</i>	<i>Can council control images?</i>
Planner 1 – Billy	Generally, yes	Generally, yes	Generally, hesitant to agree
Planner 2 – Francis	Generally, yes	Tricky to convey idea through visualisations	Generally, hesitant to agree
Planner 3 – Kim	Generally, yes	Marketing tool	Generally, hesitant to agree
Planner 4 – Lee	Generally, yes	People more interested in progress	Generally, hesitant to agree
Planner 5 – Jules	Generally, yes	Potential to mislead	Only if it is unconsented and shown as fact
Planner 6 - Robin	Helps engage people in the process	Generally, yes	More information – constraints and effects – and disclaimers needed

Table 14: Summary of Planners Results - General

4.2.5 Summary of Planners' Results

Planners understand that visualisations are not designed for them and images contain artistic elements, though less aware of exact compositional techniques. Planners see visualisations as assisting understanding general context and helping engage public. The following table (Table 15) summarises the key responses from planners.

Summary of Results – Planners			
Audience	Composition	Planning	General
<ul style="list-style-type: none"> Planners generally consider visualisations are designed for the Client – for them to understand and be impressed by the project 	<ul style="list-style-type: none"> Visualisation has artistic elements Accuracy is not important early on Should state ‘artist impression only’ Plan and visualisation differences followed up Unsure what architects consider important Context is important for planners Planners prefer any and all images that help Worst case may end up being focused on. Architects do not fully understand the rules Planners are less aware of compositional techniques 	<ul style="list-style-type: none"> Visualisations more common and increases as complexity increases Prescriptive plan allows level of confidence Understand what you are looking at Potentially affect perception but minimal through checks Does not represent final build as too early in process No check on final build but questionable if practical Architects try to get projects passed based on quality but does not work No checklist to legitimise visualisations 	<ul style="list-style-type: none"> Visualisations help the public understand and engage Could be confusing Pseudo-technical knowledge may complicate Could mislead as people believe what they see Portray a vision, an idea Large scale projects have uncontrollable factors More information about process and disclaimers

Table 15: Summary of Planners Result

Chapter 5

Discussion

The preceding results raise some interesting matters. These matters focus on the claim from the literature that visualisation improves interaction with the public, architects, and planners. Other matters were: the idea that planners should drive the visualisation process; whether visualisations are objective or subjective; human interpretation and manipulation; education and, if improving technology helps improve understanding.

One difference between the literature and the results was the suggestion in the literature that the visualisation process was planner driven. The benefit of visualisation presented in the literature was based on the assumption that planners can control and coordinate how visualisations are used. However, both the architects and planners recognise that visualisations are, in fact, client based and focused. This leads to architects presenting images from the most flattering angle and focusing on the building rather than the context in order to impress the client. This means that the current practice does not allow for the full potential of visualisations to be realised because it does not focus on matters relating to planning in order to aid better decision-making.

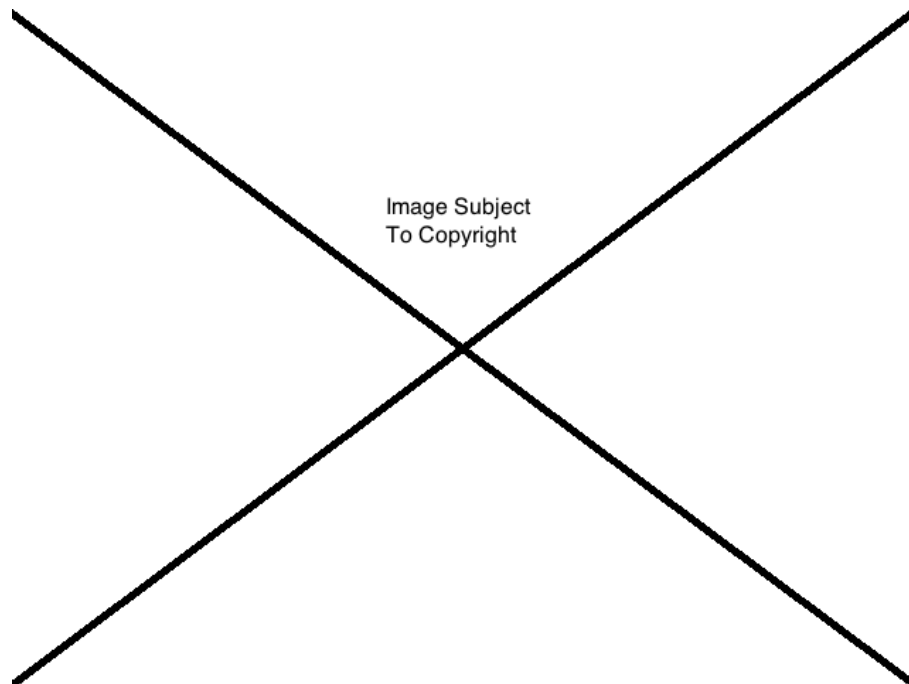


Figure 5: *From Interest.co.nz Release on each major Bank's return to CBD*

This was not what the visualisation was originally intended for. The owner may have been interested in what the building will look like, rather than its effect on its context, and the architect has obliged. The image, intended for private use, is then promoted in a public space, presenting a potential context that is intentionally false. This decision is not within the planners nor the architects control.

This raises concern that the public interest is not being addressed. The focus on the client's needs could be at the cost of the public good. However, there is no mechanism for the control of potentially misleading visualisations being presented to the public. However, this is a complex issue to deal with, entering into a discussion around the freedom of expression not within the scope of this research.

A tension in the literature, summarised by Coggan (2007) and Carrie's (2007) debate, was whether visualisations were objective or subjective and whether increased realism would improve communication through a common language. Some authors argued that the architect's values are inextricably linked to their assumptions and visualisations can only be simplified representations of the real world. Planners and architects seemed to understand that visualisations are subjective but understood there was a benefit in using them for communicating and being able to initiate dialogue from visualisations; therefore, a common language. They were cautious to suggest, though that improved realism is beneficial, if at all financially possible. Therefore, whilst visualisations help provide context for the planners and public, the use and effectiveness is limited. This is because the focus is on the client and the images are subjective.

There is a philosophical argument that anything visual is inherently subjective; that everything is just a personal perception. Therefore, visualisations cannot be discussed as potentially realistic or objective. This diminishes the credibility (and viability) of the argument that increased realism through better technology is a likely solution to visualisation issues.

However, if we pursue realism instead of objectivity through better technology and define realism as a construct of commonly agreed definitions then the philosophical

argument is merely a technical argument around the definition of objectivity and realism rather than a solution to create better credibility.

There was another similar tension in the literature about whether an increase in technology or understanding would most benefit visualisation application. Planners consider visualisations helpful communication tools, including with the public, but the technology is not currently understood so an increase will not have the impact desired. Planners recognise that more information and disclaimers about visualisations will improve communication and understanding.

When images are used in the Environment Court, they need to be of a high standard and accompanied by compositional evidence. Visualisations in resource consent could employ the same standards but architects and planners could be put off by the cost. However, compositional evidence could be supplied, as a reminder to the planner of the quality of the images and follow up these assumptions, if required.

Another theme of the interviews was seeing whether visualisations were understood through their own interpretations. This is the embodiment of subjectivity, but was it exploitable? Planners seemed to admit that they were aware of visualisation manipulability but downplayed its potential influence, as visualisation is only a small aspect of the planning process. This in fact, makes planners potentially susceptible to manipulation as they are disregarding the influence. However, architects said that planners could see past the flashy visualisations and are only focused on the breaking of rules. Therefore, architects downplay the irrelevant information within the visualisation, and subsequently the potential manipulation. This is also based on the assumption by architects that planners are aware of compositional techniques. The results however, show that planners are less aware than architects presumed. This concern that planners may not understand how visualisations were implemented is supported by the literature.

There was a lack of knowledge or agreement between architects on how visualisations are and should be prepared. Architects could not agree on the best way to present the context, and suggested it was a personal decision for the architect. However, this is the most important aspect to planners. This leaves visualisations stuck as superfluous, nice to have but unessential, for decision-making and lessens their potential impact and benefit. Furthermore, planners were unaware of what elements of a visualisation are

important to the architect, unaware of what may be highlighted or underestimated in a visualisation. As one architect said 'planners want as much detail as possible but architects want to provide as little as possible'. Planners and architects do not seem willing to collaborate as both are wary of each other and suspect each other as to not understanding the intent of planning rules.

Several solutions surfaced through the theory and interview process; whether there needs to be some legislative control or another approach. Planners considered a legislated control was generally a less effective approach as it is outside its current jurisdiction. Another was a best practice guide, which the New Zealand Landscape Architects have produced (NZLA Education Foundation, 2010), suggested by an architect. The purpose of the guide is to allow images to maintain a level of legitimacy through improved transparency. The guide states that visualisations have the potential to 'accurately portray in a realistic manner' (p. 2) in order to help all parties involved with understanding and making decisions (p. 14). It admits that visualisations can never reflect real life, as real life shown in two dimensions can never reflect what the eye can see (p. 3). The guide outlines how information needs to be identified and distributed (p. 14). Elements such as viewpoint, focal lengths and panorama views should all as close to the human eye as possible, whilst realising that no camera can capture the same as the human eye and therefore does not represent what we see (p. 11). The guide realises that visible elements can influence the appearance and therefore interpretation (p. 13). The guide sees visualisations as a tool to assist assessment and decision-making through better information and more transparency (p. 5). This approach recognises the subjectivity and potential manipulability of visualisations and suggests that increased transparency will minimise this effect.

Another approach would be a code of conduct. Sheppard (2001) proposes one, summarised as:

- Visualisations should be appropriate to the stage of development
- Appropriate level of qualification and experience
- Appropriate communication method
- Appropriate level of realism
- Seek community input
- Estimate and disclose degree of error and uncertainty

- Provide multiple views as well as information simultaneously
- Avoid sales techniques
- Avoid seeking a particular audience response

These two solutions to the management of visualisations are different ways of reaching the same outcome, that is, more transparency in process and appropriateness to improve communication. Furthermore, these solutions align with what the results found. Architects would need to consider planners in the creation of images for resource consent rather than being client-focused. Further, Architects would need to follow specific compositional guidelines and disclose their rationale rather than just personal preference. Planners treated images cautiously, not solely relying on them to support decisions. Following a guide or code of conduct, planners could place more trust in the robustness of the visualisations. With greater transparency and more information leading to more legitimacy, visualisations can play a bigger role in the decision-making process.

Do the results help understand and address concerns from Forester's (1982) framework, which helped shape the interview questions? His four areas were comprehensible, trustworthy, legitimacy and accuracy.

Comprehensible: Forester (1982) recommended that visualisations need a level of comprehensiveness, which informs decision-making. This is measured by the amount of information provided. This research suggests that more information about the visualisation process would be most beneficial in improving the use of visualisations in resource consents.

Trustworthy: Forester (1982) suggested visualisations be considered trustworthy, in order to be better applied. Currently architects do not need to show how these images are put together, leading to a sceptical approach to implementing them as part of the consent process. Visualisations are therefore still untrusted by planners and subsequently underutilised in the planning process.

Legitimacy: Forester (1982) considers that images primarily should be appropriate, with assumptions transparent to ensure legitimacy. Currently, information is not presented and so visualisations are not relied on.

Accurate: Forester (1982) deems accuracy an important element of visualisations. This is not suggesting realism as a proxy for accuracy; this is where the assumption that greater realism comes from. Accuracy is getting a visualisation as close to the actual or expected outcome, without detracting from the image with unnecessary or irrelevant information.

5.1 Example One

The study of a few examples helps illustrate these issues. This example (Figure 6) is from the CCDU river precinct documentation, illustrating the city promenade (CCDU, The Terraces - City Promenade, n.d.). This image was because of its extensive use in public marketing.



Figure 6: CCDU City Promenade Visualisation

Here there are a few things to recognise. Namely the diversity of the people inserted. Beginning with the prominent young, well-dressed woman, there is also, someone with a pet, someone with kids, tourists, as well as older people.

Modes of transport are also interesting. Most obvious is the person biking (without a helmet) but there is also only one car, which seems to be playing 'chicken' with the tram – a representation of public transport. If you look closely, the post for the tramline is situated on or inside the tram tracks.

It seems that the context, the other buildings and road systems are not shown, and the trees are not currently there. It is also a clear blue day. Also, the distant in the shot is compressed, further distorting the image's perspective.

This visualisation is not accurate and the decisions/assumptions made are not supplied. At the bottom of the website there is a disclaimer saying 'Image, artist impression. Indicative only.' This is not even next to the image.

5.2 Example Two

Another example (Figure 7) is from The Terrace Development (The Terrace, n.d.) marketing material (www.theterrace.co.nz), presented on site and online for the public. This image was chosen because of its significance to the rebuild and its comparability to the other example.

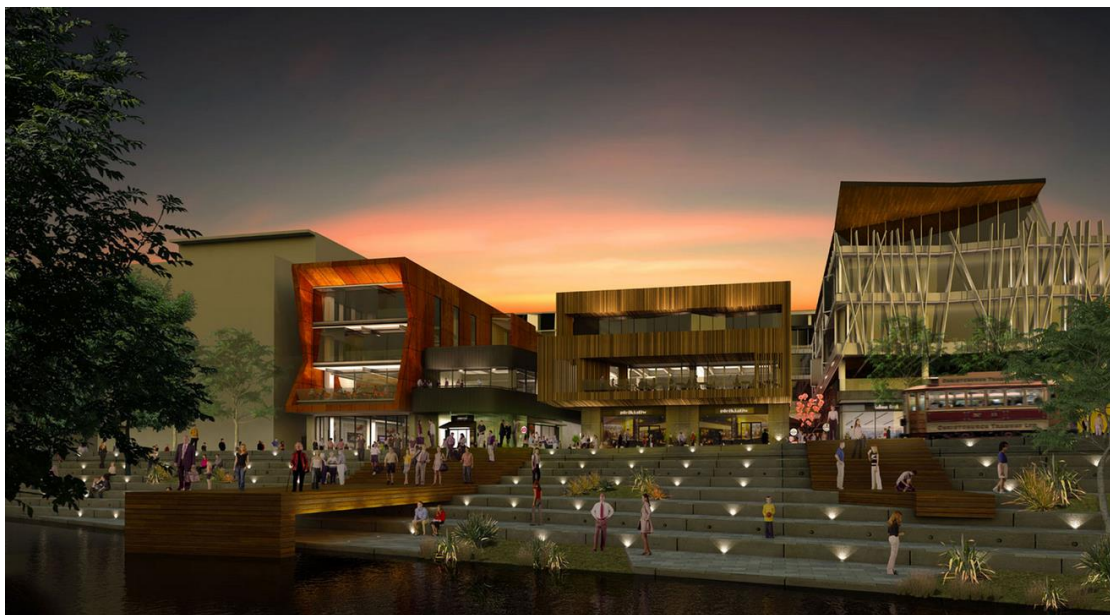


Figure 7: The Terrace Night Visualisation

Here, the sky is shown in a certain light to elicit an emotional, almost romantic, response. It is worth noting that this project is just the three buildings, which take up less than a third of the image. The landscaping of the riverbank is not what is proposed and is outside the sphere of influence of this development.

Firstly there seems to be a kid with a ball alone at the bottom, which does not seem right. It also shows the tram, which currently does not run in the evening. The wooden

wharf, which has a businessman standing at the end, would require a rail. The gap also underneath it is impossible to walk under and seems like a perfect place for the homeless to sleep. As these are bars and restaurants, it lacks any conception of the negative consequences, such as drunk people fighting, vomiting or the excessive line of taxi's. The image has an upward feel about it, making the buildings seem more imposing. Here, there is no disclaimer suggesting that it is an artistic impression only; it is presumed that it will be understood to be marketing material.

5.3 Discussion Summary

Visualisation's current use is impeded by the lack of confidence in the images credibility and legitimacy. Furthermore, planners do not necessarily understand how technology works, and subsequently, how images are constructed. The tension around the pursuit of realism or objectivity or the embracing of subjectivity creates two distinct options for improvement. Realism relies on improving technology and subsequent increased use and hopefully, an increase in understanding. Subjectivity, however, depends on the disclosure of the rationale behind decisions, that is, the assumptions made and the values driving those assumptions.

Improving knowledge or understanding seems to have the most benefit. Currently planners were unaware of what was considered important by architects, however, this knowledge was incorrectly presumed to exist by architects. Clearer communication would improve legitimacy through increased transparency.

Additionally, the literature inaccurately assumes that the visualisation process is planner led, in fact, it is client focused. Planners, therefore, lack the ability to influence visualisation development. This raises issues regarding the protection of the public from potentially being misled.

The two potential solutions offer methods to improving the confidence in visualisations. The adoption and adaption of the New Zealand's Landscape Architects' Best Practice Guide, or the creation of a Code of Conduct, based around Sheppard's (2001) idea, could improve the transparency and therefore, the legitimacy of the visualisation process.

Visualisation, currently, is at best a vehicle for providing some context and at worse, a nice but superfluous addition to resource consent applications.

Chapter 6

Conclusion

The use of visualisations in the Resource Consent process is not required despite the increase in technology and prevalent use in applications. This dissertation, whilst limited in its scope and depth, identifies several issues and potential solutions to the use and implementation of visualisations. This research demonstrates that visualisations have the ability to be an effective instrument in resource consent decision-making and communication. It shows that the ineffectiveness of visualisations is because of the difference between how architects compose and how planners perceive them. A potential solution could be through the creation of guidelines on the use of visualisations within consent documentation.

The purpose of this research was to ascertain how visualisations are used within the Resource Consent process and what, if anything, could improve their use. Visualisations are used in Resource Consent applications, however, they are not currently required. Furthermore, the lack of direction on effective visualisations within applications causing a wide range in the quality of visualisations submitted. This research highlighted discrepancies between how architects approached and planners interpreted visualisations, which leads to inefficient use. The development of guidelines could help improve their efficiency.

Currently, it is debatable whether visualisations can lead to better outcomes and decisions and whether they can create a common language for interpretation. This research asked whether visualisations are, in fact, designed for planners or the public, or are they aimed at the client and how subjective, and potentially manipulatable, as well as influential, visualisations can be.

This research identified that visualisations do not necessarily need to reflect the built or anticipated environment, as seen in the example of The Terrace Development. Images can and do contradict each other. This is because these images have certain audiences in mind, which are focused on different aspects. Furthermore, these audiences are not the public or the council but rather clients. This has the potential to mislead the public or the council, though it is not the intention of the developer. Furthermore, planners are

not required, or trained how visualisations can and could be used. The recent debate between Coggan (2007) and Carrie (2007) about the use of technology in aiding planning highlights the tension, and subsequent apprehension, in visualisation's application.

This research followed a qualitative case study approach. A framework was developed based on the key questions from the literature and using criteria developed from Forester (1982). Forester's framework addressed areas of comprehensiveness, trustworthiness, legitimacy and accuracy. These categories helped define and narrow the focus of the interview questions. Questions ranged from the intended audience, to compositional questions, as well as interpretive questions. I interviewed seven architects and six planners in the Christchurch region, face-to-face, and asked for their professional opinion.

Communication was found to be the major benefit to visualisation, allowing instant recognition, albeit potentially inaccurate. This is especially helpful for the public to be able to understand a development. Further, visualisations create a tool that can be used for ongoing discussion, including proposing instant modifications.

This further supports the result that it is not the lack of realism that restricts visualisation's application but rather, it is the lack of supporting evidence and knowledge. Furthermore, it can be argued that visualisations can never be realistic, as all images require personal perception. With more information regarding assumptions and decisions made, the increase in the legitimacy, and therefore application of the visualisation can occur. The implementation of a code of conduct or a best practice guide would also help quantify parameters to improve legitimacy.

This research shows that planners do not place much emphasis on visualisations within the planning process, as they understand that architects can manipulate the images to show the building, but not necessarily the context, in the best light. However, planners are unsure what specifically architects do subjectively choose. Architects, somewhat incorrectly, assume planners see through the presentation and focus on the specific planning related aspects. Therefore, architects do not try to take advantage of this lack of knowledge.

6.1 Implications

This dissertation advocates the exploration of the potential adoption of a best practice guide or code of conduct with the aim of improving the ability for visualisations to be adopted and used with greater influence. However, additional research may be needed to see whether the implementation of this would not be at a prohibitive cost.

Further research could explore whether there is the same response across New Zealand or could examine more deeply its use in Christchurch. Research could also look at the use of visualisations within Environment Court and also later in the Resource Consent decision-making process. Another case study approach could follow and record different responses to visualisations of one project throughout its life cycle, finishing with the end product. This would show how responses change over time and whether there is any misleading occurring.

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