Technical and Community Perspectives of Risks Associated with Purified Recycled Water in South East Queensland: A Q-Study

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The Urban Water Security Research Alliance (UWSRA) is a $50 million partnership over five years between the Queensland Government, CSIRO's Water for a Healthy Country Flagship, Griffith University and The University of Queensland. The Alliance has been formed to address South-East Queensland's emerging urban water issues with a focus on water security and recycling. The program will bring new research capacity to South-East Queensland tailored to tackling existing and anticipated future issues to inform the implementation of the Water Strategy.

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FOREWORD

Water is fundamental to our quality of life, to economic growth and to the environment. With its booming economy and growing population, Australia's South-East Queensland (SEQ) region faces increasing pressure on its water resources. These pressures are compounded by the impact of climate variability and accelerating climate change.

The Urban Water Security Research Alliance, through targeted, multidisciplinary research initiatives, has been formed to address the region's emerging urban water issues.

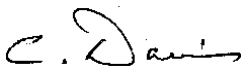
As the largest regionally focused urban water research program in Australia, the Alliance is focused on water security and recycling, but will align research where appropriate with other water research programs such as those of other SEQ water agencies, CSIRO's Water for a Healthy Country National Research Flagship, Water Quality Research Australia, eWater CRC and the Water Services Association of Australia (WSAA).

The Alliance is a partnership between the Queensland Government, CSIRO's Water for a Healthy Country National Research Flagship, The University of Queensland and Griffith University. It brings new research capacity to SEQ, tailored to tackling existing and anticipated future risks, assumptions and uncertainties facing water supply strategy. It is a $50 million partnership over five years.

Alliance research is examining fundamental issues necessary to deliver the region's water needs, including:

- ensuring the reliability and safety of recycled water systems.
- advising on infrastructure and technology for the recycling of wastewater and stormwater.
- building scientific knowledge into the management of health and safety risks in the water supply system.
- increasing community confidence in the future of water supply.

This report is part of a series summarising the output from the Urban Water Security Research Alliance. All reports and additional information about the Alliance can be found at http://www.urbanwateralliance.org.au/.



Chris Davis
Chair, Urban Water Security Research Alliance

EXECUTIVE SUMMARY

This report describes the results research conducted as part of the *Systematic Social Analysis Project* in the Urban Water Security Research Alliance.

The research focuses on technical and community perceptions of risk associated with the implementation of the PRW scheme. Previous stages of the Systematic Social Analysis Project research raised key issues that were formative in the development of this stage. The baseline measurement and modelling component of the project, completed in late 2007 (Nancarrow et al. 2007), identified the key drivers of people's intended behaviour in relation to drinking water containing PRW. To further explore these findings and the range of issues that emerged, a series of workshops were held in early December 2007. Both the survey and workshop results indicated that most participants are supportive of the PRW scheme, but are generally cautious. The key variables of trust, risk, fairness and emotion that were identified in the baseline survey were again confirmed as important in the workshops, and their interconnected relationships again highlighted. The need to develop a basis for community and technical conversations and relationships around the issues of risk also emerged as a particularly important issue warranting further research, giving direction to the current research objective.

This report contains the results and interpretations from research investigating community and technical perceptions of risk and associated factors influential in people's attitudes towards PRW. In order to explore the previously raised issues surrounding risk and the relationships between the different types of risk (such as system, environmental, and personal health risks), Q-Methodology was employed. Q-Methodology (or Q-Method) is a technique that captures similarities and differences between participants over a range of issues pertaining to a particular subject. It allows perspectives on a given issue to be grouped into typologies, each of which represents a different framework within which decisions and attitudes towards that subject are typically formulated. The amount and variation of typologies can indicate whether ways of thinking about an issue are diverse and complex, or homogenous and aligned with popular conceptions. Issues are captured in a diverse range of statements which participants in Q-Method are then asked to sort and rank on a continuum - from most unlike to most like their points of view. The statements used in this research were based around issues and themes emerging from a range of scoping interviews. These themes included the following: different aspects of risk, emotion, trust, aesthetics, fairness, alternative futures, perception of water supply after PRW implementation, societal issues, and management. Using the statements that reflected what people had previously said, it was possible to investigate in further detail (i) community perceptions of risk, (ii) professional technical perceptions of risk, and (iii) technical perceptions of *community* perceptions of risk.

The Q-Method was administered during a series of workshops in SEQ. Altogether, twelve community workshops were held, with three workshops at each location: Brisbane, Ipswich, Gold Coast and Sunshine Coast. Participants included community members who had been involved in previous stages of research as well as newly recruited community members. Altogether, 108 participants attended. In addition, 33 technical participants performed the Q-Sort, spread over three locations.

The data for the community workshops was analysed as case studies for each workshop location, and an 'overall SEQ' analysis was also completed. The community Q-Sort results produced a large variety of decision making frameworks, suggesting a high degree of complexity and heterogeneity exists with regards to formulating and formulated attitudes towards PRW. Within the case studies, it was commonly found that those accepting of the scheme felt that there needed to be sound legal and legislative frameworks in place to oversee the scheme. Those that were not accepting of the scheme were often concerned about health risks, and these were frequently the result of perceived system risks. Overall, technical Q-Sorts revealed participants were accepting, trusting and confident of the system, although there was a degree of heterogeneity in responses. Major technical concerns included health risks and a need to reduce pollutants in the water cycle. Interestingly, both the community and the technical Q-Sorts emphasised the need for strict legal and legislative requirements surrounding the implementation of the scheme. When examining the results from the technical perceptions of how the

community structures its decisions, the predominant typology was one of emotionally driven non-acceptance that was health concerned and lacked trust and confidence in scientists and authorities.

Another point of divergence between community and technical perspectives concerned 'relative risk', or couching the health risk posed by PRW in the context of everyday but unrelated risks. The argument of relative risk, often used by technical experts to address community concerns and convince them of the safety of the scheme, was frequently rejected by community members participating in the case studies who were not accepting of the PRW scheme.

As the Q-Method is a valuable tool in exploring different perspectives, many other areas of difference between community and technical stakeholders can potentially be identified. The findings suggest that there is potential value in pursuing a deliberative process, in which an authentic and ongoing dialogue between the community and the technical people is established *and* in which community concerns and questions are addressed either through information or input to the science. Investigation of this will form the next stage of the *Systematic Social Analysis Project* and will facilitate the integration of social science with bio-physical sciences in the *Purified Recycled Water Project*, and also provide insights for the *Enhancing Institutional Capacities Project* in the Research Alliance.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

GLOSSARY

Q-Methodology (also known as Q-Method) – is a systematic methodology that can be used to reveal the distinct, personal and subjective combination of factors that underlie and influence peoples' decision making processes.

Q-Method Concourse/Concourse – a set of interconnected claims and statements that reflect the breadth of the themes and topics identified above.

Q-Statements (also known as Q-Sample) – are a reduced set of statements from the initial concourse that is established by eliminating repetitive statements, and incorporating the widest possible number of themes in the final Q-Statement set.

Q-Sort – The compiled Q-Method scenario, conditions of instruction and statement sets that participants are asked to complete.

1. INTRODUCTION

The *Urban Water Security Research Alliance* was formed to address a wide range of challenges present in South East Queensland (SEQ) concerning water management. This alliance provides the basis for the collaboration and integration of effort between scientists in Queensland Government Departments, CSIRO, The University of Queensland and Griffith University. The current research report sits in the *Systematic Social Analysis Project*, whose primary objective it is to

> *develop a partnership between the government, scientists and the community that builds mutual trust, acknowledges a 'whole of community' challenge and responsibility, and provides a basis for ongoing sustainable management and use of water resources in SEQ.*

The first objective of the Systematic Social Analysis was to

> *identify and provide a baseline measurement of the psychological drivers of the community's intended behaviour in relation to drinking PRW to provide for the informed design of community engagement and education, and the monitoring of any shifts in community attitudes, values and intended behaviour over time and with increased experience.*

Nancarrow et al. (2007) completed the baseline measurement and modelling in late 2007, identifying the key drivers of people's intended behaviour in relation to drinking water containing Purified Recycled Water (PRW) in South East Queensland (SEQ). The baseline measurement found that 74% of respondents would drink PRW from the scheme, which is consistent with previous SEQ market research. The baseline study also demonstrated, however, that these high rates of acceptance levels of the PRW scheme were tempered under certain conditions, such as when presented in the context of alternative water management options or if environmental harm associated with the scheme was demonstrated. The modelling supported the hypothesis that the key socio-psychological elements of *Health Risk*, *System Risk*, *Emotion*, *Trust*, *Fairness* and *Subjective Norm* were significant predictors of intended behaviour in relation to accepting or rejecting the scheme (see Figure 1). Together, these variables accounted for 86% of the variance in respondents' stated behavioural intentions. The *Trust*, *System Risk*, *Emotion* triangle and its influence on *Health Risk* was identified as fundamental to people's decision-making. It was concluded that further investigation into these factors in order to understand both their structure and interrelationships was required.

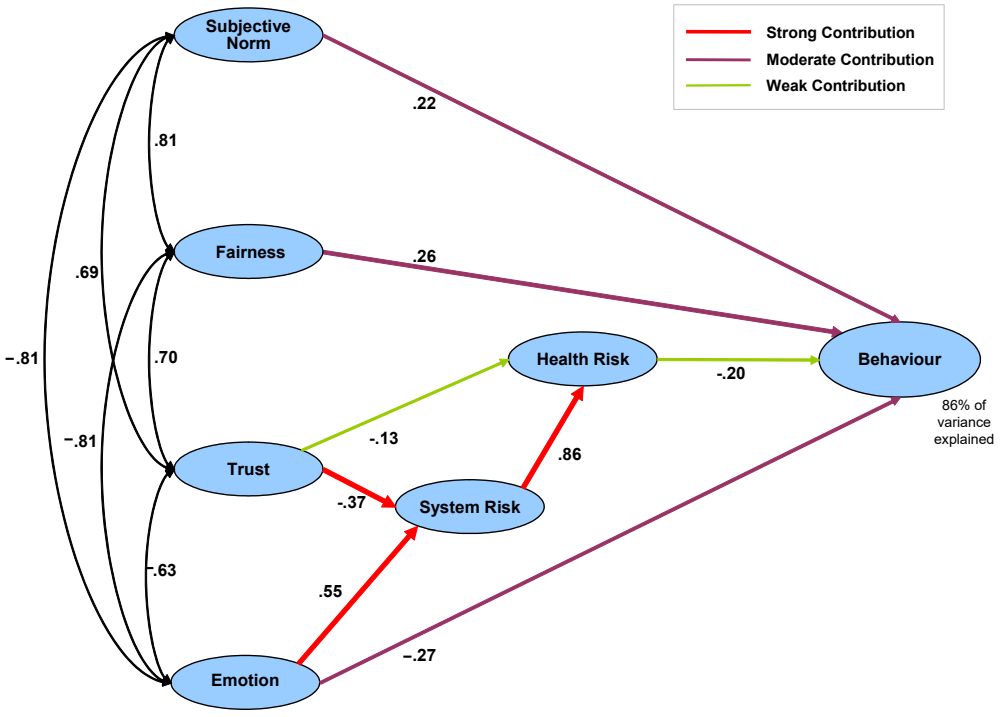


Figure 1. Simplified structural equation model of the SEQ community's intention to drink PRW

The next stage of the project was to conduct a series of focus group workshops in order to gain a more comprehensive and detailed understanding of community perspectives of PRW in relation to key behavioural model variables. These scoping workshops were also held to inform the current stage of research which aims to further explore the role of risk in relation to other key variables and associated issues. The scoping study was completed in February 2008 (Alexander et al., 2008).

Results from the scoping workshops confirmed that there is a general acceptance of the PRW scheme. However, as with the behavioural survey, this support was generally cautious and reflected views surrounding the inevitability of the scheme in the face of the current water crisis. The variables of trust and risk were found to be intertwined in the scoping workshops. A lack of trust in system operations and safety standards was commonly indicated by participants and these concerns were heightened by thoughts of any possible future political instability. When discussing the different types of risks associated with the scheme, participants indicated that system risk and health risk were the most concerning. In the scoping workshops, the role of emotion was similar to the behavioural survey. For instance, most participants believed themselves to be more accepting of the scheme than others in the community. Overall, fairness was not considered a primary concern, but these opinions may change as specific scheme details become clear or as community perceptions of risk change. Therefore, it was evident that an understanding of the interrelationships between the variables trust, risk, fairness and emotion was an important component of the research, particularly when examining risk perceptions.

The findings from the scoping phase were used to guide the third stage of research, the overall objective of which was to:

> *identify the dimensions involved in risk judgements by those who intend to drink the PRW, those who do not intend to, and those who are unsure. This involves the identification of differences and similarities in judgement dimensions of expert/technical and community.*

The scoping phase, whilst useful in building up a comprehensive picture of people's attitudes towards the scheme, had methodological limitations. For instance, risk and concepts surrounding risk were often discussed in an unstructured environment where extraneous factors, such as alternative water supply solutions, had the tendency to dominate discussions. The above objective was explored using a technique called 'Q-Method' which facilitates the exploration of a range of viewpoints that are shared or disparate by a particular group of participants (Previte, Pini and Haslam-McKenzie 2007). Q-Method has several characteristics that overcome some of the limitations present in traditional scoping workshop methodologies. Firstly it allows the parameters of the investigation to be set. That is, subjects can be constrained to dealing only with topics of relevance to the specific matter under investigation. Secondly it allows these topics to be ranked relatively to each other. Lastly it gives equal voice to each participant – an achievement difficult to attain in traditional focus group settings.

This technique has been used by various disciplines and in a number of public policy settings around public perception and risk, sustainability, forest and ocean management, climate change and nuclear technologies (Barry and Proops 1999; Niemeyer, Petts and Hobson 2005; Simmons and Walker 1999; Swedeen 2006; Tuler, Webler and Finson 2005; Webler, Tuler and Krueger 2001; Webler and Tuler 2006). It is an established methodology within the environmental sustainability arena that can be effectively integrated to inform public policy processes (Robbins and Krueger 2000; Schofield 2002; Steelman and Maguire 1999). The Australian Research Centre for Water in Society (ARCWIS) has made use of this method in previous research projects. For example, it was used to explore the dimensions of community and expert perceptions of risk in the reuse of wastewater for irrigation and indirect potable supply through Managed Aquifer Recharge (MAR) in Western Australia (Browne et al. 2007).

The Western Australian MAR research supported the applicability of this technique for exploring perceptions of risk, trust, fairness and emotion in a water recycling context. This experience with the methodology in a recycling context, and the outcomes of the scoping workshops which grounded the issues of risk, trust and emotion within an SEQ context, has ensured robust research that is embedded in, and can strongly inform, the SEQ PRW context.

The specific objectives of Stage 3 of this research are as follows:

- to further explore how the identified drivers and other issues highlighted in the scoping workshops influence patterns of decision making in relation to drinking PRW;
- to explore the similarities and distinctions between scientific and community dimensions of risk; and
- to use the understandings of different decision making typologies about PRW to guide the next stages of research to address community risk concerns.

2. METHODOLOGY

2.1. An Introduction to Q-Methodology

Q-Method is a technique that captures similarities and differences between participants about a range of issues surrounding a particular topic such as PRW (Previte et al. 2007). The issues are captured in a diverse range of statements that are collated about a topic which the participants are then asked to sort and rank on a continuum from most unlike to most like their point of view. The statements are developed in such a way that they reflect the broadest possible range of issues relating to a particular topic (McKeown and Thomas 1988; Previte et al. 2007; Simmons and Walker 1999).

Rather than trying to understand the factors that influence people's acceptance or intention to drink water containing PRW in a way that generates the most common pattern across a range of people, an approach typical of survey methodology, Q-Method captures the way that these factors may be represented in the decision making of individuals (Robbins and Krueger 2000). It is a non-reductive technique which opens up multiplicity, complexity, tension and inconsistency around a particular issue or topic (Previte et al. 2007). That is, Q-Method reflects the different way that these variables (e.g., perceptions of risk, trust or emotion) combine within individuals, which allows for different typologies of individual decision making patterns to emerge. It is a useful methodology to explore the SEQ PRW scheme because it can reflect the highly complex context and therefore highly complex structuring of opinions, judgements and understandings of PRW from a range of lay and expert perspectives (Robbins and Krueger 2000; Simmons and Walker 1999; Stainton-Rogers 1998).

2.2. Scoping and Q-Method Development Phase

The first stage of developing the research project was to gain an understanding of the PRW scheme from both technical and community perspectives in the SEQ context. This involved developing a firm understanding of the SEQ-specific context and related issues through the behavioural survey and the scoping workshops, held in December 2007. In addition, some interviews with experts were conducted to add SEQ specificity to previously conducted technical/expert workshops on the subject of risk and recycling. A number of underlying themes emerged from the scoping report (Alexander et al. 2008) and technical input and these were used to inform the next phase of research development. The underlying emergent themes are outlined in Table 1 and expanded upon in Appendix 4.

The next stage of the research process was to develop a set of interconnected claims and statements that reflect the breadth and depth of the themes and topics identified in this first stage (this set of statements is called the concourse[1]). It is common to develop a concourse for a study from both within the research design, previous stages of research and other external forms of public comment and reflection (Previte et al. 2007; Simmons and Walker 1999). The statements in this research project have been derived from the following sources: interviews and focus groups with a range of technical and community stakeholders; the behavioural baseline survey; past ARCWIS Q-Method studies; recycled water research and archival analysis; policy and media analysis (and other forms of public comment), and literature reviews. Although statements and themes from previous ARCWIS research have been incorporated, the structure and development of the PRW research was determined based on

[1] In Q-Method, the concourse refers to "the flow of communicability surrounding any topic" in "the ordinary conversation, commentary, and discourse of every day life" (Brown 1993).

the themes that emerged as important and salient in the SEQ context. The aim of developing and refining this concourse was to capture a broadly representative and diverse set of statements which reflected the whole issue 'domain' and perspectives on PRW (Watts and Stenner 2005; Previte et al. 2007).

2.3. Summary of Concepts and Themes about Risk and PRW in SEQ

The final set of statements for the SEQ PRW Q-Method was developed under a framework of themes, outlined in Table 1 below. The set of statements include many permutations of people's risk perceptions (versus just asking people to consider 'actual' risk). Appendix 4 contains detailed descriptions of the thematic areas detailed in Table 1, and Appendix 5 lists the final 64 statements.

Table 1. Table outlining the different concourse themes

- Different elements of risk:
  - unknown risks/uncertainties;
  - system failure risk;
  - relative/competitive risk;
  - political risk;
  - personal health risk;
  - population health risk;
  - intergenerational issues and risk;
  - financial risk;
  - environmental risk;
  - perceptions of scientific and community responses to risk;
  - chemical/toxicological risk;
  - voluntary versus imposed risk; and
  - tolerability and resignation to risk.
- Emotion – the 'yuck factor'.
- Trust.
- Aesthetics and water quality.
- Fairness (general).
- Alternative futures.
- Perception of increased water use.
- Societal issues.
- Management (including scientific, policy and infrastructure management/knowledge).

2.4. Q-Method Sampling and Administration

Q-Method differs from survey methodology in that often it is best to use a smaller sample size as the method is not concerned with generalisability of results. In fact a suggested sample size is often between 30-40 sorters (Addams 2000) to maintain the effectiveness of the methodology. Previte et al. (2007, p.139) have suggested that "a larger number of participants can be problematic, because they negate the complexities and fine distinctions which are essential features of qualitative techniques". Therefore, for this research it was decided that a sample size of approximately 36 people from each workshop location would be appropriate (accounting for attrition of attendees). Approximately the same numbers of technical professionals were recruited.

2.4.1. Community Workshops

While the baseline measurement and modelling revealed no major differences based on geographic location, the scoping workshops revealed subtle regional differences between opinions and perspectives of PRW. Therefore participants were selected from four different locations within SEQ: Brisbane, Ipswich, Gold Coast and Sunshine Coast. Altogether 12 workshops were held during the week of the 18-24 February 2008, with three workshops at each location. The workshops were held at different times of the day (morning, afternoon and evening) to allow for a wide range of people and age groups to have the opportunity to attend. The analysis amalgamates the data of the three workshops held at each location.

New participants were recruited by random telephone contact in suburbs which would require no more than 30 minutes travelling time to reach the venue. Attempts were also made to recruit from suburbs of different socio-economic status. The suburbs selected in each location for recruitment are detailed in Appendix 6. In addition, some people who had participated in the survey and/or the scoping workshops were also invited (see Table 2 for previous participant details).

A trained team of interviewers were requested to recruit approximately 36 people from each location. The interviewers were instructed to contact the previous participants first (up to a maximum of 15 confirmed attendees from each location) and then move on to calling the randomly selected names. Interviewers were also asked to recruit equal numbers of male and female participants in stratified age categories (18-30, 31-50, over 50). Obtaining this sample proved difficult, especially in recruiting males and participants in the 18-30 age category. Therefore, to increase workshop participant numbers, the interviewers were asked to collapse the age categories and aim to recruit two-thirds of the sample under the age of 50, and one-third over the age of 50. All who agreed to participate were sent letters of confirmation along with maps detailing the location of the venue.

Of the 145 community people who agreed to attend, 108 actually attended their respective workshops. Details of specific attendance numbers per workshop are detailed in Table 2. Of those that attended 36.1% were male and 63.9% were female. Acknowledgement of the participants' donation of their time was made through presenting them with commercial retail gift vouchers after the workshops.

2.4.2. Technical Workshops

The participants for the technical expert workshops were recruited using a 'snowball sampling' technique.[2] Employees within the relevant state government departments, water utilities, and universities were contacted by email to gauge their interest in participating in one of two workshops to be held in February, and they were also given the option of holding a workshop at their actual workplace if they could provide a small group of participants.

Altogether 33 technical participants performed the Q-Sort across three workshops. Of these participants, 60.6% were male and 39.4% female. A number of staff from the research team was also included in the technical expert sample, in the capacity of social technical professionals. The inclusion of research staff in the technical sample is methodologically consistent with Q-Method (Dryzek 1990; Swedeen 2006).

[2] Snowball sampling is an established social science recruitment technique whereby initial contacts make referrals to other participants who, when contacted, then provide links to other potential participants, thus 'snowballing' your initial contacts into a larger sample of relevant participants.

Table 2. Number of participants performing the Q-Sort for each location

Workshop Location	Participant	No. accepted	No. attended
Brisbane	New	23	18
	Survey	6	6
	Scoping Workshop	6	5
	Survey and Scoping Workshop	1	1
	Total	**36**	**30**
Ipswich	New	22	17
	Survey	6	5
	Scoping Workshop	6	5
	Survey and Scoping Workshop	3	3
	Total	**37**	**30**
Gold Coast	New	30	20
	Survey	-	-
	Scoping Workshop	6	6
	Survey and Scoping Workshop	-	-
	Total	**36**	**26**
Sunshine Coast	New	33	19
	Survey	-	-
	Scoping Workshop	3	3
	Survey and Scoping Workshop	-	-
	Total	**36**	**22**

2.4.3. Q- Method Administration Details

The following section provides a brief overview of the process undertaken at the technical and community Q-Method workshops. Each workshop was approximately 1.5 hours in duration and there were 5 stages to the workshops.

- Introduction and overview of PRW scenario.
- Administration of the Q-Method.
- A brief one-on-one interview with the participant to get feedback about the process and to describe in more detail their decision making and placement of the statement cards.
- Completion of a brief questionnaire to obtain demographic information and more detail about their perspectives of PRW.
- A debrief and feedback session where more information about the PRW scheme was given to participants, as well as opportunity for participants to ask questions of the technical water quality expert on hand.

Technical workshops had a slightly different format, with the technical participants being asked to sort from their own perspective, as well as what they thought to be the community's perspective. In summary there were 4 stages of the technical professional workshops.

- Introduction and instructions.
- Administration of the Q-Method from their own perspective.
- Administration of the Q-Method from their perspective of community perceptions of PRW.
- Completion of a brief questionnaire to elicit demographic information and more detail about their own perspectives of PRW.

Participants were presented with the PRW scenario and procedures (Appendix 1 and 2). As they read through the cards, they were asked to sort the statements into three piles of cards, (i) most like their point of view, (ii) most unlike their point of view, and (iii) statements they felt uncertain about or neutral towards (Tuler et al. 2005). They were then asked to place the cards on the board according to whether the statements were unrepresentative or representative of their viewpoints (-5 to +5). An example of a Q-Sort board is set out in Figure 2. Table 3 shows the Sorting Scheme Distribution used for this study. A Sorting Scheme Distribution ranks values from least like my point of view (in this case -5) through to most like my point of view (here, +5). The Distribution also determines the number of statements that must be placed under each ranking (eg., 8 statements can be placed in the column whose value is +1).

Table 3. Q-Methodology sorting scheme distribution

Statement Rank	-5	-4	-3	-2	-1	0	1	2	3	4	5
Number of Statements	3	4	5	7	8	10	8	7	5	4	3

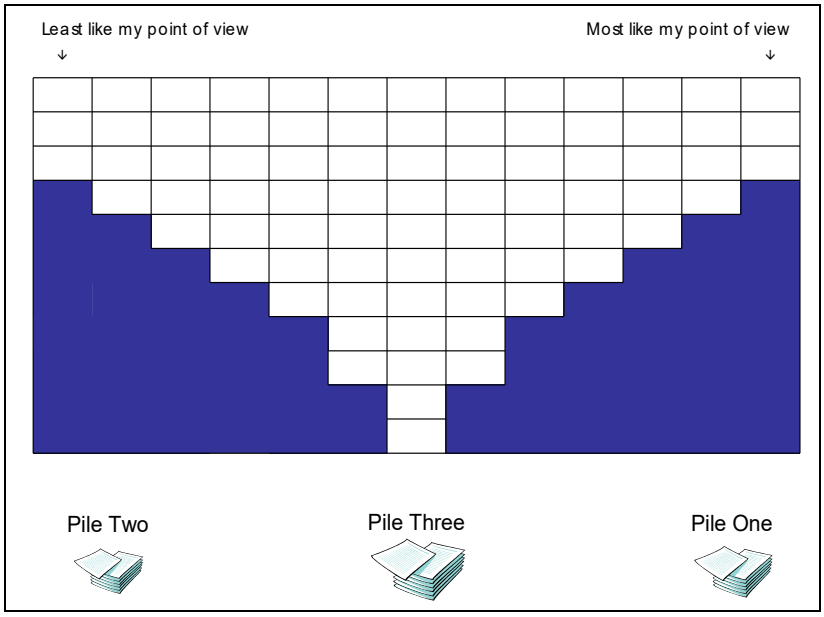


Figure 2. An example of a Q-sort board

Previous research has shown that it is useful to check the representativeness of the statements in the samples by asking each subject undertaking the Q-Sort whether they could think of additional elements that weren't included in the Q-Statements set (Tuler, Webler and Finson 2005). Participants were asked to record details of how they made their decisions, any statements they had problems with, and any other comments on a feedback form.

Participants were also asked to note any other statements that weren't included in the Q-Sort that better reflected their points of view in the brief questionnaire. The questionnaire also included: perceptions of current water quality and supply; knowledge and concerns about PRW; intended uses for PRW (aside from drinking); alternative water supply systems; and demographics.

2.5. Analysis Tools

PQ Method software (a freeware package available on the internet) was used for the analysis of the results (Previte et al. 2007; Schmolck 2002). This software is available from http://www.lrz-muenchen.de/~schmolck/qmethod/downpqx.htm . SPSS can also be used to analyse Q-Method data, however when compared with PQ Method it is more limited in analytic features and ability (Brown 1996). Factor analyses of the Q-Sort data allowed the identification of patterns across individuals. Each factor consists of individuals who have similarly sorted the statement items, and hold a generally similar perspective (Previte et al. 2007).[3] It should be noted that all statements could be of importance to a person but, as individuals were directed to differentiate between the statements, they represent relative rather than absolute rankings. Hence, care needs to be taken in the interpretation of the data to ensure that this is understood and reflected in the analysis. For this study a 'Principle Components Analysis' with 'Varimax Rotation' was chosen, as no prior assumptions or hypotheses were made of the data. As was conducted in this study, Brown (1980) recommends researchers run from an eight-factor to two-factor solution before accepting a final solution (Previte et. al. 2007).

3. RESULTS

3.1. Community PRW Results

The data for the community workshops are presented below as case studies for each workshop location, as well as an 'overall SEQ' analysis at the end of this section. The four location based case studies amalgamate the data of the three workshops held at each location: Brisbane, Ipswich, Gold Coast and Sunshine Coast. The data is presented per location in order to preserve the robustness of the research design, and because the scoping workshops revealed small regional differences between opinions and issues related to PRW. For each of the locations, a diagrammatic representation of the resultant factors and their relationships has been created. In these figures the colour of the oval represents the level of acceptance of the scheme, with the colour spectrum ranging from green (accepting) through blues and oranges (ambivalence) to red (not accepting). The size of the ovals in the figures represents the variance[4] explained by that factor, and the overlap represents common areas of perceptions between the factors.

3.1.1. Case Study 1: Brisbane

Six factors emerged as significant for the Brisbane case study. Together, these six factors explain 70% of the variance in responses. For a more detailed understanding of the specific statements that loaded on each factor please refer to Appendix 3 (in which the Factor Arrays are presented). The only statement that gained consensus amongst all six groups was the strong disagreement with "my life is too busy so the risk of PRW is too small to worry about" (ranging in value from -2 to -5). A representation of the factors and their relationships is provided in Figure 3.

[3] Statistical significance of a factor (a factor means a group of people with a similar perspective) is determined by the factor having an Eigenvalue of greater than 1. For a detailed understanding of appropriate rationales for factor extraction and exclusion for Q-Method refer to Adams (2000).

[4] Here, variance refers to the amount of discrepancy between all people's Q-Sort explained by each factor.

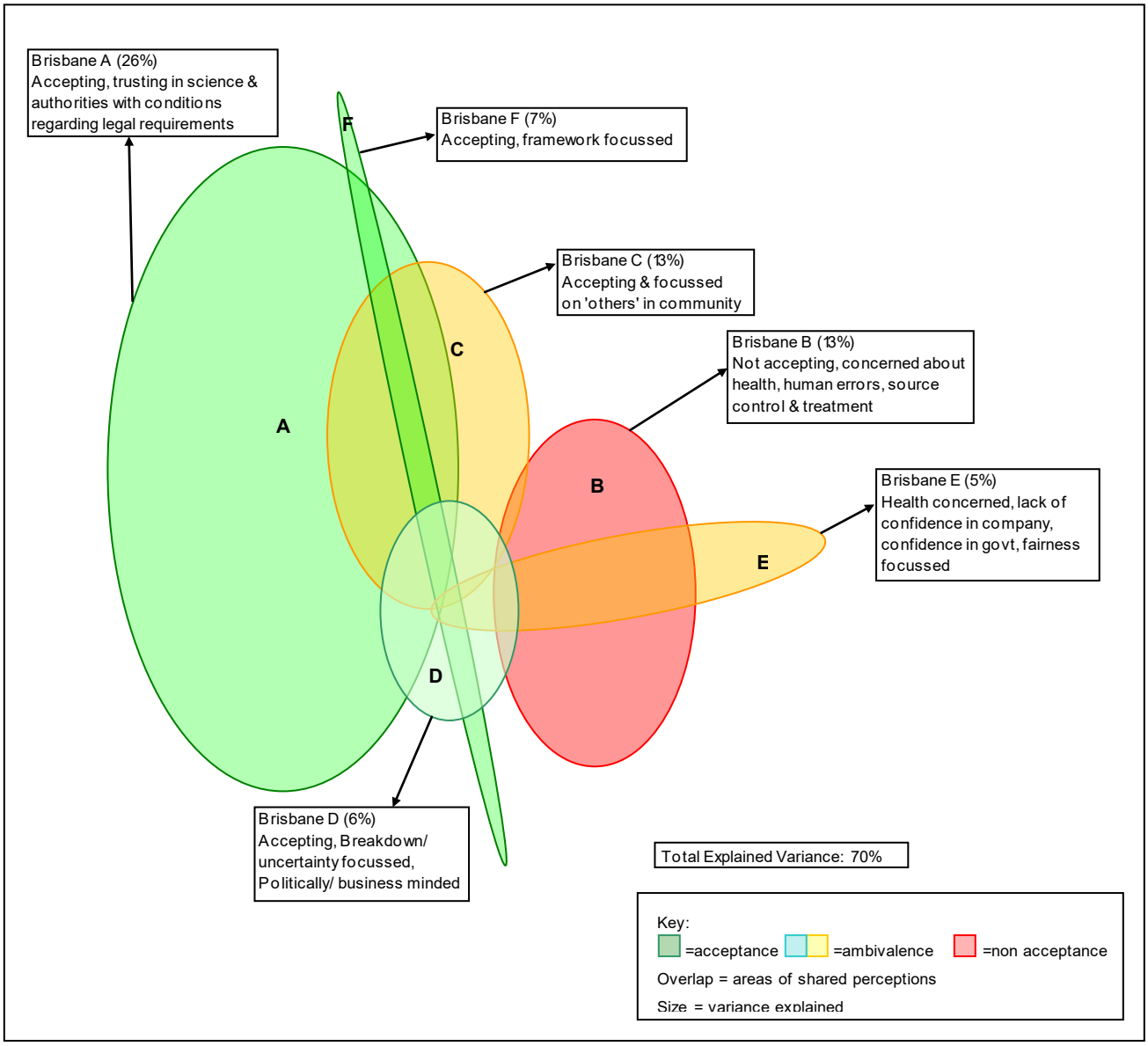


Figure 3. Representation of factor relationships for Brisbane community sort

<u>Brisbane Perspective A</u>: Accepting, trusting in science and authorities with conditions regarding legal requirements (26% variance explained)

The strongest perspective to emerge for Brisbane is one that is largely accepting of PRW. People in this factor feel strongly that they do not see PRW as sewage, and do not think that the people of Queensland are being used as 'guinea pigs'. Some of the features of this perspective which differentiates it from the other perspectives are participants' trust in science to guarantee the scheme's safety, trust in government and the safety of the treatment system. People from this perspective are also reassured by PRW's use in other countries, however, they consider it a necessity to guarantee the accountability and responsibility of those operating the scheme. They are strongly unconcerned about the technical capacity required to operate the scheme.

***Brisbane Perspective B*: Not accepting, concerned about health, human errors, source control and treatment (13% variance explained)**

This group demonstrates a high level of non-acceptance of the suggested scheme and is particularly concerned about human errors and source control. One of the most significant features of this perspective is the concern for health, including concern over potential chemical and toxin build up and hormones. They are not concerned that PRW is 'too clean' in a way that could influence immunity. The concerns about health and toxicity may be related to this group's perceptions of human error, source control and the lack of confidence in the treatment process. The risks of PRW are not small compared with other everyday risks from this perspective, and would not simply be 'tolerated'. They differ from other perspectives because they strongly believe that other sources of water are better solutions for Queensland.

***Brisbane Perspective C*: Accepting and focussed on 'others' in community (13% variance explained)**

This group is accepting of PRW. They do not feel that the SEQ community are being treated as 'guinea pigs', and in fact do not think that there are better water source options available for SEQ. They do not see the PRW as still being sewage and are reassured of its safety based on the use of PRW in other countries. However, they appear to make decisions based on a compromise between recycled water and the potential lack of potable water for SEQ, particularly given the current water crisis. This perspective differs from others because the emphasis given to the role of, and impact on, the SEQ community is of importance. They are glad that the decision was made to withdraw the referendum, and do not believe there is enough time to wait for community consensus. This is possibly due to the salience placed on recycled water as a solution to the current water crisis, as well as the perceived inability of the community to make 'rational' rather than emotional decisions about the issue, in contrast to the scientific community. This perspective is also characterised by a lack of agreement with the argument that PRW will be unfair to sectors of the community who lack a voice.

***Brisbane Perspective D*: Accepting, breakdown/uncertainty focussed, politically/business minded (6% variance explained)**

Although this perspective does not still see the water as sewage and does not feel the people of SEQ are 'guinea pigs', it is characterised by concern about uncertainties and potential system breakdowns. Despite this, those from this perspective have a firm view that the quality of PRW will be better than the current drinking water supply. This perspective is also politically and business focussed. They believe that political interests and processes could compromise the scheme; however, they do not feel that 'local representation' has been lost due to council amalgamations. The accountability and responsibility of those operating the scheme is important. They also do not feel that it will impact the competitiveness of businesses that use the PRW water.

***Brisbane Perspective E:* Health concerned, lack of confidence in company, confidence in government, fairness focussed (5% variance explained)**

This group is characterised by a lack of confidence in the company running the scheme and a belief in the need for strict legal and legislative requirements. This perspective is also characterised by a belief that the scheme could be compromised by political interests. While they are not confident in the company appointed to run the scheme and have conditions requiring the frameworks surrounding the PRW scheme, the group feels strongly that the Queensland government is capable of ensuring a safe system. Concerns for this group centre around health effects, particularly from chemicals and toxins. They do not feel that the treatment process will make the water 'too clean'. This perspective also appears to be characterised by a consideration of 'fairness' issues. They disagree strongly that there is no difference in putting PRW into the drinking water supply because people are not sure what comes out of their taps now. They also do not feel that everyone who is supplied with PRW should pay for it, and do not think it is fair that some people will be forced to drink the water.

***Brisbane Perspective F*: Accepting, framework focused (7% variance explained)**

This perspective is accepting and strongly does not reflect the view of the water as sewage. They do not see other solutions as a better source of drinking water and do not feel the people of SEQ are being used as 'guinea pigs'. They are strongly *not* health concerned. This perspective is focused on the frameworks that underpin the PRW system, including source control, legal and legislative requirements and degrees of accountability and responsibility of the operators. They are not concerned about a lack of capacity to run the scheme, and have confidence in the scientific knowledge that exists around water testing and treatment, as well as in the treatment process itself. They are also community focused believing that the community has the required knowledge and expertise to make a decision about PRW. They also feel that a bigger focus should be placed on reducing water use. They are concerned about the energy intensity of the scheme.

3.1.2. Case Study 2: Ipswich

Four factors emerged as significant for the Ipswich case study, which explains 55% of the variance. For a more detailed understanding of the specific statements that loaded on each factor please refer to the Factor Arrays in Appendix 3. Thoughts about the scheme and the system that were shared by all perspectives were a neutral stance on ongoing government commitment to the scheme, a neutral stance on the scheme's impact on future generations, a relatively neutral stance on whether we need to focus on water reduction, and mild support with the concept that, had the government acted earlier, there would be more water supply options available. A representation of the factors and their relationships is demonstrated in Figure 4.

***Ipswich Perspective A*: Not accepting, lack trust and confidence (21% variance explained)**

This perspective is characterised by a clear lack of confidence in the government to oversee the scheme, humans to run the scheme without incident, and science to identify and overcome problems associated with the scheme. There is a high level of concern with industrial and hospital pollutants and impacts to health. This group considers that PRW is not the right solution to water shortages, and that it need not have been an option had the government acted sooner. They are more likely than others in the Ipswich sample to promote other solutions to water augmentation.

***Ipswich Perspective B*: Reserved acceptance with conditions on legal requirements (18% variance explained)**

This perspective is characterised by a conditional acceptance of PRW. While this group feels that there are benefits of the scheme, there is a strong imperative on appropriate legal and legislative controls and accountable operation of the scheme. There is also concern about industrial and hospital waste. On the other hand, they think the PRW is fair, that it poses no threat to the environment of the dam, and have a reasonable amount of faith in the scientific process. While they feel that PRW is now a necessity, they also feel that the government could have done more to prevent the current water shortage.

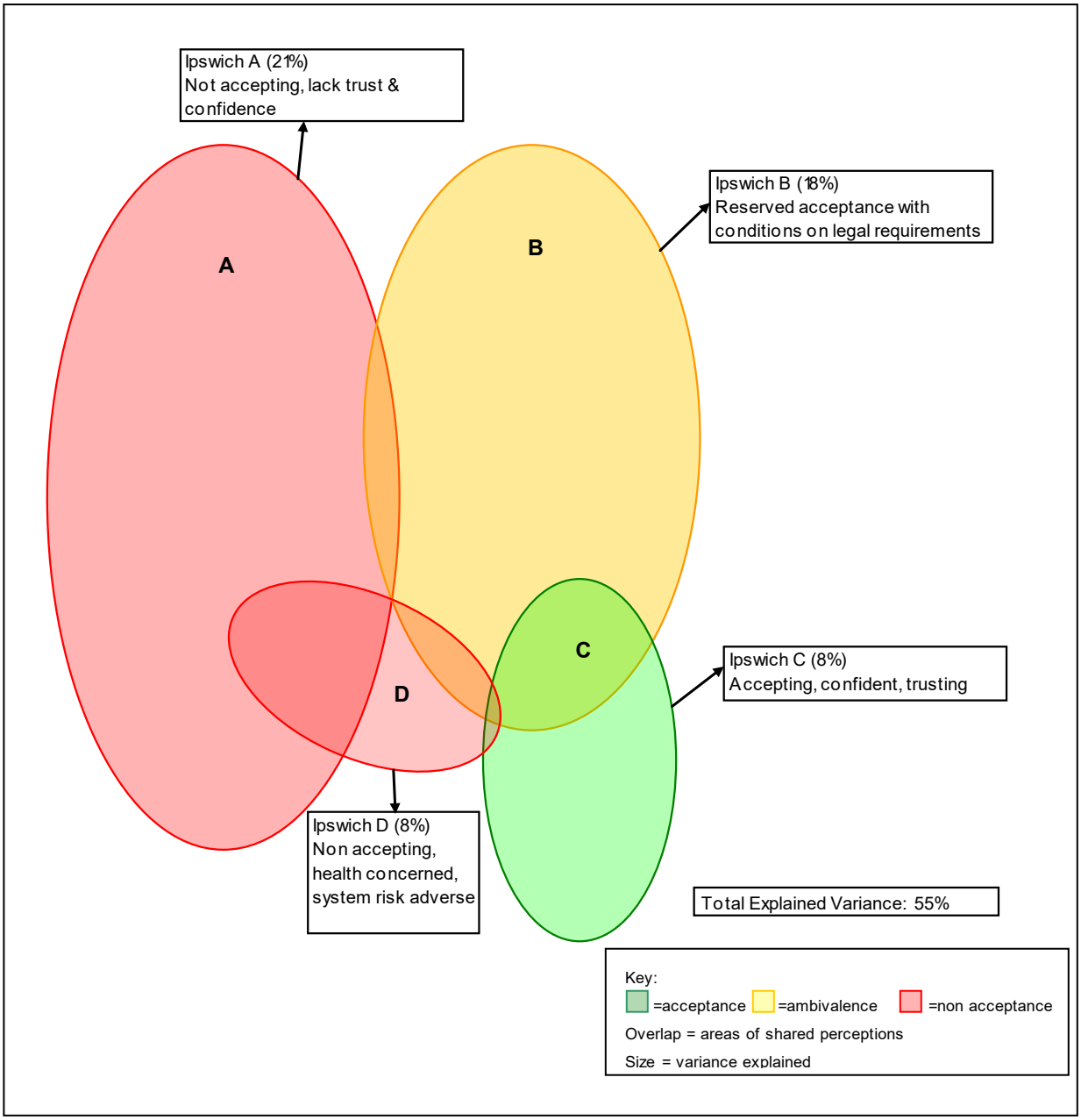


Figure 4. Representation of factor relationships for Ipswich community sort

Ipswich Perspective C: Accepting, confident and trusting (8% variance explained)

This perspective is characterised by confidence in the PRW scheme and a belief that benefits will accrue from its implementation. There is trust in the science and expertise associated with the scheme, and confidence that the scheme will not be detrimental to people's health or the environment. The perspective is differentiated from the others by the view that scientists make their decisions based on fact, while the community bases their decisions on feelings. Interestingly, they are against the notion that everyone in SEQ should pay for the scheme, and are against the withdrawal of the referendum.

***Ipswich Perspective D*: Not accepting, health concerned, system risk adverse (8% variance explained)**

This perspective is characterised by concern about human error and the chance of system breakdown. There is no confidence in the company nominated to run the scheme. There is a high level of health concern as well as environmental concern, particularly in regard to any long term impacts. These risks are seen as significant even when compared with other, everyday risks. Interestingly, the concern is not linked to a fear of political 'meddling' – it is more that, despite its treatment, the water still remains sewage.

3.1.3. Case Study 3: Gold Coast

Six factors emerged as significant for the Gold Coast case study which explains 68% of the variance. For a more detailed understanding of the specific statements that loaded on each factor please refer to Appendix 3 (Factor Arrays). Thoughts about the scheme and the system that were shared by all perspectives were agreement with the importance of responsibility and accountability of those operating the scheme (ranging in value from 0 to 3), strong agreement with the notion that government are looking for the safest not the cheapest water options (ranging in value from 3 to 5), and a relatively neutral perspective about businesses who rely on the PRW water finding it difficult to compete (ranging in value from -2 to 0). A representation of the factors and their relationships is demonstrated in Figure 5.

***Gold Coast Perspective A*: Accepting, trusting and confident (14% variance explained)**

This perspective is characterised more strongly than any of the other factors by the acceptance of the scheme. It is also characterised by a strong trust in science and scientific knowledge, and confidence in various authorities in control of the scheme's safety. This group are strongly unconcerned about the environment or health risks, and are confident in the scheme due to the use of PRW in other countries.

***Gold Coast Perspective B*: Not accepting, concerned about uncertainties, human errors and treatment (21% variance explained)**

This perspective describes a concern for the uncertainty and unknowns of the scheme, particularly about the unknown health impacts. Out of all the perspectives this group most strongly see the recycled wastewater as sewage. This perspective is also strongly characterised by a lack of faith in the treatment process, which may be based on the significant concern for human errors and the lack of scientific knowledge available. It is also based on the reflection of science and government being wrong in the past. The perspective also emphasises the perception of the lack of choice surrounding the scheme. Those who fall in this perspective feel that the implementation of the scheme is a serious concern and they will not tolerate the scheme as an acceptable solution.

***Gold Coast Perspective C*: Accepting with conditions regarding legal requirements (11% variance explained)**

This perspective is reassured about the scheme particularly in terms of its environmental impact, and trusting of government and science. This trust in government is also highlighted by the desire for a group of independent experts to guarantee the safety of the PRW scheme. Despite this trust, legal and legislative requirements for the scheme are highlighted as important. There is also an emphasis on how the scheme is viewed by wider society, including the belief that the scheme is controversial because it is a new concept.

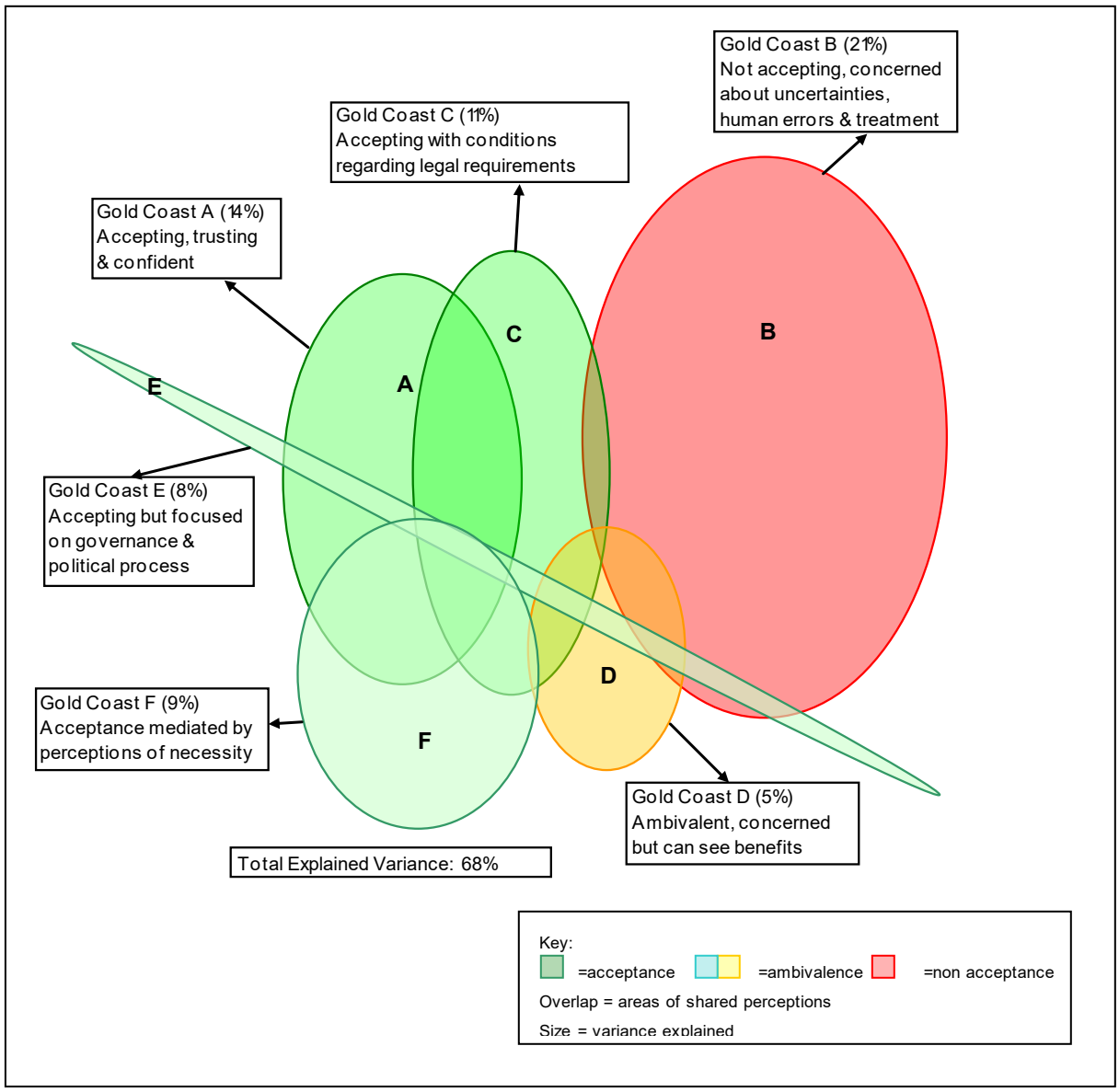


Figure 5. Representation of factor relationships for Gold Coast community sort

<u>Gold Coast Perspective D</u>: Ambivalent, concerned but can see benefits (5% variance explained)

This perspective is characterised by ambivalence around a core set of issues. For example, there are a number of concerns raised about unknowns and uncertainties, health risks, lack of capacity to run the scheme, and lack of trust in government and science. This group expressed the view that they would not "just tolerate" the scheme because of its impending implementation or due to other issues going on in their life. However, they also see the benefit that such a scheme could have for the SEQ community.

<u>Gold Coast Perspective E</u>: Accepting but focused on governance and political process (8% variance explained)

This perspective is accepting and sees the benefits of the scheme but is focused on the role of government and the governance of the system. This focus is expressed through trust in science and independent experts and reassurance that they will responsible for implementing the scheme. It is also expressed in the opinion that there would have been more options if the government had acted earlier. A strong feature of this perspective is that they are concerned about breakdowns and also source control (i.e., the reduction of hospital and industrial emissions). This group does not think there is

enough time to wait until there is a general level of acceptance in the community about the process, or fairness at a general community level. They are however unhappy about their own (lack of) role in the political process, namely the withdrawal of an SEQ referendum as an option to make a decision about this scheme.

***Gold Coast Perspective F*: Acceptance mediated by perceptions of necessity (9% variance explained)**

This perspective is characterised by general acceptance, with confidence expressed in the company appointed, and the capacity available, to run the system. This group think that the scheme needs to have effective legal and legislative frameworks. In addition to this focus on legal and legislative requirements, this perspective is also more likely to hold the belief that the scheme could be compromised by political issues. They have health concerns though these are not due to uncertainty or perceived impact of the water on immunity. These concerns about politics and health may be mitigated into general acceptance by the fact that PRW is seen to be a necessity given the current water crisis.

3.1.4. Case Study 4: Sunshine Coast

Five factors emerged for the Sunshine Coast case study explaining 64% of the variance. For a more detailed understanding of the specific statements that loaded on each factor please refer to Appendix 3 (Factor Arrays). Thoughts that gained consensus across all groups for the Sunshine Coast workshops were the need for strict legal and legislative requirements (ranging in value from 2 to 3), that there will be many benefits from the PRW scheme (ranging in value from 1 to 4), less of a concern that future governments will not be committed to the scheme (ranging in value from -3 to 0), a lack of concern that the cleanliness of the water will impact upon immunity (ranging in value from -3 to 0), a general mild consensus that implementing PRW is a necessity given the current water crisis (ranging in value from 1 to 3) and, interestingly, a lack of concern about local representativeness due to council amalgamations (ranging in value from -4 to 0). A representation of the factors and their relationships is demonstrated in Figure 6.

***Sunshine Coast Perspective A*: Accepting, trusting, confident (25% variance explained)**

This perspective is characterised by a strong acceptance of the scheme, and potential health or environmental impacts are not of great concern. This perspective is characterised by a strong belief and trust in scientists and scientific knowledge underpinning the scheme, and rational decision making (as opposed to community decisions which are perceived as being based on feeling). The evidence that PRW has been used in other countries without a problem is also a strong feature of this acceptance. This group are not concerned about the impact of the scheme for businesses or the SEQ community. This perspective also thinks that it is important to focus on reducing water use.

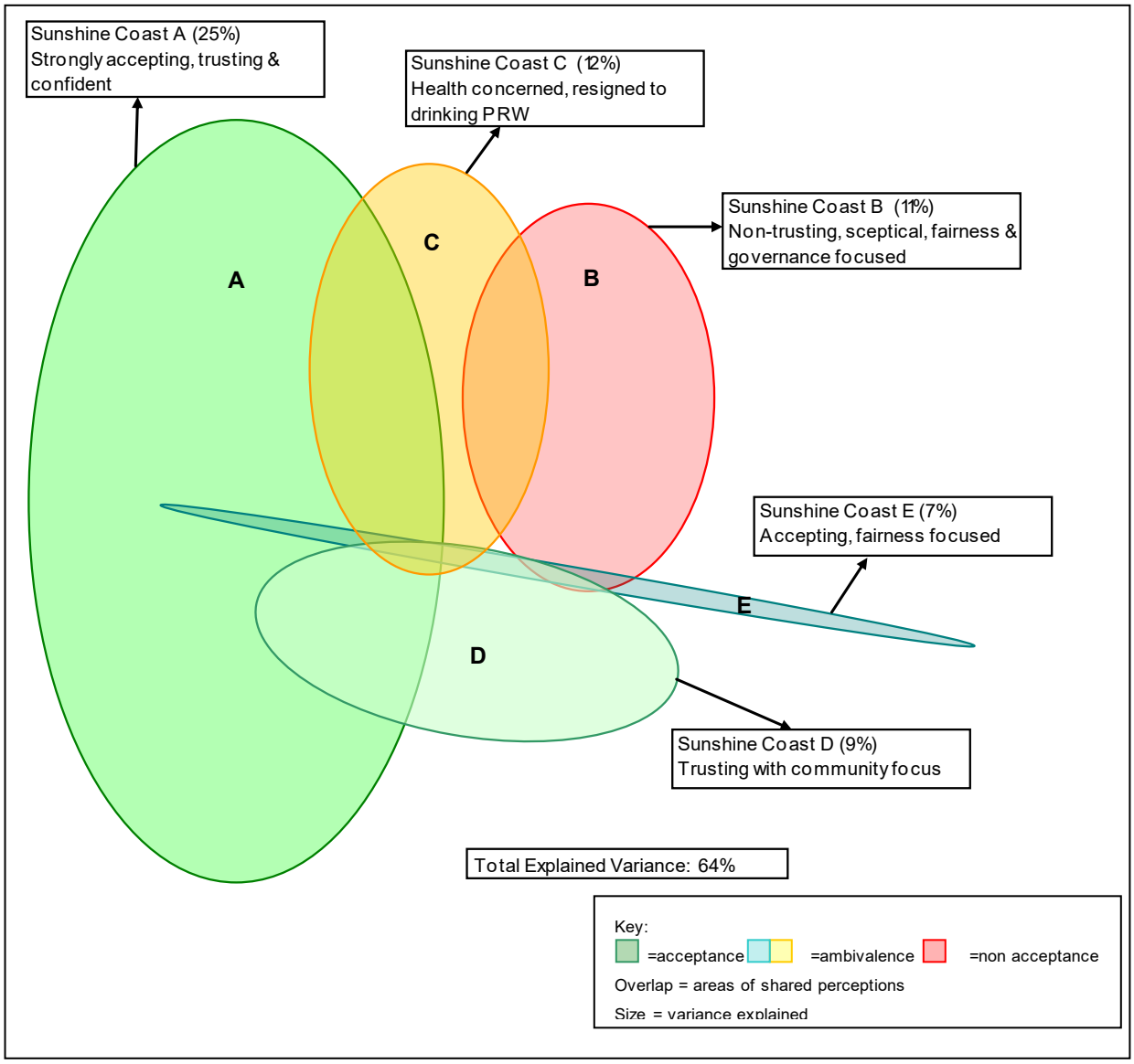


Figure 6. Representation of factor relationships for Sunshine Coast community sort

<u>Sunshine Coast Perspective B</u>: Non-trusting sceptics, fairness and governance focused (11% variance explained)

This perspective is characterised by a lack of trust and confidence in independents or the government overseeing the scheme to safe standards. There is also a lack of trust in scientists to assure the safety of the system. The concerns of this perspective seem to be centred around the role and responsibility of government and fairness issues. The specific concerns are breakdowns and source control. This group's thoughts around the role of governance includes the need for accountability and responsibility of those overseeing the scheme, that the government should be looking for the safest water augmentation options, that the government should have acted earlier, and that the scheme could be compromised by political interests. They also are focused on issues of 'fairness' with strong perceptions about who should use the PRW first, and the belief that PRW will increase the cost of living. They do not see that PRW is a small risk relative to other risks, and have the perspective that we do have time to wait until the majority of the community is happy with PRW before proceeding.

Sunshine Coast Perspective C: Health concerned but partly resigned to drinking PRW (12% variance explained)

This perspective is strongly characterised by their health concerns. For example, a focus on hormones and the build up of chemicals and toxins, and the impact on future generations is a significant feature of this perspective. This focus on health concerns is further emphasised by their desire for stringent source control. However, there is a feature of 'resignation' about this perspective. The group do not perceive the water as still being sewage, and they would rather drink PRW than have with the anxiety of running out of water. They also do not think there will be disparate impacts or degrees of fairness for different individuals, groups or businesses. They do not perceive capacity to run the scheme as an issue. However they do feel the government should be looking for the safest water augmentation options.

Sunshine Coast Perspective D: Trusting of government and safety standards, strong community focus (9% variance explained)

This perspective is strongly characterised by a trust and confidence in governments and the company appointed by the government to oversee the PRW system. This perspective is also highly confident in the treatment process. Accountability and responsibility for those operating the scheme is also important. Interestingly, this group is characterised by a lack of trust in scientists to ensure the safety of the system. There is also an interesting importance placed upon a number of the community related topics. For example, they do not think that the PRW scheme is unfair for people forced to drink the water, or that there are potential problems for future generations. However, they do believe the community can agree on the issue, and have the required information and expertise to make a decision about PRW. They do not feel that the 'real issue' is population growth, but feel there would be more options if the government had acted earlier.

Sunshine Coast Perspective E: Accepting with strong opinions on fairness (7% variance explained)

This perspective is strongly unconcerned about any potential environmental or health risks. However, they do perceive that there could be some people who are more likely to suffer potential health effects. They are concerned about breakdowns and source control, and the accountability and responsibility of those who are overseeing the scheme. Despite the belief that high users and polluters should use the water first and that the costs of the water should be shared evenly across users in SEQ, other 'fairness' issues are strongly unlike their point of view (for instance, they are strongly unconcerned about people being forced to drink the water, and don't believe it will impact adversely on living costs). They also focus strongly on reducing water use.

3.1.5. SEQ Community Combined Results

As explained previously, Q-Methodology is not concerned with generalisability of results, it differs somewhat from survey methodology in that it can cope with smaller sample sizes. The benefit of Q-Methodology is that it can provide detailed descriptions of small groups of people with an often suggested sample being between 30-40 sorters (Addams 2000). As has been shown through the detailed examples in the case studies above, the methodology provides an opportunity to investigate, in depth, a range of people from different communities. As has been captured in the previous sections, this analysis provides information beyond the baseline behavioural survey (Nancarrow et al., 2007), about the different features and aspects that are important for those people who are accepting, and also a more detailed understanding of those who are ambivalent or not accepting. However, there is also usefulness in presenting the combined workshop data, and linking it with the behavioural survey results. The following section discusses that amalgamated data.

The results from the combined community data set indicate that there are two major groupings of people. These two factors can account for an impressive 45% of the variance among all community participants. For a more detailed understanding of the specific statements that loaded on each factor please refer to Appendix 3 (Factor Arrays).The bulk of participants loaded on Factors A (24% variance explained) and B (17% variance explained). This suggests that the divergent perspectives that were captured in each of the case studies above can be roughly translated into two rough groupings – one group in Factor A that is largely accepting and another group in Factor B that is largely

unaccepting of the scheme – but again, it should be noted that such an amalgamation means that many of the fine nuances that distinguish similar perspectives are lost.

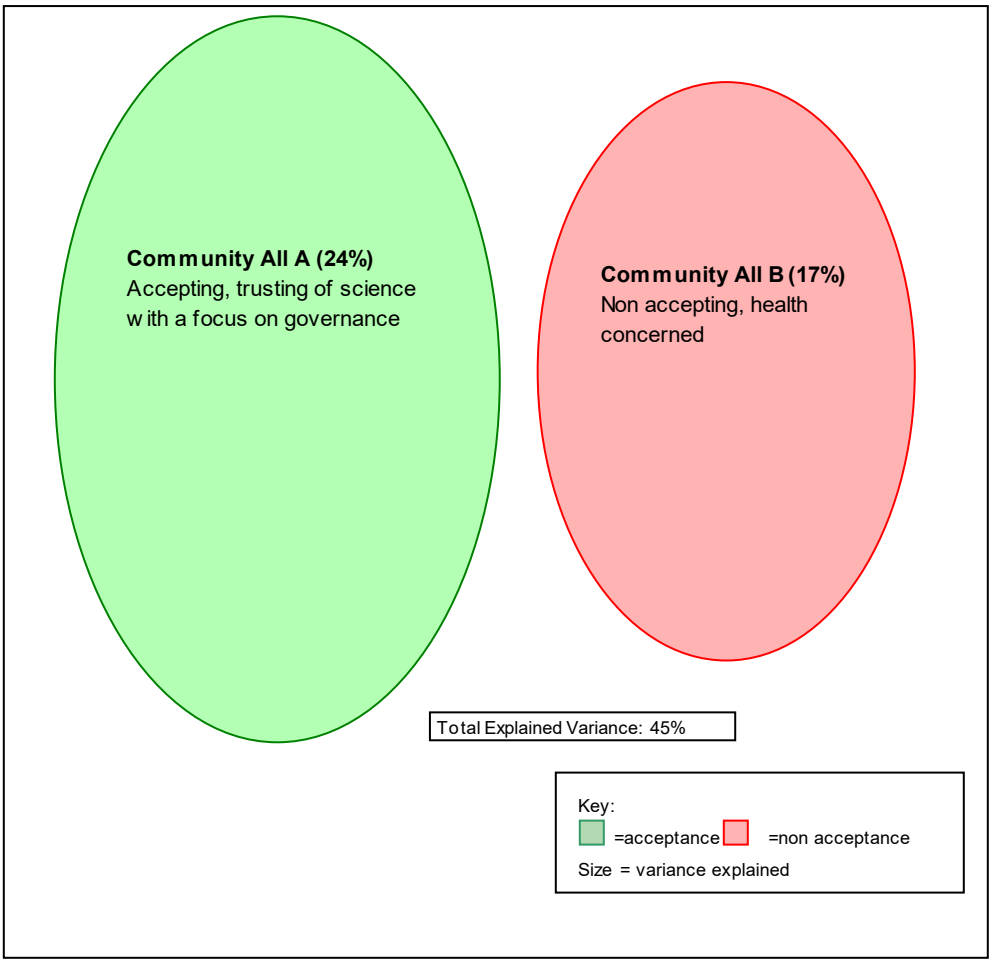


Figure 7. Representation of factor relationships for community combined results

<u>Community All Perspective A</u>: Accepting, trusting of science with a focus on governance (24% variance explained)

This general perspective is accepting, do not perceive the water as still sewage and believe that there are a number of benefits that can be derived from the scheme. This group highlights the importance of source control, strong legal and legislative arrangements, and the accountability and responsibility of the people operating the scheme. They are strongly unconcerned about future expertise and have a strong belief in the existing scientific knowledge about water treatment, in particular about chemicals and the impact of the water on immunity. They also take the examples of its use in other countries as evidence for its safety, see the scheme as fair and do not see that the SEQ community are being used as guinea pigs.

<u>Community All Perspective B</u>: Not accepting, health concerned (17% variance explained)

This general perspective is characterised by strong concerns, particularly in regard to the possibility of human error and the inadequacy of scientific knowledge and therefore the fallibility of the treatment process. Health risks posed by the water are a fundamental concern, including the risk to future generations, even when compared with other risks that one might encounter in other aspects of life. There is strong disagreement that PRW will produce water better than that presently being used for the water supply. It is a strongly held view that government should be looking at implementing schemes that are the safest, not the cheapest, and that there are better supply alternatives to address water shortage problems.

3.1.6. Gender Differences

A chi-square test revealed no significant differences between gender and factor membership.

3.2. Technical PRW Results

The participants involved with the technical Q-Sort were asked to each complete two sorts, the first being from their own perspective and the second from the perspective of *community* perceptions of risk. These two separate sorts were included in the Q-Sort methodology to determine whether differences exist between community perceptions and technical perceptions of community. Previous research conducted by ARCWIS (Browne et. al. 2007) has demonstrated that community Q-Sorts exhibit a high level of heterogeneity whereas technical perceptions of community reveal a high level of homogeneity. The data from the current technical sorts is analysed and presented separately for ease of comparison.

3.2.1. Technical Perspective (Self)

Six factors emerged as significant for the technical perspective case study which explains 74% of the variance. For a more detailed understanding of the specific statements that loaded on each factor please refer to Appendix 3 (Factor Arrays). All technical perspectives shared similar views on the following: reducing hospital and industrial waste is important (ranging in value from 1 to 4); government is looking for the safest and not the cheapest water options (-1 to 3); individual support for PRW but belief that it will be difficult to convince others (-2 to 0); relatively strong disagreement with the concept of highly treated water still being perceived as sewage (-5 to -3); and a neutral perspective that everyone supplied with water in SEQ should be paying for the PRW scheme.

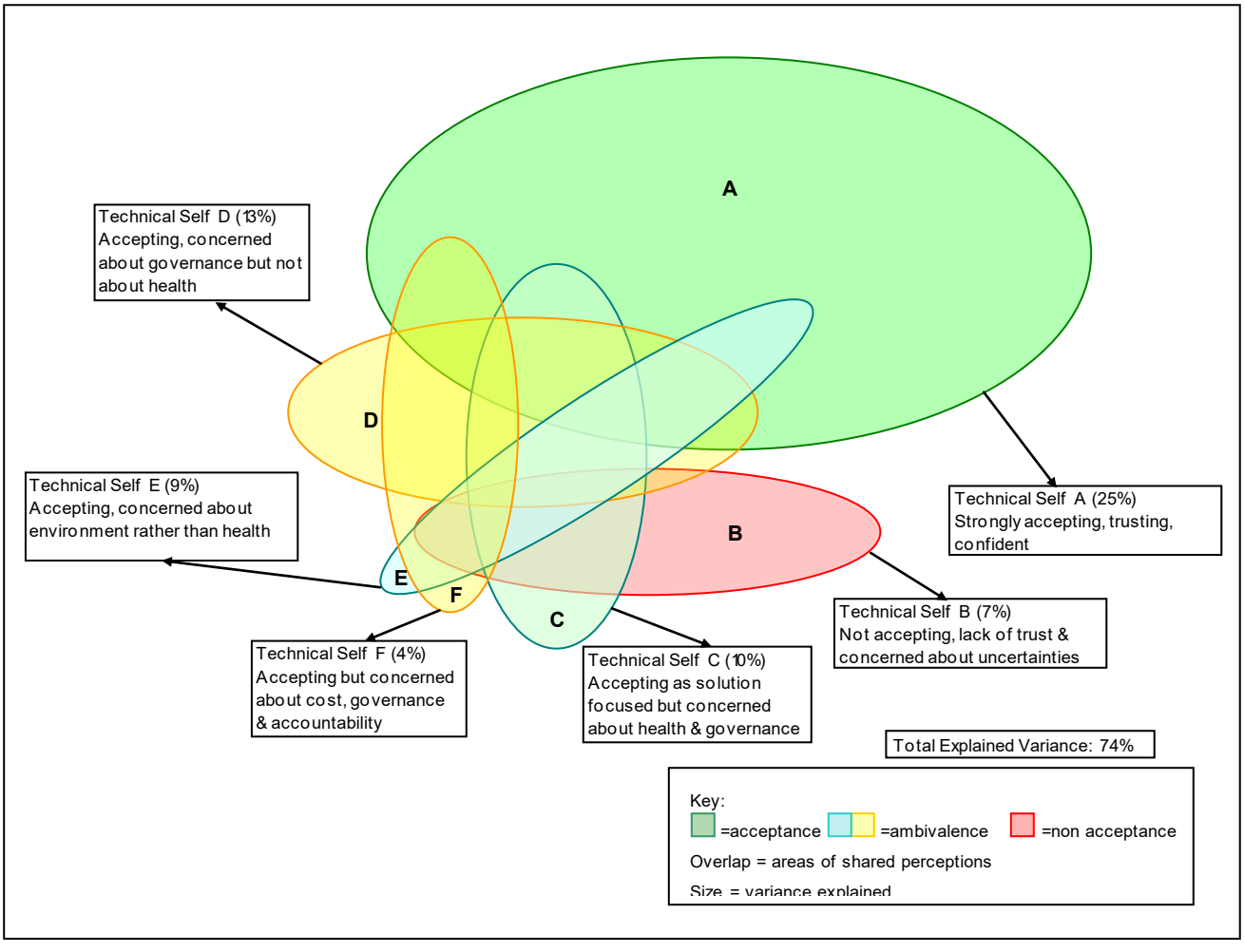


Figure 8. Representation of factor relationships for technical (self) sort

***Technical Perspective Self A*: Accepting, trusting and confident (25% variance explained)**

This perspective is strongly accepting of the scheme and has confidence in the treatment system. There is trust in government to oversee the scheme and belief that there is enough knowledge about water for informed decisions to be made. This group also believe that people are exposed to many risks everyday and therefore the risks associated with the scheme are minimal. The biggest concern is that there needs to be strict legal and legislative requirements surrounding the management of the system. This perspective believes that health effects are of the least concern, particularly hormones in the water and chemical build up. Those of this perspective also believe that people of SEQ are *not* being used as guinea pigs.

***Technical Perspective Self B*: Not accepting, concerned about uncertainties and lack of trust in government and scientists (7% variance explained)**

Overall, this perspective is not accepting of the scheme, particularly due to concerns about future unknowns and uncertainties. There is a lack of trust in scientific knowledge and in the capabilities of the Queensland government to ensure safe system standards. It is also thought that strict legal and legislative requirements are necessary; however political interests and processes could compromise the scheme. Those of this perspective also feel that the water is not guaranteed to be safe just because there are similar schemes in other countries or because the authorities are saying so. There is also disagreement that scientists base their decisions on fact and the community on feeling.

***Technical Perspective Self C*: Accepting as finding a solution to the crisis is priority, although concerned about health risks and governance (10% variance explained)**

This perspective is accepting of the system as finding a solution to water management issues is viewed as a priority. Those of this perspective were glad that the referendum was withheld and believe that reducing water use is important. Therefore they would rather drink PRW than be faced with the anxiety that water supplies may run out altogether. Despite this urgency, health risk concerns are raised and reducing industrial and hospital waste is also seen as a priority. Those of this perspective believe that the system should be administered to all, not just those who pollute or use more water. Accountability and having legal/legislative requirements is also seen to be crucial to the success of the scheme.

***Technical Perspective Self D*: Accepting, concerned about governance, not concerned about health (13% variance explained)**

This perspective believes that there will be benefits from the PRW scheme but there needs to be accountability and strict legal/legislative requirements for it to be successful. It is also thought that there is no other choice given the current water crisis. Those of this perspective are not concerned about human health risks but do think that the water may not be clean enough for the environment and that reducing hospital and industrial waste is a priority. This perspective also feels that the people of SEQ are not being used as guinea pigs but agree that the community do not have the required expertise or information to make a decision.

***Technical Perspective Self E*: Accepting, concerned about environment rather than health (9% variance explained)**

This perspective believes that there would be many benefits from the scheme and their concerns are targeted towards reducing water use and controlling population growth. The belief that the government should have acted earlier is apparent and it is thought that future governments would remain committed due to no other choice. There is also concern about lack of scientific knowledge about chemical reactions and environmental effects. Health risks are not seen as a concern and the system is perceived to be fair to businesses.

***Technical Perspective Self F*: Accepting, although concerned about cost, governance and accountability (4% variance explained)**

This perspective generally accepts the system but feels that human error could make the scheme risky and that those operating the system must be accountable and responsible. There is also little trust in the government's capacity to ensure safe standards. It is thought that an increase in water cost would lead

to an increase in the cost of living, therefore reducing water use needed to be a focus for the future. Health risks are seen as minimal as people were not sure about the contents of current water supplies. Those of this perspective disagree that PRW will make water too clean and also disagree that no matter what the treatment it would still be seen as sewage, therefore confirming that the water treatment is acceptable.

3.2.2. Technical Perceptions of Community Perspectives

Four factors emerged from the Technical Perception of Community Q-sort which explained 77% of the variance. Appendix 3 (factor arrays) has a more detailed account of the specific statements that loaded onto each factor. Overall six statements gained consensus across all technical perception of community factors. Fairly neutral perspectives were shared about political interests and processes compromising the PRW scheme (values ranging from -1 to 2); government looking for water options that are the safest, not the cheapest (-1 to 2); and if scientists cannot agree on many things, how can the community be expected to agree (-2 to 1). There was shared agreement about concerns of the build up of chemicals and toxins in the body (2 to 4) and about concerns of hormones in the water (1 to 4). It was strongly agreed across all factors that the biggest concern is the health effects of the PRW scheme (4 to 5). A representation of the factors and their relationships is demonstrated in Figure 9.

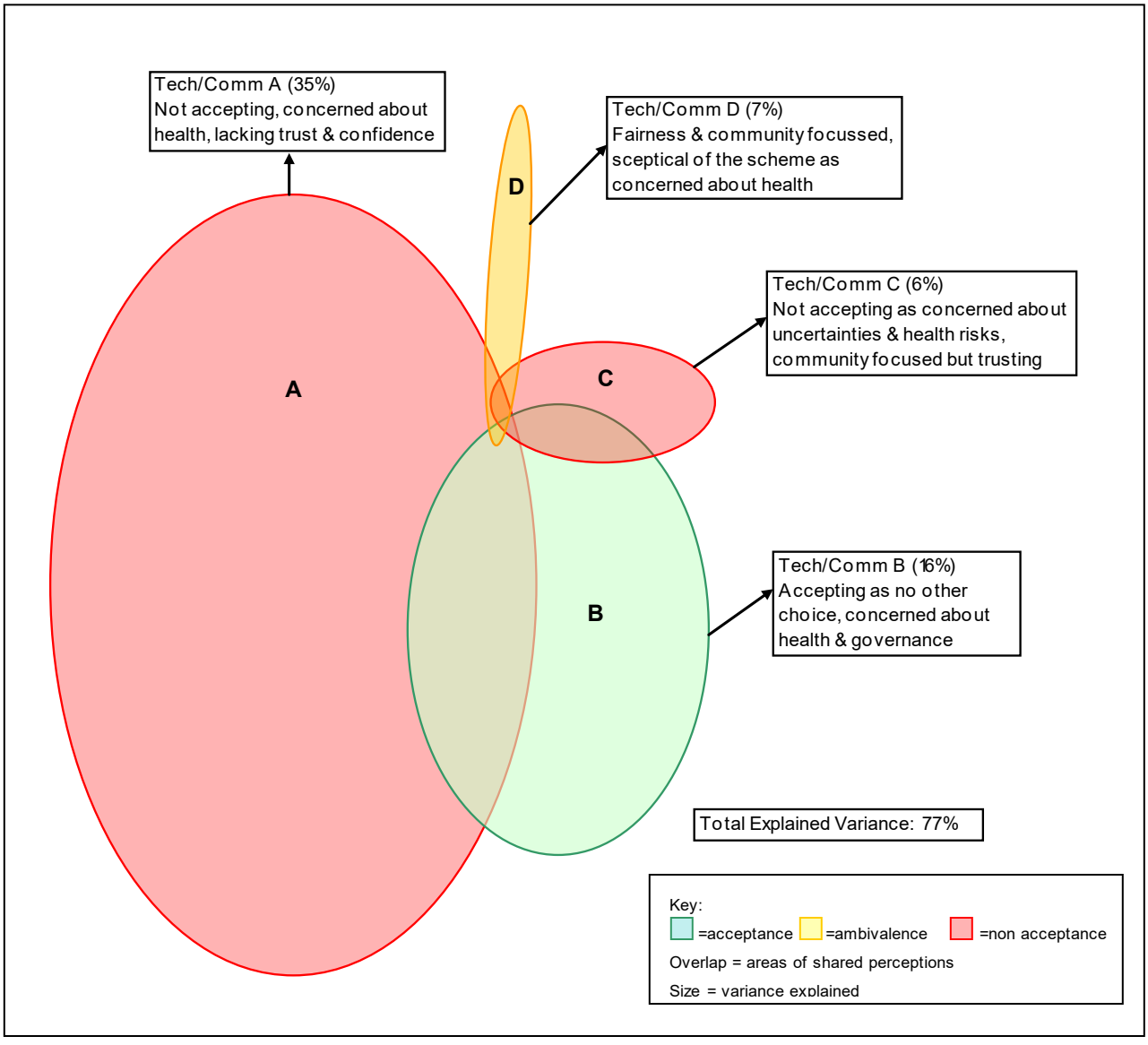


Figure 9. Representation of factor relationships for the technical perceptions of community sort

Technical Perception of Community Factor A: Not accepting, concerned about health, lacking trust and confidence (35% of the variance explained)

This perspective of community believes the scheme is unacceptable and that there are other solutions that would provide a better source of water for the future. The technical people loading onto this factor believe that the community is deeply concerned with related health issues such as hormones in the water and unknown diseases. Those of this perspective see community as having a lack of trust in government capabilities and in scientific knowledge about water. An overall lack of confidence with the scheme was evident, as was concern about PRW scheme uncertainties and unknowns. Overall the scheme was viewed as a large risk that communities would not be willing to take and that the scheme would not be better than the current drinking supply.

Technical Perception of Community Factor B: Accepting as see no other choice, concerned about health and governance (16% of the variance explained)

This technical perception of community is characterised by an acceptance of the scheme but only because they see no other choice. It is believed that implementing the PRW is a necessity given the current water crisis and that the government should have acted earlier because now the scheme will go ahead regardless of how the community feels. There is also the perception that the community are more concerned about health than environmental impacts, as those of this perception disagree that the community will consider the scheme as energy intensive or a cause of algal blooms. Overall health effects are seen as the biggest concern, particularly the effects from hormones being present in the water. This perspective also acknowledges that the community have a need for accountability and strict legal and legislative requirements but disagrees that the community think that future governments will not be committed.

Technical Perception of Community Factor C: Not accepting as concerned about uncertainties and health risks, community focussed but trusting (6% of the variance explained)

Those loading onto this perspective felt that the community is not accepting of the scheme and would not tolerate it as there are strong concerns about health, particularly effects on future generations. It is also believed that the main focus should be on reducing water use, rather than implementing the scheme. This perspective is also characterised by a strong community focus as it is thought that the referendum should not have been withheld and that the community do have the required expertise to make a decision. To further this, this group thought that the community would disagree that scientists base their decisions on fact and community on feeling. Those adhering to this perspective also feel that the community is not accepting of the scheme due to uncertainty as to what could go wrong. Despite non-acceptance of the scheme there is belief that the community has trust in scientific knowledge and authorities as the scheme would not go ahead unless the authorities were satisfied it was safe.

Technical Perception of Community Factor D: Fairness and community focussed, concerned about health, sceptical of the scheme (7% of the variance explained)

This technical perspective of community strongly disagrees that the real issues are related to population growth or cost. Instead they believe that the community are concerned about the health effects from the PRW scheme such as chemical and toxin build up over time. Those of this perspective are also focussed on fairness as it is agreed that some people are more likely to suffer from potential health effects than others and that the community would rather that the referendum was *not* withdrawn. This perspective also agreed that it is unlikely that scientists can know how chemicals will react together and believed that human errors are always possible, therefore perceiving the scheme to be a risk. It was also felt that those community members sceptical of the scheme would feel reassured if there were international experts guaranteeing PRW safety. There was also the perception that certain community individuals would see themselves as accepting of the scheme but believe that there would be a hard time convincing others.

3.3. Issues Missing

As part of our research design we asked our participants if they felt that anything was missing from the statement set that more accurately reflected their perspective or opinion. Table 4 below summarises the issues that people identified.

Table 4. Issues participants identified as missing from the statement set

Education/public information (for example: on process, didn't realise happening so soon, don't know company, what goes into water before it is cleaned, how is it being billed, more effects, more on use in other countries)
Fluoride in water
Separate source for Drinking Water / Fit for purpose uses
Preventing people putting contaminants in the water system / Water-based terrorism
More conservation/saving/reducing/storing options
Community involvement in the board overseeing the scheme
Define 'independent' experts
Role of media
Bottled water impact if people choose not to drink PRW (recycle like SA)
Longitudinal studies
Councils abusing water

4. DISCUSSION AND CONCLUSION

Using Q-Method to understand technical and community aspects of risk in relation to PRW has facilitated an understanding of the range of viewpoints that are disparate, favoured or shared between groups. The study has highlighted subjective and meaningful aspects of people's decision making and consideration of risk around this issue. Emergent typologies reflected a detailed understanding of the elements of risk that were currently considered by participants. Although factors (or 'typologies') and descriptions represent generalisations or a 'typical' way of thinking that summarises the people who load on a similar factor, the results should not be extrapolated or generalised to the wider community (Brown 1996). Typologies that emerge from Q-Method are specific to study participants and may alter if Q-Method is administered to groups at a later time, or to another set of participants. However, this does not limit the research study's community component. While Q-Method does not always allow for specificity in terms of frequency of attitudes and generalisability of opinions to a wider population, the methodology provides knowledge of characteristic features and dimensions of risk in relation to PRW in SEQ (Previte et al. 2007). Further, for the *technical* component of the Q-Method, the sample who participated in the technical Q-Sort represents a significant number of key technical players involved in the PRW 'discourse'. As such, the Q-Sorts for the technical group can be said to legitimately provide representativeness in regards to the different frameworks operating in relation to attitudes and decision making in response to PRW in SEQ.

4.1. Community Q-Sorts

While the community Q-Sort case studies alluded to a large range of ways of thinking about PRW, there were a number of common threads running across the separate case studies. Chief among these was a strong caveat placed upon people's acceptance that a sound legal and legislative framework be put in place to oversee the scheme, with a strong emphasis on both accountability and responsibility.

Another emergent theme concerned the main motivations for non-acceptance of the scheme. A recurrent message here was that people in these groups were concerned about health effects, and that these concerns were due to, or at least exacerbated by, the perceived fallibilities of the system. That is, while health concerns were common, they were predicated on perceived system risks.

With regards to other typologies revealed by the case studies, a diversity of issues appeared as salient in people's minds, including the perceived fairness of the scheme and judgements about how capable the general public was of making informed decisions.

An interesting element of the overall community sort – where case study data was combined - was that the factor associated with acceptance of the scheme was characterised by positivity. That is, concepts such as confidence in the treatment process and scientific knowledge were accentuated, rather than acquiescence, or an acceptance borne out of a sense of perceived lack of alternatives.

4.2. Technical Q-Sorts

The technical Q-Sorts elicited a greater degree of heterogeneity than in previous research in the context of indirect potable wastewater systems (see Browne et al. 2007). This suggests a quite large degree of complexity in attitudes towards the PRW scheme; possibly a product of vigorous dialogue that has taken place in the technical and professional realms over the life of the scheme's conceptualisation and development.

While the major technical factor was accepting, trusting and confident, some of the technical typologies reflected concerns, such as the need to reduce pollutants entering the waste stream and a concern over whether health risks had been suitably addressed.

4.3. Points of Commonality and Difference

4.3.1. Legal and Legislative Requirements

One of the major themes to emerge from both the community and technical Q-Sorts concerned the emphasis placed on legal and legislative frameworks, accountability and responsibility. Importantly, this emphasis was particularly so in factors where there was already general support for the PRW scheme, suggesting that this area may provide a fundamental basis from which to ensure that ongoing majority support of the scheme is enjoyed.

4.3.2. Technical Perceptions of the Community

There is sometimes a tendency in posited recycled wastewater schemes for planners and researchers to get preoccupied with thinking about the impact of community perspectives. This perspective is often characterised by a perception that the community will be relatively non-accepting, emotion driven, preoccupied with health concerns, and have a lack of faith and confidence in scientific, policy and management processes. Indeed, this is reflected in the predominant typology emerging from the technical expert Q-Sort from the lay community perspective.

In contrast, as was evidenced with emergent factors for the community case studies, the strongest typologies from actual community participants frequently consisted of people who were not in fact opposed to the scheme. That is, in most cases the dominant factor was characterised by people who were accepting, with appeased health concerns connected to the scheme. Put another way, the features of the strongest typology for technical perceptions of community drinking water were in direct contrast to the most salient community typologies that emerged.

A further difference to emerge was the notion that a major driver of community acceptance is the feeling that current water level 'crisis' left no other choice than to accept the scheme. As suggested above however, a characteristic of accepting community groups was a positivity in regards to the nature of the scheme (such as a confidence in the science behind it), rather than pessimism about the repercussions of not implementing the scheme.

4.3.3. Relative Risks

For many of the community typologies, there was a salient or strong disagreement with the idea that, when viewed in the context of all the other risks faced in one's everyday life, the risk posed by PRW is rendered insignificant. Of interest here is that the idea of 'relative risk' is often utilised by technical experts as a means of argument to convince community about the safety of recycled water schemes. This is reflected in the main technical factor, where the relative risk statement features prominently. This thinking, while often espoused by technical specialists, does not appear to be convincing to the community case study participants.

A possible explanation as to why the concept of relative risk is not influential might come in the form of cumulative risk. The belief in the possibility of cumulative risk was mentioned by community members involved in the scoping phase of the project (Alexander et al. 2007) – both in terms of cumulative health impacts and in terms of the compounding of a myriad of small risks (that is, PRW is yet another risk, albeit small, to add to the risks one is already exposed to). Regardless of whether this perspective is justified in a scientific sense, it suggests that communicating the risks of PRW by presenting them as inconsequential when compared to a host of unrelated risks needs careful consideration.

4.4. Conclusion

The findings here highlight the potential traps of anticipating the types of questions and concerns of the community in relation to risk, and tailoring research and policy processes according to these *perceptions* of community concern. The findings suggest that there is potential value in pursuing a deliberative process, in which an authentic and ongoing dialogue between the community and the technical people is established *and* in which community concerns and questions are addressed either through information or input to the science. Such an approach might involve a range of stakeholders from a variety of perspectives. These stakeholders, whilst acknowledging areas of agreement, could concentrate on the points of difference in perspectives and identify how these areas might best be demonstrated to the broader community. The broader community could also be assured that their perspectives and concerns are being discussed with the scientists. Investigation of this will form the next stage of the *Systematic Social Analysis Project* and will facilitate the integration of social science with bio-physical sciences in the *Purified Recycled Water Project*, and also provide insights for the *Enhancing Institutional Capacities Project* in the Research Alliance.

Q-Method also presents as a valuable longitudinal tool for understanding and tracking changing community opinion through time. As the scheme comes online and the community accesses more information about its workings, a barometer of changing risk perceptions may be regarded as valuable information for scheme implementation and its ongoing support.

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APPENDICES

APPENDIX 1

SCENARIO FOR Q-METHOD PARTICIPANTS

South-East Queensland has experienced a significant reduction in rainfall over the past 30 years with a record drought over the past five years or so. The reduced rainfall may continue with the onset of climate change. With the increasing population, there is a need to provide reliable sources of water for the future of the region. Most of the water supply for South-East Queensland is from dams, such as Wivenhoe Dam, North Pine Dam and Somerset Dam. Due to the length of the drought, most of the dams' levels are now around 35%[5].

The South-East Queensland community has been working to reduce water use, and the Queensland Government is investing in new sources of water. A desalination plant is being built on the Gold Coast to provide water from the sea. Another major source is to use water more than once. Currently, the water used inside our homes in the kitchen, laundry, bathroom and toilet, goes to wastewater treatment plants, where it is treated and disposed into rivers and Moreton Bay. The government has now decided to treat this water to a very high standard and use it to replenish Wivenhoe dam. From there, the purified recycled water will be supplied to homes and businesses for drinking, washing, cooking and all other uses.

The treatment plants at Luggage Point, Gibson Island and Bundamba will treat the wastewater through a seven barrier process to drinking-quality using the best available science. The process will remove solids, chemicals from industry and households - including oils and greases, cleaning products and pesticides -, as well as bacteria and pathogens. Some small amounts of chemicals may pass the barriers, but there are no current proven health effects from them. The treated water will be piped to Wivenhoe Dam where it will mix with normal fresh water. It will later be taken out, treated again in the normal drinking water treatment processes, and piped to houses and businesses. Some people and businesses could still provide their own water by installing a rainwater tank or buying bottled water.

The details of who will manage and oversee the scheme have not yet been finalised, however a likely structure is as follows. The Queensland government will appoint a special body to oversee the whole scheme and the government will receive ongoing advice from the Queensland Water Commission, assisted by an Expert Advisory Panel. Veolia Water, a private company with world-wide experience, will be responsible for operating the scheme and treating the wastewater to stringent water quality standards. Queensland Health will be responsible for setting the standards according to the Australian Guidelines for Drinking Water and for Recycled Water. The Department of Natural Resources and Water will be responsible for ensuring Veolia Water meets these standards.

Figure 10. Introduction given to Q-Method participants

[5] Combined dam level details correct as of 11/02/08 from http://www.qwc.qld.gov.au/Water+use+measurement.

APPENDIX 2

CONDITIONS OF INSTRUCTION AND SORTING PROCEDURE FOR Q-SORT

General Community Conditions of Instruction

You have in front of you a series of cards and a board on which we will ask you to place the cards. Each card holds one statement. The purpose of this exercise is to sort the cards according to which statements most closely represent *your point of view* based on the information given to you above and your other knowledge and feelings about the PRW scheme for South East Queensland. The following two pages is a guide to sorting the cards.

Technical Professionals Conditions of Instruction

You have in front of you a series of cards and a board on which we will ask you to place the cards. Each card holds one statement. The purpose of this exercise is to sort the cards according to which statements most closely represent *your point of view* based on the information given to you above and your other knowledge and feelings about the PRW scheme for South East Queensland. We will be asking you to complete this task twice:

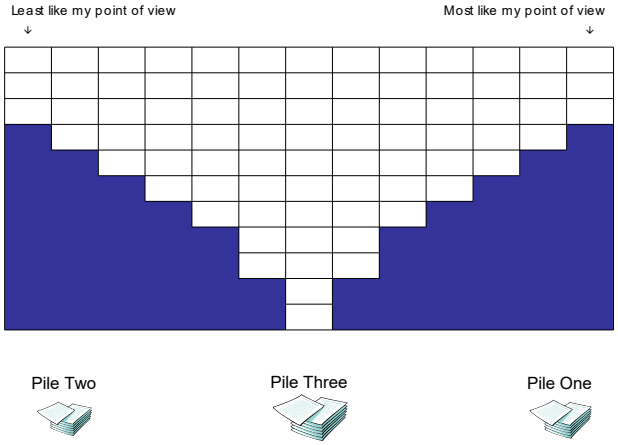
1. First, sort the cards according to what most closely represents *your point of view on the issue.*
2. After someone records the information from Stage 1 sort the cards according to what you think most closely represents the *general community's point of view on the issue.*

The following two pages is a guide to sorting the cards.

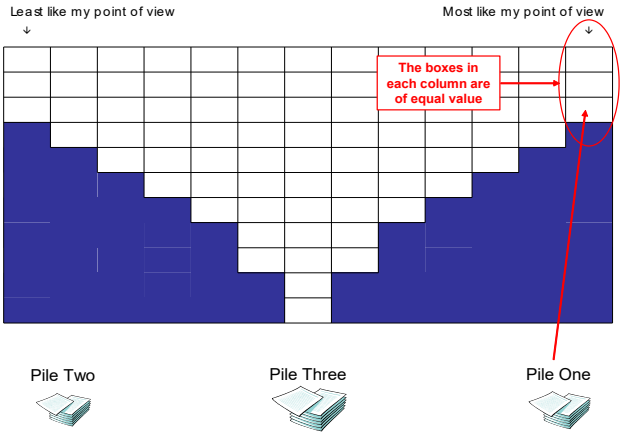
Step 1:

Read through the cards to become familiar with the statements. As you are doing so, sort the cards into three piles:

- Pile One - statements that are *like* your point of view
- Pile Two - statements that are *unlike* your point of view
- Pile Three - statements that you are *uncertain* about or feel *neutral* towards.



Don't worry if the number of cards in each pile is not the same!

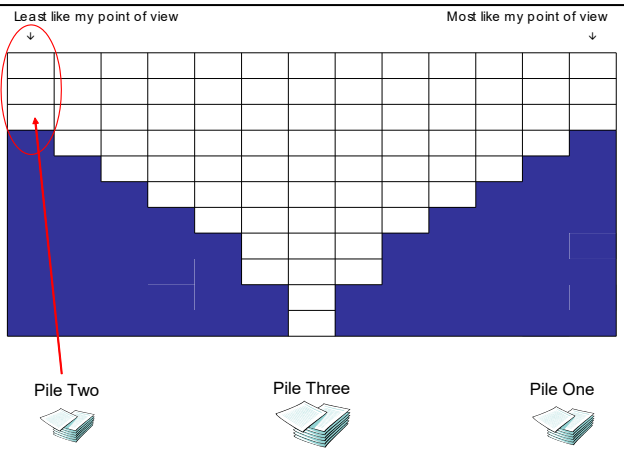


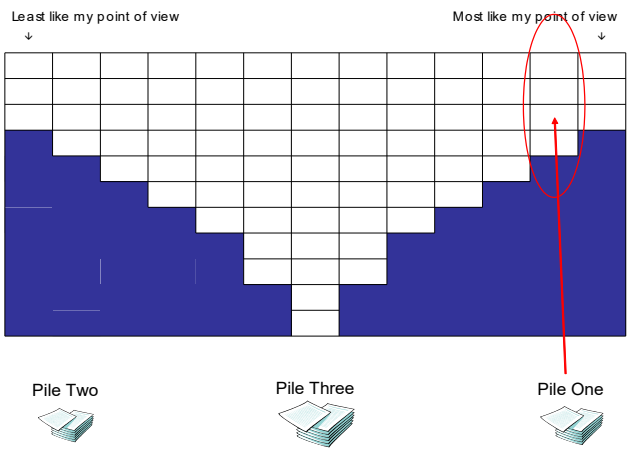
Step 2:

Once you have placed the cards into the three piles, start sorting them onto the board in front of you. Place the three cards from Pile One that are most strongly *like* your point of view into the extreme right hand column.

Step 3:

Once you have done this, place three cards from Pile Two that are most strongly *unlike* your point of view into the extreme left hand column.



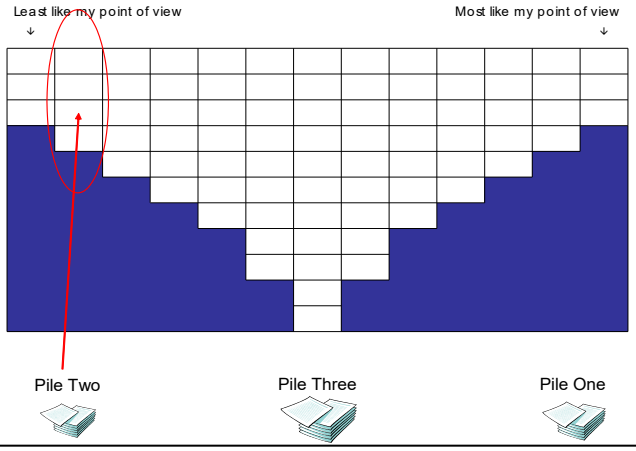


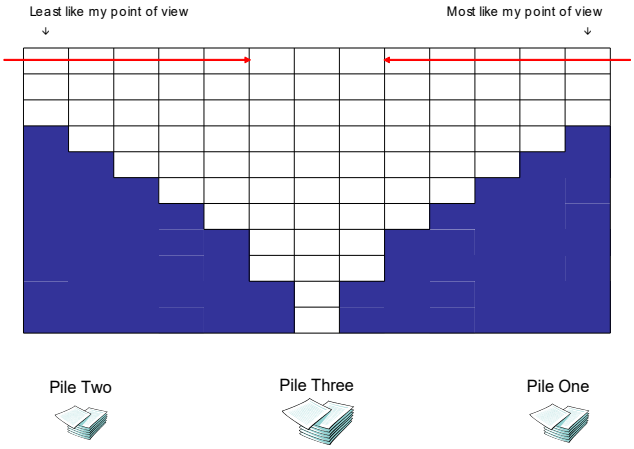
Step 4:

Returning to the right side of the board, now pick the four cards out of the remaining cards in Pile One that are most strongly like your point of view. Place these into the next free column on the right.

Step 5:

Continue by moving to the left of the board and the next free column and similarly place the four cards from Pile Two that are most unlike your point of view.



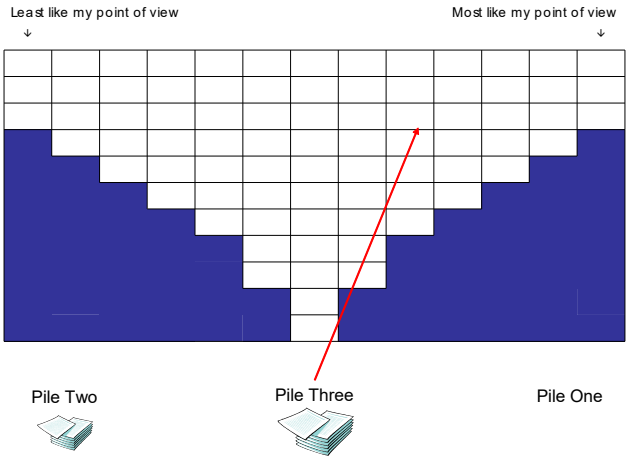


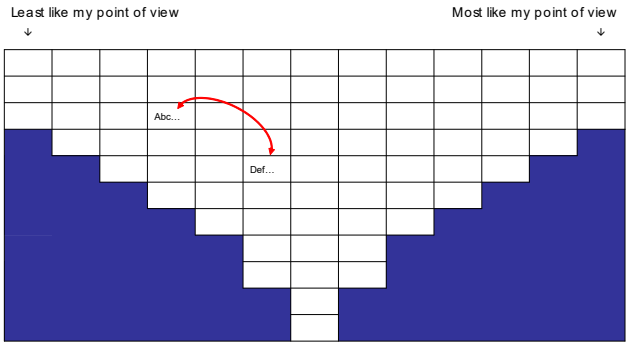
Step 6:

Continue placing the cards from Pile One and Pile Two onto the board, moving back and forward from the right to left hand side of the board, working towards the middle.

Step 7:

If you run out of cards from Pile One/Two then move onto the cards you have placed in Pile Three and continue sorting the statements in the same manner according to which statements are most like/most unlike your point of view.





Step 8:

At any stage you may switch cards that you have placed in one column with cards in another column. Once you have finished sorting all of the cards onto the board – do a final check and move any cards that you wish.

APPENDIX 3

Q-METHOD FACTOR ARRAYS

Table 5. Brisbane community PRW statements and their factor rankings (factor arrays)

Statements	Factor Rank					
	1	2	3	4	5	6
Unknown Risks/Uncertainties (inc what is actually not known and public perceptions of unknowns)						
1. I am worried about diseases that we don't know about yet.	-1	2	-2	2	1	-3
2. It is the uncertainty of what could go wrong that troubles me.	-1	2	1	4	0	-2
3. Scientists and governments have been wrong in the past about what is safe for us, what is to say they won't be wrong about this too?	-2	1	0	0	3	-1
4. It will be a long time before we will really know what the impacts are.	0	3	-1	-1	3	1
Trust						
5. I would be reassured that the water was safe if there was a panel of independent experts who could guarantee its safety.	2	2	1	0	-2	1
6. I trust the government to set and oversee safe standards.	3	-1	-3	-2	-2	-1
7. I trust scientists to tell me whether the water is safe or not.	4	0	2	0	-1	-1
8. It wouldn't go ahead unless the authorities were satisfied it was safe.	4	-1	0	-2	-3	2
Systems Failure Risk (inc mismanagement/monitoring)						
9. Human errors are always possible which makes the PRW scheme risky.	-2	5	1	2	2	0
10. I am concerned about something going wrong such as breakdowns or something not working properly.	0	2	1	5	-3	0
Management (inc scientific, policy and infrastructure management and knowledge)						
11. I believe there is enough scientific knowledge about water treatment that the PRW system will not be a problem.	3	-2	2	0	-2	4
12. A main priority should be to reduce industrial and hospital waste entering the water system before it becomes recycled water.	1	4	2	-1	0	5
13. There needs to be strict legal and legislative requirements to make sure that the system is managed well.	5	3	4	0	5	4
14. I am concerned that there will not be enough people with the expertise needed to maintain the system effectively.	-4	1	0	1	-3	-4
15. The people operating the system must be accountable and responsible for their actions.	5	4	3	5	2	5
16. I have confidence in the company appointed to run the PRW system.	2	-2	0	-3	-5	0
Relative/Competitive Risk (risk compared to other risks/other water sources)						
17. I don't have a problem with the PRW scheme.	4	-5	2	1	-2	3
18. There will be many benefits from the PRW system (e.g. water for the future, reduced water restrictions, economic growth and employment)	2	0	3	3	0	2
19. People are exposed to so many risks everyday that the risk of PRW is too small to worry about.	1	-5	0	2	1	-2
20. People don't really know what comes out of their tap now, so what's the difference if they put PRW in it or not?	0	-3	-2	1	-5	-1
Political Issues (inc risk to political domain, community backlash)						
21. Political interests and processes could compromise the PRW scheme.	-1	1	2	4	5	1
22. I am concerned that future governments will not be committed to the PRW system.	-2	0	0	2	-3	0
23. I believe the Queensland government is capable of ensuring a safe system.	3	-1	-2	0	5	2
24. I am glad the decision to have a referendum about the PRW scheme was withdrawn.	0	-2	4	-2	1	1
Personal Health Risk						
25. My biggest concern is the health effects of drinking PRW.	1	5	0	3	4	-4
26. I am concerned about a build-up of chemicals and toxins in my body over time.	-1	4	-4	1	4	0

Statements	Factor Rank					
	1	2	3	4	5	6
Population Health Risks (that is, not a focus on personal health but health of others/population)						
27. I am concerned there may be hormones in the water that impact on health and fertility.	-3	4	-2	0	-3	0
28. Some people may be more likely to suffer from the potential health effects of PRW than others.	-2	3	-1	-1	1	0
29. I'm concerned that PRW will make the water too clean and that people's immunity will suffer as a result.	-4	-5	-5	0	-5	-1
Intergenerational Issues						
30. I am worried about how this might effect generations to come.	-2	3	-1	1	0	-2
Aesthetics						
31. I believe that PRW water will be better than the current drinking water supply.	-1	-4	-1	5	3	2
Fairness						
32. Those who pollute or use water the most should have to use PRW before anyone else.	-3	0	-3	-4	1	-4
33. I feel that the people of South East Queensland are being used as guinea pigs.	-5	-2	-4	-5	-4	-5
34. Due to the council amalgamations we won't have a local to represent our views on PRW.	-3	-1	1	-5	-2	-1
35. It's not fair that some people will be forced to drink PRW because they can't afford bottled water or water tanks.	-3	0	-5	-3	4	-3
Financial Risk						
36. Government should be looking for water options that are the safest, not the cheapest.	2	3	2	2	2	1
37. Businesses that rely on PRW for production will find it hard to compete nationally and internationally.	-2	-1	-2	-5	1	2
38. The higher cost of water will mean a higher cost of living for South East Queensland.	1	1	0	0	0	-2
39. Everyone who is supplied with water in SEQ should pay for the PRW scheme.	0	-3	1	0	-4	3
Environmental (inc Risk)						
40. If the water is clean enough for us to drink then it will be clean enough for the environment.	2	0	3	3	0	0
41. I am concerned that the PRW system will be too energy intensive.	0	-3	-1	-1	0	4
42. I am worried that PRW will cause algal blooms in Lake Wivenhoe.	-3	1	-3	-1	-1	-1
43. I am worried about the impact of the PRW system on the environment.	-1	1	-1	2	-1	3
Perceptions of Community Response						
44. Scientists base their decision-making on fact, community base their decisions on feeling.	2	0	5	2	-1	0
45. If scientists can't agree on many things, how can the community be expected to agree?	-1	0	-3	2	2	-3
46. We don't have the time to wait until the entire community is happy with the safety of drinking PRW before it proceeds.	1	-2	5	1	2	1
47. The community do not have the required expertise or information to make a decision about PRW.	0	0	0	0	3	-5
48. I support it, but you will have a hard time convincing others to use it.	0	-4	0	-1	1	0
Chemical/Toxicological Risk						
49. I have confidence in the PRW treatment system.	4	-4	1	-1	1	4
50. It is extremely unlikely that scientists can know how the different chemicals in PRW will react together.	-4	1	-3	-2	-4	-3
Emotion						
51. It doesn't matter how much you treat the water, to me it is still sewage.	-5	2	-5	-4	4	-5
Voluntary versus Imposed Risk						
52. There is a difference between choosing to take risks and having risks imposed on us.	-2	2	-1	-1	3	-2

Statements	Factor Rank					
	1	2	3	4	5	6
Tolerability and Resignation to Risk						
53. If I was told it was safe to drink I would probably just get used to drinking it.	2	-1	1	1	-2	-2
54. My life is too busy so I will probably just tolerate it even though I don't like it.	-5	-4	-2	-3	-4	-4
55. I would rather drink PRW than live with the anxiety that we could run out of water to drink.	3	-2	4	-3	-2	2
56. There is controversy surrounding the use of PRW because it is a new concept.	1	0	2	2	-1	1
57. It is going to happen anyway regardless of how I feel about it.	1	-1	-1	-2	0	-3
58. We would have had more choice of water supplies if the government had acted earlier.	0	2	3	-3	-1	2
Alternative Futures						
59. We need to focus on reducing our water use.	1	1	3	4	2	5
60. I think that other solutions are a better source of drinking water for South East Queensland than PRW (e.g. rainwater tanks, and/or home water recycling, desalination, stormwater, Bradford scheme etc).	0	5	-4	-2	-1	-4
61. The real issue is controlling population growth.	-4	-1	-2	-4	0	3
Perceptions of Abundant Supply after PRW implementation						
62. Recycling wastewater will just encourage people to use more water anyway.	-1	-3	-4	-3	-1	-1
Societal Issues						
63. I think it is safe as other countries have been drinking recycled water for a long time with no problems.	5	-2	4	4	0	1
64. Implementing PRW is a necessity, we don't have a choice given the current water crisis.	3	-3	5	-4	2	1

Table 6. Ipswich community PRW statements and their factor rankings (factor arrays)

Statement	Factor Rank 1	2	3	4
Unknown Risks/ Uncertainties (inc what is actually not known and public perceptions of unknowns)				
1. I am worried about diseases that we don't know about yet.	3	2	1	2
2. It is the uncertainty of what could go wrong that troubles me.	3	-1	-1	2
3. Scientists and governments have been wrong in the past about what is safe for us, what is to say they won't be wrong about this too?	5	-2	-1	2
4. It will be a long time before we will really know what the impacts are.	1	1	3	4
Trust				
5. I would be reassured that the water was safe if there was a panel of independent experts who could guarantee its safety.	-1	3	-3	-1
6. I trust the government to set and oversee safe standards.	-5	-1	2	1
7. I trust scientists to tell me whether the water is safe or not.	-1	0	5	-1
8. It wouldn't go ahead unless the authorities were satisfied it was safe.	-3	1	2	1
System Failure Risk (inc mismanagement/monitoring)				
9. Human errors are always possible which makes the PRW scheme risky.	4	0	1	4
10. I am concerned about something going wrong such as breakdowns or something not working properly.	1	2	-3	5
Management (inc scientific, policy and infrastructure management and knowledge)				
11. I believe there is enough scientific knowledge about water treatment that the PRW system will not be a problem.	-4	3	2	-3
12. A main priority should be to reduce industrial and hospital waste entering the water system before it becomes recycled water.	4	4	-1	3
13. There needs to be strict legal and legislative requirements to make sure that the system is managed well.	2	5	0	1
14. I am concerned that there will not be enough people with the expertise needed to maintain the system effectively.	1	-3	-4	-3
15. The people operating the system must be accountable and responsible for their actions.	2	5	0	0
16. I have confidence in the company appointed to run the PRW system.	-3	-1	1	-4
Relative/Competitive Risk (risk compared to other risks/other water sources)				
17. I don't have a problem with the PRW scheme.	-5	2	5	-4
18. There will be many benefits from the PRW system (e.g. water for the future, reduced water restrictions, economic growth and employment).	-2	4	4	-2
19. People are exposed to so many risks everyday that the risk of PRW is too small to worry about.	-3	-2	0	-5
20. People don't really know what comes out of their tap now, so what's the difference if they put PRW in it or not?	-1	2	-5	0

Cont'd.

Statement	Factor Rank			
	1	**2**	**3**	**4**
Political Issues (inc risk to political domain, community backlash)				
21. Political interests and processes could compromise the PRW scheme.	0	1	1	-5
22. I am concerned that future governments will not be committed to the PRW system.	-1	1	0	2
23. I believe the Queensland government is capable of ensuring a safe system.	-4	-1	2	-3
24. I am glad the decision to have a referendum about the PRW scheme was withdrawn.	-2	0	-4	-2
Personal Health Risk				
25. My biggest concern is the health effects of drinking PRW.	4	1	3	5
26. I am concerned about a build-up of chemicals and toxins in my body over time.	3	1	-2	3
Population Health Risks (that is, not a focus on personal health but health of others/population)				
27. I am concerned there may be hormones in the water that impact on health and fertility.	1	0	-4	2
28. Some people may be more likely to suffer from the potential health effects of PRW than others.	2	-1	-3	1
29. I'm concerned that PRW will make the water too clean and that people's immunity will suffer as a result.	0	-3	-5	0
Intergenerational Issues				
30. I am worried about how this might effect generations to come.	3	1	1	3
Aesthetics				
31. I believe that PRW water will be better than the current drinking water supply.	-4	-2	0	-3
Fairness				
32. Those who pollute or use water the most should have to use PRW before anyone else.	-1	-1	-2	-1
33. I feel that the people of South East Queensland are being used as guinea pigs	2	-5	0	-5
34. Due to the council amalgamations we won't have a local to represent our views on PRW	1	-4	-2	-2
35. It's not fair that some people will be forced to drink PRW because they can't afford bottled water or water tanks.	1	-4	-2	-1
Financial Risk				
36. Government should be looking for water options that are the safest, not the cheapest.	5	4	1	0
37. Businesses that rely on PRW for production will find it hard to compete nationally and internationally	0	-3	-1	-1
38. The higher cost of water will mean a higher cost of living for South East Queensland.	0	-1	-1	-4
39. Everyone who is supplied with water in SEQ should pay for the PRW scheme.	-2	0	-5	-3
Environmental (inc Risk)				
40. If the water is clean enough for us to drink then it will be clean enough for the environment.	-1	2	4	0
41. I am concerned that the PRW system will be too energy intensive.	0	0	-4	-4
42. I am worried that PRW will cause algal blooms in Lake Wivenhoe	0	-4	-3	0

Cont'd.

Statement	Factor Rank			
	1	**2**	**3**	**4**
43. I am worried about the impact of the PRW system on the environment.	0	-3	1	4
Perceptions of Community Response				
44. Scientists base their decision-making on fact, community base their decisions on feeling.	-1	1	4	-1
45. If scientists can't agree on many things, how can the community be expected to agree?	0	-2	-1	1
46. We don't have the time to wait until the entire community is happy with the safety of drinking PRW before it proceeds	-2	2	2	-2
47. The community do not have the required expertise or information to make a decision about PRW.	2	0	-2	-2
48. I support it, but you will have a hard time convincing others to use it.	-2	-3	3	0
Chemical/Toxicological Risk				
49. I have confidence in the PRW treatment system.	-5	2	4	-2
50. It is extremely unlikely that scientists can know how the different chemicals in PRW will react together.	0	-4	-2	-1
Emotion				
51. It doesn't matter how much you treat the water, to me it is still sewage	3	-5	0	5
Voluntary versus Imposed Risk				
52. There is a difference between choosing to take risks and having risks imposed on us	2	-1	0	1
Tolerability and Resignation to Risk				
53. If I was told it was safe to drink I would probably just get used to drinking it.	-4	0	-5	2
54. My life is too busy so I will probably just tolerate it even though I don't like it	-2	-5	0	-2
55. I would rather drink PRW than live with the anxiety that we could run out of water to drink.	-2	3	3	1
56. There is controversy surrounding the use of PRW because it is a new concept.	-1	0	2	0
57. It is going to happen anyway regardless of how I feel about it.	1	-2	0	0
58. We would have had more choice of water supplies if the government had acted earlier.	4	5	5	2
Alternative Futures				
59. We need to focus on reducing our water use.	2	3	3	4
60. I think that other solutions are a better source of drinking water for South East Queensland than PRW (e.g. rainwater tanks, and/or home water recycling, desalination, stormwater, Bradford scheme etc).	5	0	2	-1
61. The real issue is controlling population growth.	1	-2	-2	0
Perceptions of Abundant Supply after PRW implementation				
62. Recycling wastewater will just encourage people to use more water anyway	0	-2	-2	1
Societal Issues				
63. I think it is safe as other countries have been drinking recycled water for a long time with no problems.	-3	3	-1	3
64. Implementing PRW is a necessity, we don't have a choice given the current water crisis.	-3	4	1	2

Table 7. Gold Coast community PRW statements and their factor rankings (factor arrays)

Statements	Factor Rank					
	1	2	3	4	5	6
Unknown Risks/Uncertainties (inc what is actually not known and public perceptions of unknowns)						
1. I am worried about diseases that we don't know about yet.	-4	2	-3	5	0	1
2. It is the uncertainty of what could go wrong that troubles me.	-3	5	-2	2	1	-5
3. Scientists and governments have been wrong in the past about what is safe for us, what is to say they won't be wrong about this too?	-4	4	-3	0	2	-2
4. It will be a long time before we will really know what the impacts are.	-1	4	2	5	0	0
Trust						
5. I would be reassured that the water was safe if there was a panel of independent experts who could guarantee its safety.	-2	0	4	3	4	1
6. I trust the government to set and oversee safe standards.	0	-3	4	-4	0	2
7. I trust scientists to tell me whether the water is safe or not.	4	-3	4	-2	5	-2
8. It wouldn't go ahead unless the authorities were satisfied it was safe.	4	-2	2	1	1	1
Systems Failure Risk (inc mismanagement/monitoring)						
9. Human errors are always possible which makes the PRW scheme risky.	0	4	2	2	-2	-2
10. I am concerned about something going wrong such as breakdowns or something not working properly.	-1	2	3	0	4	-1
Management (inc scientific, policy and infrastructure management and knowledge)						
11. I believe there is enough scientific knowledge about water treatment that the PRW system will not be a problem.	4	-5	3	4	1	-1
12. A main priority should be to reduce industrial and hospital waste entering the water system before it becomes recycled water.	1	1	2	-1	5	-1
13. There needs to be strict legal and legislative requirements to make sure that the system is managed well.	1	2	5	0	2	4
14. I am concerned that there will not be enough people with the expertise needed to maintain the system effectively.	-1	1	1	4	2	-4
15. The people operating the system must be accountable and responsible for their actions.	2	2	3	1	3	0
16. I have confidence in the company appointed to run the PRW system.	2	-2	-1	-3	1	4
Relative/Competitive Risk (risk compared to other risks/other water sources)						
17. I don't have a problem with the PRW scheme.	5	-3	0	-5	2	4
18. There will be many benefits from the PRW system (e.g. water for the future, reduced water restrictions, economic growth and employment)	3	-1	3	4	4	2
19. People are exposed to so many risks everyday that the risk of PRW is too small to worry about.	1	-4	-2	1	-2	-1

Cont'd.

Statements	Factor Rank					
	1	2	3	4	5	6
20. People don't really know what comes out of their tap now, so what's the difference if they put PRW in it or not?	1	-3	1	0	-4	0
Political Issues (inc risk to political domain, community backlash)						
21. Political interests and processes could compromise the PRW scheme.	1	0	0	-1	-4	5
22. I am concerned that future governments will not be committed to the PRW system.	-2	-1	-2	-2	2	-1
23. I believe the Queensland government is capable of ensuring a safe system.	1	-2	0	0	-2	3
24. I am glad the decision to have a referendum about the PRW scheme was withdrawn.	2	-1	0	-1	-4	-2
Personal Health Risk						
25. My biggest concern is the health effects of drinking PRW.	-5	5	2	5	3	4
26. I am concerned about a build-up of chemicals and toxins in my body over time.	-4	3	1	2	1	-3
Population Health Risks (that is, not a focus on personal health but health of others/population)						
27. I am concerned there may be hormones in the water that impact on health and fertility.	-2	2	-1	2	-2	0
28. Some people may be more likely to suffer from the potential health effects of PRW than others.	0	2	0	3	-1	-3
29. I'm concerned that PRW will make the water too clean and that people's immunity will suffer as a result.	0	0	-5	-3	0	-4
Intergenerational Issues						
30. I am worried about how this might effect generations to come.	-2	3	-3	1	3	0
Aesthetics						
31. I believe that PRW water will be better than the current drinking water supply.	2	-4	-1	3	-1	2
Fairness						
32. Those who pollute or use water the most should have to use PRW before anyone else.	-2	-1	-3	1	-5	1
33. I feel that the people of South East Queensland are being used as guinea pigs.	-5	0	-2	-1	0	-4
34. Due to the council amalgamations we won't have a local to represent our views on PRW.	-3	1	-4	0	-1	-2
35. It's not fair that some people will be forced to drink PRW because they can't afford bottled water or water tanks.	-1	1	-2	-3	-5	-5
Financial Risk						
36. Government should be looking for water options that are the safest, not the cheapest.	3	3	5	4	3	4
37. Businesses that rely on PRW for production will find it hard to compete nationally and internationally.	0	-1	-2	0	-2	-2
38. The higher cost of water will mean a higher cost of living for South East Queensland.	1	1	1	2	-1	2
39. Everyone who is supplied with water in SEQ should pay for the PRW scheme.	-1	-2	-3	-3	0	0
Environmental (inc Risk)						
40. If the water is clean enough for us to drink then it will be clean enough for the environment.	4	0	-1	3	1	2

Cont'd.

Statements	Factor Rank					
	1	**2**	**3**	**4**	**5**	**6**
41. I am concerned that the PRW system will be too energy intensive.	0	-1	-4	-2	0	1
42. I am worried that PRW will cause algal blooms in Lake Wivenhoe.	-4	0	0	-1	-3	0
43. I am worried about the impact of the PRW system on the environment.	-3	0	-1	3	-3	-3
Perceptions of Community Response						
44. Scientists base their decision-making on fact, community base their decisions on feeling.	5	0	0	1	1	1
45. If scientists can't agree on many things, how can the community be expected to agree?	-1	-1	-1	0	1	-5
46. We don't have the time to wait until the entire community is happy with the safety of drinking PRW before it proceeds.	1	-2	-1	-4	5	2
47. The community do not have the required expertise or information to make a decision about PRW.	3	2	1	-1	-3	0
48. I support it, but you will have a hard time convincing others to use it.	0	-2	-2	2	0	-1
Chemical/Toxicological Risk						
49. I have confidence in the PRW treatment system.	3	-5	0	-2	-1	3
50. It is extremely unlikely that scientists can know how the different chemicals in PRW will react together.	-2	1	-4	1	-2	-2
Emotion						
51. It doesn't matter how much you treat the water, to me it is still sewage.	-5	5	-1	-4	-5	-3
Voluntary versus Imposed Risk						
52. There is a difference between choosing to take risks and having risks imposed on us.	-1	4	0	2	-1	-1
Tolerability and Resignation to Risk						
53. If I was told it was safe to drink I would probably just get used to drinking it.	-1	-5	2	-1	-3	0
54. My life is too busy so I will probably just tolerate it even though I don't like it.	-3	-4	-5	-5	0	-3
55. I would rather drink PRW than live with the anxiety that we could run out of water to drink.	2	-3	2	-4	1	3
56. There is controversy surrounding the use of PRW because it is a new concept.	0	0	5	-2	-3	2
57. It is going to happen anyway regardless of how I feel about it.	0	-1	1	-3	0	-4
58. We would have had more choice of water supplies if the government had acted earlier.	2	1	0	-2	4	0
Alternative Futures						
59. We need to focus on reducing our water use.	3	3	1	0	3	0
60. I think that other solutions are a better source of drinking water for South East Queensland than PRW (e.g. rainwater tanks, and/or home water recycling, desalination, stormwater, Bradford scheme etc).	0	3	3	-1	-2	-1
61. The real issue is controlling population growth.	-3	0	-5	-5	-2	1
Perceptions of Abundant Supply after PRW implementation						
62. Recycling wastewater will just encourage people to use more water anyway.	-2	1	-4	-2	-4	2
Societal Issues						
63. I think it is safe as other countries have been drinking recycled water for a long time with no problems.	5	-2	4	0	2	0
64. Implementing PRW is a necessity, we don't have a choice given the current water crisis.	2	-4	1	1	-1	5

Table 8. Sunshine Coast community PRW statements and their factor rankings (factor arrays)

Statements	Factor Rank				
	1	2	3	4	5
Unknown Risks/Uncertainties (inc what is actually not known and public perceptions of unknowns)					
1. I am worried about diseases that we don't know about yet.	-4	2	2	1	0
2. It is the uncertainty of what could go wrong that troubles me.	-2	1	2	-1	0
3. Scientists and governments have been wrong in the past about what is safe for us, what is to say they won't be wrong about this too?	-2	3	0	1	-2
4. It will be a long time before we will really know what the impacts are.	0	2	2	0	0
Trust					
5. I would be reassured that the water was safe if there was a panel of independent experts who could guarantee its safety.	0	-4	0	-3	-3
6. I trust the government to set and oversee safe standards.	1	-4	-3	4	2
7. I trust scientists to tell me whether the water is safe or not.	4	-4	1	-5	2
8. It wouldn't go ahead unless the authorities were satisfied it was safe.	3	-2	-1	3	-1
System Failure Risk (inc mismanagement/monitoring)					
9. Human errors are always possible which makes the PRW scheme risky.	-1	3	0	1	1
10. I am concerned about something going wrong such as breakdowns or something not working properly.	-2	5	1	2	4
Management (inc scientific, policy and infrastructure management and knowledge)					
11. I believe there is enough scientific knowledge about water treatment that the PRW system will not be a problem.	3	0	2	2	1
12. A main priority should be to reduce industrial and hospital waste entering the water system before it becomes recycled water.	1	4	5	2	5
13. There needs to be strict legal and legislative requirements to make sure that the system is managed well.	2	2	3	3	2
14. I am concerned that there will not be enough people with the expertise needed to maintain the system effectively.	-3	-3	-4	-1	2
15. The people operating the system must be accountable and responsible for their actions.	2	5	3	5	4
16. I have confidence in the company appointed to run the PRW system.	0	-2	-2	4	-2
Relative/Competitive Risk (risk compared to other risks/other water sources)					
17. I don't have a problem with the PRW scheme.	5	0	0	2	-1
18. There will be many benefits from the PRW system (e.g. water for the future, reduced water restrictions, economic growth and employment).	2	1	1	4	3
19. People are exposed to so many risks everyday that the risk of PRW is too small to worry about.	2	-5	-1	-4	2
20. People don't really know what comes out of their tap now, so what's the difference if they put PRW in it or not?	1	-2	1	1	-1

Cont'd.

Statements	Factor Rank				
	1	**2**	**3**	**4**	**5**
Political Issues (inc risk to political domain, community backlash)					
21. Political interests and processes could compromise the PRW scheme.	0	3	0	-3	-1
22. I am concerned that future governments will not be committed to the PRW system.	-1	-3	0	-2	-2
23. I believe the Queensland government is capable of ensuring a safe system.	1	-3	-1	5	-1
24. I am glad the decision to have a referendum about the PRW scheme was withdrawn.	1	-1	-2	-3	-2
Personal Health Risk					
25. My biggest concern is the health effects of drinking PRW.	-2	3	4	0	-5
26. I am concerned about a build-up of chemicals and toxins in my body over time.	-3	-1	4	-1	0
Population Health Risks (that is, not a focus on personal health but health of others/population.)					
27. I am concerned there may be hormones in the water that impact on health and fertility.	-4	-2	0	-2	-1
28. Some people may be more likely to suffer from the potential health effects of PRW than others.	-1	2	-5	1	4
29. I'm concerned that PRW will make the water too clean and that people's immunity will suffer as a result.	-3	-2	-2	-2	0
Intergenerational Issues					
30. I am worried about how this might effect generations to come.	-2	1	5	-4	-3
Aesthetics					
31. I believe that PRW water will be better than the current drinking water supply.	0	-5	-2	0	-3
Fairness					
32. Those who pollute or use water the most should have to use PRW before anyone else.	-1	4	1	-2	5
33. I feel that the people of South East Queensland are being used as guinea pigs.	-5	0	-4	-3	-3
34. Due to the council amalgamations we won't have a local to represent our views on PRW.	-2	-4	-3	0	0
35. It's not fair that some people will be forced to drink PRW because they can't afford bottled water or water tanks.	-3	1	-4	-4	-4
Financial Risk					
36. Government should be looking for water options that are the safest, not the cheapest.	4	5	4	2	-5
37. Businesses that rely on PRW for production will find it hard to compete nationally and internationally.	-4	-5	-5	0	0
38. The higher cost of water will mean a higher cost of living for South East Queensland.	0	4	-1	0	-5
39. Everyone who is supplied with water in SEQ should pay for the PRW scheme.	0	-1	-1	-1	4
Environmental (inc Risk)					
40. If the water is clean enough for us to drink then it will be clean enough for the environment.	4	1	-2	1	3
41. I am concerned that the PRW system will be too energy intensive.	0	2	-1	-2	-2
42. I am worried that PRW will cause algal blooms in Lake Wivenhoe.	-5	-1	0	-1	-2
43. I am worried about the impact of the PRW system on the environment.	-2	-1	2	0	-4
Perceptions of Community Response					
44. Scientists base their decision-making on fact, community base their decisions on feeling.	5	-2	3	-1	1

Cont'd.

Statements	Factor Rank				
	1	**2**	**3**	**4**	**5**
45. If scientists can't agree on many things, how can the community be expected to agree?	-1	0	-3	-4	-2
46. We don't have the time to wait until the entire community is happy with the safety of drinking PRW before it proceeds.	3	-3	1	3	2
47. The community do not have the required expertise or information to make a decision about PRW.	1	0	1	-5	0
48. I support it, but you will have a hard time convincing others to use it.	2	0	2	-1	0
Chemical/Toxicological Risk					
49. I have confidence in the PRW treatment system.	3	-1	-1	5	-1
50. It is extremely unlikely that scientists can know how the different chemicals in PRW will react together.	-4	0	-1	2	0
Emotion					
51. It doesn't matter how much you treat the water, to me it is still sewage.	-5	0	-4	-2	-4
Voluntary versus Imposed Risk					
52. There is a difference between choosing to take risks and having risks imposed on us.	-1	1	-5	1	-3
Tolerability and Resignation to Risk					
53. If I was told it was safe to drink I would probably just get used to drinking it.	0	-3	1	0	2
54. My life is too busy so I will probably just tolerate it even though I don't like it.	-3	0	-3	-2	-4
55. I would rather drink PRW than live with the anxiety that we could run out of water to drink.	3	1	5	0	3
56. There is controversy surrounding the use of PRW because it is a new concept.	1	-2	3	1	1
57. It is going to happen anyway regardless of how I feel about it.	0	0	0	-3	1
58. We would have had more choice of water supplies if the government had acted earlier.	1	4	-2	4	1
Alternative Futures					
59. We need to focus on reducing our water use.	5	2	4	-1	5
60. I think that other solutions are a better source of drinking water for South East Queensland than PRW (e.g. rainwater tanks, and/or home water recycling, desalination, stormwater, Bradford scheme etc).	-1	2	2	0	-1
61. The real issue is controlling population growth.	2	3	-3	-5	1
Perceptions of Abundant Supply after PRW implementation					
62. Recycling wastewater will just encourage people to use more water anyway.	-1	-1	-2	2	3
Societal Issues					
63. I think it is safe as other countries have been drinking recycled water for a long time with no problems.	4	-1	0	3	3
64. Implementing PRW is a necessity, we don't have a choice given the current water crisis.	2	1	2	3	1

Table 9. Community All PRW statements and their factor rankings (factor arrays)

Statement	Factor Rank	
	1	2
Unknown Risks/Uncertainties (inc what is actually not known and public perceptions of unknowns)		
1. I am worried about diseases that we don't know about yet.	-2	4
2. It is the uncertainty of what could go wrong that troubles me.	-1	3
3. Scientists and governments have been wrong in the past about what is safe for us, what is to say they won't be wrong about this too?	-2	5
4. It will be a long time before we will really know what the impacts are.	0	3
Trust		
5. I would be reassured that the water was safe if there was a panel of independent experts who could guarantee its safety.	2	1
6. I trust the government to set and oversee safe standards.	1	-4
7. I trust scientists to tell me whether the water is safe or not.	2	-2
8. It wouldn't go ahead unless the authorities were satisfied it was safe.	2	-2
System Failure Risk (inc mismanagement/monitoring)		
9. Human errors are always possible which makes the PRW scheme risk.	-1	5
10. I am concerned about something going wrong such as breakdowns or something not working properly.	0	2
Management (inc scientific, policy and infrastructure management and knowledge)		
11. I believe there is enough scientific knowledge about water treatment that the PRW system will not be a problem.	4	-4
12. A main priority should be to reduce industrial and hospital waste entering the water system before it becomes recycled water.	3	3
13. There needs to be strict legal and legislative requirements to make sure that the system is managed well.	5	2
14. I am concerned that there will not be enough people with the expertise needed to maintain the system effectively.	-4	1
15. The people operating the system must be accountable and responsible for their actions.	5	3
16. I have confidence in the company appointed to run the PRW system.	1	-3
Relative/Competitive Risk (risk compared to other risks/other water sources)		
17. I don't have a problem with the PRW scheme.	4	-5
18. There will be many benefits from the PRW system (e.g. water for the future, reduced water restrictions, economic growth and employment).	4	-1
19. People are exposed to so many risks everyday that the risk of PRW is too small to worry about.	1	-5
20. People don't really know what comes out of their tap now, so what's the difference if they put PRW in it or not?	1	-1

Cont'd.

Statement	Factor Rank 1	Factor Rank 2
Political Issues (inc risk to political domain, community backlash)		
21. Political interests and processes could compromise the PRW scheme.	0	0
22. I am concerned that future governments will not be committed to the PRW system.	-1	-1
23. I believe the Queensland government is capable of ensuring a safe system.	1	-3
24. I am glad the decision to have a referendum about the PRW scheme was withdrawn.	0	-3
Personal Health Risk		
25. My biggest concern is the health effects of drinking PRW.	-1	5
26. I am concerned about a build-up of chemicals and toxins in my body over time.	-2	3
Population Health Risks (that is, not a focus on personal health but health of others/population)		
27. I am concerned there may be hormones in the water that impact on health and fertility.	-3	1
28. Some people may be more likely to suffer from the potential health effects of PRW than others.	-1	2
29. I'm concerned that PRW will make the water too clean and that people's immunity will suffer as a result.	-5	-2
Intergenerational Issues		
30. I am worried about how this might effect generations to come.	-1	4
Aesthetics		
31. I believe that PRW water will be better than the current drinking water supply.	0	-4
Fairness		
32. Those who pollute or use water the most should have to use PRW before anyone else.	-2	-1
33. I feel that the people of South East Queensland are being used as guinea pigs.	-5	0
34. Due to the council amalgamations we won't have a local to represent our views on PRW.	-3	0
35. It's not fair that some people will be forced to drink PRW because they can't afford bottled water or water tanks.	-4	1
Financial Risk		
36. Government should be looking for water options that are the safest, not the cheapest.	2	4
37. Businesses that rely on PRW for production will find it hard to compete nationally and internationally.	-3	-1
38. The higher cost of water will mean a higher cost of living for South East Queensland.	0	1
39. Everyone who is supplied with water in SEQ should pay for the PRW scheme.	0	-2
Environmental (inc Risk)		
40. If the water is clean enough for us to drink then it will be clean enough for the environment.	3	0
41. I am concerned that the PRW system will be too energy intensive.	-1	-1
42. I am worried that PRW will cause algal blooms in Lake Wivenhoe.	-3	0
43. I am worried about the impact of the PRW system on the environment.	-2	1
Perceptions of Community Response		
44. Scientists base their decision-making on fact, community base their decisions on feeling.	3	0

Cont'd.

Statement	Factor Rank	
	1	**2**
45. If scientists can't agree on many things, how can the community be expected to agree?	-2	0
46. We don't have the time to wait until the entire community is happy with the safety of drinking PRW before it proceeds.	2	-2
47. The community do not have the required expertise or information to make a decision about PRW.	0	1
48. I support it, but you will have a hard time convincing others to use it.	1	-2
Chemical/Toxicological Risk		
49. I have confidence in the PRW treatment system.	2	-5
50. It is extremely unlikely that scientists can know how the different chemicals in PRW will react together.	-4	1
Emotion		
51. It doesn't matter how much you treat the water, to me it is still sewage.	-5	2
Voluntary versus Imposed Risk		
52. There is a difference between choosing to take risks and having risks imposed on us.	-1	2
Tolerability and Resignation to Risk		
53. If I was told it was safe to drink I would probably just get used to drinking it.	1	-4
54. My life is too busy so I will probably just tolerate it even though I don't like it.	-4	-3
55. I would rather drink PRW than live with the anxiety that we could run out of water to drink.	3	-1
56. There is controversy surrounding the use of PRW because it is a new concept.	1	0
57. It is going to happen anyway regardless of how I feel about it.	0	0
58. We would have had more choice of water supplies if the government had acted earlier.	2	2
Alternative Futures		
59. We need to focus on reducing our water use.	3	2
60. I think that other solutions are a better source of drinking water for South East Queensland than PRW (e.g. rainwater tanks, and/or home water recycling, desalination, stormwater, Bradford scheme etc).	0	4
61. The real issue is controlling population growth.	-2	-1
Perceptions of Abundant Supply after PRW implementation		
62. Recycling wastewater will just encourage people to use more water anyway.	-3	0
Societal Issues		
63. I think it is safe as other countries have been drinking recycled water for a long time with no problems.	5	-2
64. Implementing PRW is a necessity, we don't have a choice given the current water crisis.	4	-3

Table 10. Technical experts PRW statements and their factor rankings (factor arrays)

Statements	Factor Rank					
	1	2	3	4	5	6
Unknown Risks/Uncertainties (inc what is actually not known and public perceptions of unknowns)						
1. I am worried about diseases that we don't know about yet.	-4	1	-3	0	1	-1
2. It is the uncertainty of what could go wrong that troubles me.	-2	4	0	-1	1	3
3. Scientists and governments have been wrong in the past about what is safe for us, what is to say they won't be wrong about this too?	-2	3	0	-1	-2	0
4. It will be a long time before we will really know what the impacts are.	-1	4	2	1	0	2
Trust						
5. I would be reassured that the water was safe if there was a panel of independent experts who could guarantee its safety.	1	-3	3	2	-2	-2
6. I trust the government to set and oversee safe standards.	4	-5	0	-1	3	-4
7. I trust scientists to tell me whether the water is safe or not.	2	-2	1	0	-1	-3
8. It wouldn't go ahead unless the authorities were satisfied it was safe.	2	-5	0	-3	-2	2
Systems Failure Risk (inc mismanagement/monitoring)						
9. Human errors are always possible which makes the PRW scheme risky.	0	5	-2	-1	-1	4
10. I am concerned about something going wrong such as breakdowns or something not working properly.	0	2	1	-2	-2	3
Management (inc scientific, policy and infrastructure management and knowledge)						
11. I believe there is enough scientific knowledge about water treatment that the PRW system will not be a problem.	4	-1	2	1	2	-1
12. A main priority should be to reduce industrial and hospital waste entering the water system before it becomes recycled water.	2	3	4	4	4	1
13. There needs to be strict legal and legislative requirements to make sure that the system is managed well.	5	5	5	5	3	1
14. I am concerned that there will not be enough people with the expertise needed to maintain the system effectively.	-1	3	-1	2	-1	2
15. The people operating the system must be accountable and responsible for their actions.	3	2	5	5	1	4
16. I have confidence in the company appointed to run the PRW system.	0	-2	0	3	-2	-3
Relative/Competitive Risk (risk compared to other risks/other water sources)						
17. I don't have a problem with the PRW scheme.	5	-4	2	1	0	2
18. There will be many benefits from the PRW system (e.g. water for the future, reduced water restrictions, economic growth and employment)	3	0	0	4	4	4
19. People are exposed to so many risks everyday that the risk of PRW is too small to worry about.	4	0	-3	5	1	1

Cont'd.

Statements	Factor Rank					
	1	**2**	**3**	**4**	**5**	**6**
20. People don't really know what comes out of their tap now, so what's the difference if they put PRW in it or not?	0	-3	-3	3	-3	-4
Political Issues (inc risk to political domain, community backlash)						
21. Political interests and processes could compromise the PRW scheme.	1	5	0	2	2	1
22. I am concerned that future governments will not be committed to the PRW system.	-1	2	0	-1	-5	0
23. I believe the Queensland government is capable of ensuring a safe system.	3	-5	2	-2	2	-4
24. I am glad the decision to have a referendum about the PRW scheme was withdrawn.	1	-3	4	1	2	-3
Personal Health Risk						
25. My biggest concern is the health effects of drinking PRW.	-4	2	4	-4	1	-4
26. I am concerned about a build-up of chemicals and toxins in my body over time.	-4	1	-1	-3	0	-2
Population Health Risks (that is, not a focus on personal health but health of others/population)						
27. I am concerned there may be hormones in the water that impact on health and fertility.	-4	-1	-2	-5	-4	2
28. Some people may be more likely to suffer from the potential health effects of PRW than others.	-2	-1	1	-2	0	-2
29. I'm concerned that PRW will make the water too clean and that people's immunity will suffer as a result.	-5	-1	-4	-3	-4	-5
Intergenerational Issues						
30. I am worried about how this might effect generations to come.	-2	2	-3	-3	-1	-1
Aesthetics						
31. I believe that PRW water will be better than the current drinking water supply.	2	-2	-1	2	-3	3
Fairness						
32. Those who pollute or use water the most should have to use PRW before anyone else.	-3	0	-4	-2	0	-2
33. I feel that the people of South East Queensland are being used as guinea pigs.	-5	-1	-5	-4	0	-5
34. Due to the council amalgamations we won't have a local to represent our views on PRW.	-2	-1	-4	-1	-5	0
35. It's not fair that some people will be forced to drink PRW because they can't afford bottled water or water tanks.	-3	2	-4	-3	-3	1
Financial Risk						
36. Government should be looking for water options that are the safest, not the cheapest.	1	3	3	1	-1	0
37. Businesses that rely on PRW for production will find it hard to compete nationally and internationally.	-3	1	-1	-1	-5	-2
38. The higher cost of water will mean a higher cost of living for South East Queensland.	0	0	2	0	1	5
39. Everyone who is supplied with water in SEQ should pay for the PRW scheme.	1	0	1	0	1	0
Environmental (inc Risk)						
40. If the water is clean enough for us to drink then it will be clean enough for the environment.	3	-2	-3	-4	-3	-1

Cont'd.

Statements	Factor Rank					
	1	**2**	**3**	**4**	**5**	**6**
41. I am concerned that the PRW system will be too energy intensive.	-1	1	3	-1	2	-1
42. I am worried that PRW will cause algal blooms in Lake Wivenhoe.	-1	-1	-2	3	3	1
43. I am worried about the impact of the PRW system on the environment.	-2	2	0	1	4	2
Perceptions of Community Response						
44. Scientists base their decision-making on fact, community base their decisions on feeling.	1	-4	-1	2	2	5
45. If scientists can't agree on many things, how can the community be expected to agree?	-1	0	0	0	0	1
46. We don't have the time to wait until the entire community is happy with the safety of drinking PRW before it proceeds.	2	-2	2	0	-1	3
47. The community do not have the required expertise or information to make a decision about PRW.	0	-1	-1	4	-1	2
48. I support it, but you will have a hard time convincing others to use it.	0	-2	0	0	0	0
Chemical/Toxicological Risk						
49. I have confidence in the PRW treatment system.	5	-2	2	0	3	3
50. It is extremely unlikely that scientists can know how the different chemicals in PRW will react together.	-1	4	1	-2	4	-3
Emotion						
51. It doesn't matter how much you treat the water, to me it is still sewage.	-5	-3	-5	-5	-4	-5
Voluntary versus Imposed Risk						
52. There is a difference between choosing to take risks and having risks imposed on us.	0	3	-1	0	3	1
Tolerability and Resignation to Risk						
53. If I was told it was safe to drink I would probably just get used to drinking it.	0	-4	-2	0	-3	0
54. My life is too busy so I will probably just tolerate it even though I don't like it.	-1	-3	-5	-2	-2	-1
55. I would rather drink PRW than live with the anxiety that we could run out of water to drink.	1	1	4	2	0	0
56. There is controversy surrounding the use of PRW because it is a new concept.	2	0	3	1	-4	-2
57. It is going to happen anyway regardless of how I feel about it.	0	1	-1	2	0	4
58. We would have had more choice of water supplies if the government had acted earlier.	1	2	1	1	5	-1
Alternative Futures						
59. We need to focus on reducing our water use.	2	1	5	3	5	5
60. I think that other solutions are a better source of drinking water for South East Queensland than PRW (e.g. rainwater tanks, and/or home water recycling, desalination, stormwater, Bradford scheme etc).	-2	-1	-2	-2	2	0
61. The real issue is controlling population growth.	-3	-2	-2	-5	5	-1
Perceptions of Abundant Supply after PRW implementation						
62. Recycling wastewater will just encourage people to use more water anyway.	-3	0	-2	-4	-2	-2
Societal Issues						
63. I think it is safe as other countries have been drinking recycled water for a long time with no problems.	4	-4	1	3	1	-3
64. Implementing PRW is a necessity, we don't have a choice given the current water crisis.	3	0	3	4	-1	0

Table 11. Technical perceptions of community PRW statements and their factor rankings (factor arrays)

Statement	Factor Rank			
	1	2	3	4
Unknown Risks/ Uncertainties (inc what is actually not known and public perceptions of unknowns)				
1. I am worried about diseases that we don't know about yet.	4	2	3	-2
2. It is the uncertainty of what could go wrong that troubles me.	4	1	4	-2
3. Scientists and governments have been wrong in the past about what is safe for us, what is to say they won't be wrong about this too?	2	0	-3	1
4. It will be a long time before we will really know what the impacts are.	2	0	-2	1
Trust				
5. I would be reassured that the water was safe if there was a panel of independent experts who could guarantee its safety.	0	0	1	5
6. I trust the government to set and oversee safe standards.	-4	1	1	-1
7. I trust scientists to tell me whether the water is safe or not.	-2	-1	2	2
8. It wouldn't go ahead unless the authorities were satisfied it was safe.	-2	3	4	-2
System Failure Risk (inc mismanagement/monitoring)				
9. Human errors are always possible which makes the PRW scheme risky.	3	0	3	5
10. I am concerned about something going wrong such as breakdowns or something not working properly.	5	1	2	-1
Management (inc scientific, policy and infrastructure management and knowledge)				
11. I believe there is enough scientific knowledge about water treatment that the PRW system will not be a problem.	-4	-1	3	2
12. A main priority should be to reduce industrial and hospital waste entering the water system before it becomes recycled water.	1	3	-1	1
13. There needs to be strict legal and legislative requirements to make sure that the system is managed well.	2	5	1	0
14. I am concerned that there will not be enough people with the expertise needed to maintain the system effectively.	0	-3	0	3
15. The people operating the system must be accountable and responsible for their actions.	2	4	2	-1
16. I have confidence in the company appointed to run the PRW system.	-3	-2	0	-1
Relative/Competitive Risk (risk compared to other risks/other water sources)				
17. I don't have a problem with the PRW scheme.	-4	-1	-1	-2
18. There will be many benefits from the PRW system (e.g. water for the future, reduced water restrictions, economic growth and employment).	0	-1	1	2
19. People are exposed to so many risks everyday that the risk of PRW is too small to worry about.	-5	-1	0	3
20. People don't really know what comes out of their tap now, so what's the difference if they put PRW in it or not?	-3	-3	0	2
Political Issues (inc risk to political domain, community backlash)				
21. Political interests and processes could compromise the PRW scheme.	0	2	0	-1
22. I am concerned that future governments will not be committed to the PRW system.	0	-5	0	1

Cont'd.

Statement	Factor Rank			
	1	**2**	**3**	**4**
23. I believe the Queensland government is capable of ensuring a safe system.	-4	1	0	-1
24. I am glad the decision to have a referendum about the PRW scheme was withdrawn.	-2	0	-5	-4
Personal Health Risk				
25. My biggest concern is the health effects of drinking PRW.	5	5	5	4
26. I am concerned about a build-up of chemicals and toxins in my body over time.	3	2	2	4
Population Health Risks (that is, not a focus on personal health but health of others/population)				
27. I am concerned there may be hormones in the water that impact on health and fertility.	4	4	3	1
28. Some people may be more likely to suffer from the potential health effects of PRW than others.	2	-2	-2	4
29. I'm concerned that PRW will make the water too clean and that people's immunity will suffer as a result.	-1	-5	-5	1
Intergenerational Issues				
30. I am worried about how this might effect generations to come.	3	-3	5	3
Aesthetics				
31. I believe that PRW water will be better than the current drinking water supply.	-5	-5	-3	2
Fairness				
32. Those who pollute or use water the most should have to use PRW before anyone else.	1	-2	-2	-3
33. I feel that the people of South East Queensland are being used as guinea pigs	3	0	-3	0
34. Due to the council amalgamations we won't have a local to represent our views on PRW	0	-4	-1	-4
35. It's not fair that some people will be forced to drink PRW because they can't afford bottled water or water tanks.	1	-2	-3	-3
Financial Risk				
36. Government should be looking for water options that are the safest, not the cheapest.	1	1	2	-1
37. Businesses that rely on PRW for production will find it hard to compete nationally and internationally	-1	-3	-2	0
38. The higher cost of water will mean a higher cost of living for South East Queensland.	1	2	1	-5
39. Everyone who is supplied with water in SEQ should pay for the PRW scheme.	-1	0	1	-2
Environmental (inc Risk)				
40. If the water is clean enough for us to drink then it will be clean enough for the environment.	0	3	3	2
41. I am concerned that the PRW system will be too energy intensive.	-1	-4	-2	-3
42. I am worried that PRW will cause algal blooms in Lake Wivenhoe	-2	-4	1	-3
43. I am worried about the impact of the PRW system on the environment.	-1	-3	2	-2
Perceptions of Community Response				
44. Scientists base their decision-making on fact, community base their decisions on feeling.	-1	0	-4	0
45. If scientists can't agree on many things, how can the community be expected to agree?	1	1	-2	0
46. We don't have the time to wait until the entire community is happy with the safety of drinking PRW before it proceeds	-1	2	-1	3
47. The community do not have the required expertise or information to make a decision about PRW.	-3	2	-5	0

Cont'd.

Statement	Factor Rank			
	1	**2**	**3**	**4**
48. I support it, but you will have a hard time convincing others to use it.	-1	-1	0	4
Chemical/Toxicological Risk				
49. I have confidence in the PRW treatment system.	-5	0	0	-1
50. It is extremely unlikely that scientists can know how the different chemicals in PRW will react together.	2	1	-4	5
Emotion				
51. It doesn't matter how much you treat the water, to me it is still sewage	5	-2	-3	0
Voluntary versus Imposed Risk				
52. There is a difference between choosing to take risks and having risks imposed on us	2	-1	-1	-3
Tolerability and Resignation to Risk				
53. If I was told it was safe to drink I would probably just get used to drinking it.	-2	1	-1	0
54. My life is too busy so I will probably just tolerate it even though I don't like it	0	2	-4	0
55. I would rather drink PRW than live with the anxiety that we could run out of water to drink.	-3	3	2	3
56. There is controversy surrounding the use of PRW because it is a new concept.	1	0	4	-4
57. It is going to happen anyway regardless of how I feel about it.	1	5	-2	0
58. We would have had more choice of water supplies if the government had acted earlier.	3	4	3	-5
Alternative Futures				
59. We need to focus on reducing our water use.	0	-1	5	1
60. I think that other solutions are a better source of drinking water for South East Queensland than PRW (e.g. rainwater tanks, and/or home water recycling, desalination, stormwater, Bradford scheme etc).	4	3	0	1
61. The real issue is controlling population growth.	-2	-2	-2	-5
Perceptions of Abundant Supply after PRW implementation				
62. Recycling wastewater will just encourage people to use more water anyway	0	-4	-4	-4
Societal Issues				
63. I think it is safe as other countries have been drinking recycled water for a long time with no problems.	-3	-2	1	2
64. Implementing PRW is a necessity, we don't have a choice given the current water crisis.	-2	4	-1	-2

APPENDIX 4

STATEMENT CATEGORIES AND THEMES

STATEMENT CATEGORIES AND THEMES

Unknown Risks and Uncertainties

Risk can be unknown and uncertain – in terms of the uncertainty of the predicted risky event actually occurring, and through disagreement amongst experts about the uncertainties (Blowers 1997). Uncertainty is classified in several ways, such as (i) general situational uncertainty, (ii) legal-moral uncertainty, (iii) social uncertainty, (iv) institutional uncertainty, and (v) uncertainties determined by rights and interests of property and privacy (Funtowicz and Ravetz 1990). 'Unknown risks and uncertainties' emerged from both the literature and the data derived during the scoping phase. Unknown risks and uncertainties involve future-oriented perceptions of potential risky events and include (i) perception of what is actually unknown, (ii) what is not scientifically known, and (iii) emergence of knowledge that could reveal more risks in the future. Studies have suggested that people do not use the same or global frames of reference to judge risky or uncertain situations (Beckwith 1996; Syme and Bishop 1992). The uknown risks and uncertainties theme attempts to capture the research that explores subjective risks in the face of conflicting scientific information, and the uncertain status of scientific information (Cameron 2005; Thalmann and Wiedemann 2006).

Systems Failure Risk - Mismanagement/Monitoring

Systems failure risk as a category includes human aspects of management and monitoring that could contribute to systems breaking down. Different levels and layers of systems failure emerged from the technical scoping workshops. For example, systems failure could include issues of governance, technological systems, individual negligence and failure, regulatory issues, or the impact of scientific uncertainties of systems risk.

Relative/Competitive Risk - Risk Compared to Other Risks

Relative and competitive risk emerged as a theme by capturing the way people talked about the risks of PRW relative to other risks. Risks were related to current supplies of water, and in other areas of everyday life.

Political Risk - Risk to Political Domain, Community Backlash

The theme of political risk emerged as a means to express the way in which political interests could compromise the implementation of the scheme or effectiveness in the running of the system.

Personal Health Risk; Population Health Risk; Intergenerational Issues and Risk - Family Health, Personal Cumulative Risk

Three themes characterise a broader discourse surrounding PRW that in particular is concerned with health risks. Personal health risk includes issues such as family health, individual risks and issues, personal cumulative health issues, and the influence of population health issues on personal life. Population risk involves perspectives on the risks to population health such as the impact on reproductive health and fertility. Intergenerational issues include the risks posed to both current and future generations of children and young people.[6]

Financial Risk

Financial risk is constructed of statements that capture the economic characteristics and risks of the PRW scheme identified during the scoping phase.

Environmental Risk

Concern about risks to the environment as a result of the PRW scheme arose during discussions in scoping workshops and qualitative responses from the baseline survey, including concern over the dam environment and its subsequent impact on surrounding amenities.

[6] Although intergenerational issues, it could be argued, include more than just the impacts on children and young people, the discussion about intergenerational issues in the scoping phases

Perceptions of Scientific and Community Responses to Risk

Peters, Burraston and Mertz (2004) have suggested that risk perceptions are largely emotional, and that these emotions are linked to people's judgements and assessments of technologies and communications about those technologies. Subjective risk and emotion appears to be an important factor, particularly in the face of the uncertainty of science (Cameron 2005; Thalmann and Wiedemann 2006). Thalmann and Wiedemann (2006) discussed this in terms of technology debates and the uncertainty of scientific knowledge and emotional discussions between stakeholders. They found that beliefs influenced judgements and highly emotive information polarised beliefs and risk appraisals. Perceptions of scientific and community responses to risk and beliefs about the 'other' people involved in making decisions around PRW did appear to polarize the perceptions of others' risk appraisals. The inclusion of this category is to trial how perceptions of other responses to PRW influence thinking and decision making.

Chemical and Toxicological Risk

Chemical and toxicological risk was developed from detailed discussions in technical and community scoping workshops which revealed an array of concerns. Although presented in 'layperson' terms, the category contains statements about (i) faith in filtration and treatment, (ii) common statements from community about not being able to account for what is in the waste stream, and (iii) perceived scientific knowledge gaps regarding the long-term build up and consequences of the mixing of different chemical compounds and organic pollutants.

Voluntary versus Imposed Risk

This category emerged as community members reflected upon the difference between risks taken as a choice or a voluntary action, and imposed or involuntary risks. The category also included a perception of choice even with imposed risk.

Tolerability and Resignation to Risk

Tolerability and resignation as a risk category reflects a number of comments by participants, particularly from community focus groups, about levels of tolerability of certain risks associated with PRW. Tolerability and resignation reflects concerns and perceptions of limited water supply and impacts on personal lifestyle. Also expressed was a sense of lack of control over outcomes of the scheme and perceptions regarding the salience or strength of the debate. Concerns were over the newness as a social issue, and opinions that water reuse may be tolerated in the future once it becomes more familiar or is proven to be 'safe'. The category also reflects theoretical concepts about tolerability of risk, where risk is broken into three categories, (i) a broadly acceptable region, (ii) a zone where risk needs to be considered carefully, and (iii) an unacceptable region (Blowers 1997; Simmons and Walker 1999).

Emotion – The Yuck Factor

Much of the available literature captures people's sensitivity and disgust when actions involve ingestion of 'disgusting' materials (e.g., Charash and McKay 2002). Disgust is often linked to the principles of contamination (Charash and McKay 2002; Marzillier and Davey 2004), and is described as a defensive emotion (Charash and McKay 2002). The stigma of wastewater exists as an emotive/cognitive feature that can influence decision making, despite expert based reassurances of its safety.

Trust

Trust includes trust in government regulators and operators and science, as well as elements of individual trust and trust in systems to 'mediate' risk (e.g., Leviston et al. 2006; Sjoberg 2001). It is also a dynamic and fluid property of relationships between people in the public and private sectors (Kjoernes et al. 2006). General trust is a belief that other people can be relied on, and this type of trust involves risk and vulnerability which is important when familiarity is low (Luhman 1988, 1998). General confidence, on the other hand, involves the conviction that everything is under control, uncertainty is low, and is based on high levels of familiarity (Luhman 1988). It is also important to reflect that objects of trust are persons, but confidence can be in anything, including systems. (Luhman

1988; Hamilton and Sherman 1996; Marks and Zadoroznyj 2005; McDonnell 1997). As faith and trust (or lack of) are cited as the most common reason for not accepting indirect potable recycling it is an important issue to explore, particularly its relationship to risk (Stenekes et al. 2006).

Aesthetics and Water Quality

Aesthetics is simply a concern about the aesthetic quality of water produced by the PRW scheme, such as the smell and taste, and visual impressions. There are different aesthetic qualities and requirements for drinking water and irrigation which are reflected in the statements.

Fairness – in general

Fairness highlights an issue that is commonly raised by community stakeholders i.e., - that polluters and industrial and commercial users of water should use recycled water before it is used for other purposes (such as drinking).

Alternative Futures

When considering the risks associated with PRW, many people often cite examples of alternative water futures that are more acceptable to them than recycled wastewater. This sense of alternative can be defined at two levels i) technical/ technological/ government based changes and processes, and ii) personal responsibility and choice at a personal level.

Perceptions of Increased Water Use

Perceptions of abundant supply as a category attempts to capture the belief the introduction of an alternative water supply may encourage greater water usage in the community, thereby providing an inadequate solution to current water supply shortages.

Societal Issues

Societal issues as a category captures peoples' reflections on national and international level issues influencing people's perceptions of recycled wastewater schemes. The theme highlights, for example, the comparison of the use of recycled wastewater at an international level, and the extent to which the participants see this issue as a fundamental community and societal debate.

Management – Scientific, Policy and Infrastructure Management/Knowledge

The 'management' component of the concourse is comprised of scientific information, government policy, infrastructural management and knowledge to reduce or prevent risks. Legal and legislative frameworks, and harm reduction/minimisation are included in this theme.

APPENDIX 5

Q-METHOD STATEMENTS

Table 12. Q-Method Statements

1. I am worried about diseases that we don't know about yet
2. It is the uncertainty of what could go wrong that troubles me
3. Scientists and governments have been wrong in the past about what is safe for us, what is to say they won't be wrong about this too?
4. It will be a long time before we will really know what the impacts are
5. I would be reassured that the water was safe if there was a panel of independent experts who could guarantee its safety
6. I trust the government to set and oversee safe standards
7. I trust scientists to tell me whether the water is safe or not
8. It wouldn't go ahead unless the authorities were satisfied it was safe
9. Human errors are always possible which makes the PRW scheme risky
10. I am concerned about something going wrong such as breakdowns or something not working properly
11. I believe there is enough scientific knowledge about water treatment that the PRW system will not be a problem
12. A main priority should be to reduce industrial and hospital waste entering the water system before it becomes recycled water
13. There needs to be strict legal and legislative requirements to make sure that the system is managed well
14. I am concerned that there will not be enough people with the expertise needed to maintain the system effectively
15. The people operating the system must be accountable and responsible for their actions
16. I have confidence in the company appointed to run the PRW system
17. I don't have a problem with the PRW scheme
18. There will be many benefits from the PRW system (e.g. water for the future, reduced water restrictions, economic growth and employment)
19. People are exposed to so many risks everyday that the risk of PRW is too small to worry about
20. People don't really know what comes out of their tap now, so what's the difference if they put PRW in it or not?
21. Political interests and processes could compromise the PRW scheme
22. I am concerned that future governments will not be committed to the PRW system
23. I believe the Queensland government is capable of ensuring a safe system
24. I am glad the decision to have a referendum about the PRW scheme was withdrawn
25. My biggest concern is the health effects of drinking PRW
26. I am concerned about a build-up of chemicals and toxins in my body over time
27. I am concerned there may be hormones in the water that impact on health and fertility
28. Some people may be more likely to suffer from the potential health effects of PRW than others
29. I'm concerned that PRW will make the water too clean and that people's immunity will suffer as a result
30. I am worried about how this might effect generations to come
31. I believe that PRW water will be better than the current drinking water supply
32. Those who pollute or use water the most should have to use PRW before anyone else
33. I feel that the people of South East Queensland are being used as guinea pigs
34. Due to the council amalgamations we won't have a local to represent our views on PRW

35. It's not fair that some people will be forced to drink PRW because they can't afford bottled water or water tanks
36. Government should be looking for water options that are the safest, not the cheapest
37. Businesses that rely on PRW for production will find it hard to compete nationally and internationally
38. The higher cost of water will mean a higher cost of living for South East Queensland
39. Everyone who is supplied with water in SEQ should pay for the PRW scheme
40. If the water is clean enough for us to drink then it will be clean enough for the environment
41. I am concerned that the PRW system will be too energy intensive
42. I am worried that PRW will cause algal blooms in Lake Wivenhoe
43. I am worried about the impact of the PRW system on the environment
44. Scientists base their decision-making on fact, community base their decisions on feeling
45. If scientists can't agree on many things, how can the community be expected to agree?
46. We don't have the time to wait until the entire community is happy with the safety of drinking PRW before it proceeds
47. The community do not have the required expertise or information to make a decision about PRW
48. I support it, but you will have a hard time convincing others to use it
49. I have confidence in the PRW treatment system
50. It is extremely unlikely that scientists can know how the different chemicals in PRW will react together
51. It doesn't matter how much you treat the water, to me it is still sewage
52. There is a difference between choosing to take risks and having risks imposed on us
53. If I was told it was safe to drink I would probably just get used to drinking it
54. My life is too busy so I will probably just tolerate it even though I don't like it
55. I would rather drink PRW than live with the anxiety that we could run out of water to drink
56. There is controversy surrounding the use of PRW because it is a new concept
57. It is going to happen anyway regardless of how I feel about it
58. We would have had more choice of water supplies if the government had acted earlier
59. We need to focus on reducing our water use
60. I think that other solutions are a better source of drinking water for South East Queensland than PRW (e.g. rainwater tanks, and/or home water recycling, desalination, stormwater, Bradford scheme etc)
61. The real issue is controlling population growth
62. Recycling wastewater will just encourage people to use more water anyway
63. I think it is safe as other countries have been drinking recycled water for a long time with no problems
64. Implementing PRW is a necessity, we don't have a choice given the current water crisis

APPENDIX 6

SUBURBS USED FOR WORKSHOP PARTICIPANT RECRUITMENT

Table 13. Suburbs chosen for the community workshops

Workshop locations		
Brisbane	*New suburbs selected*	Alderly, Belmont, Camp Hill, Enoggera, Gaythorne, Highgate, Spring Hill, Taringa, Tingulpa, Toowong, West End
	Suburbs selected with participants from survey only	Banyo, Bardon, Bulimba, Carina, Carina Heights, Clayfield, Graceville, Highgate Hill, Kedron, Kenmore, Newmarket, Paddington, St Lucia, Stafford, The Grange
	Suburbs selected with participants from workshop only	Chermside, Gordon Park, Indooroopilly, Kedron, Kenmore, Lutwyche, Windsor, Wooloowin
	Suburbs selected with participants from survey and workshop	Kedron, Belmont
Ipswich	*New suburbs selected*	Brassall, Bundamba, Silkstone
	Suburbs selected with participants from survey only	Booval, Churchill, Flinders View, Leichhardt, Raceview, Redbank Plains, Yamanto
	Suburbs selected with participants from workshop only	Booval, East Ipswich, Eastern Heights, North Ipswich, One Mile
	Suburbs selected with participants from survey and workshop	Booval, Leichhardt, Raceview
Gold Coast – Surfers Paradise	*New suburbs selected*	Molindar, Robina, Southport
	Suburbs selected with participants from workshop only	Ashmore, Broadbeach Waters, Nerang, Southport
Sunshine Coast – Caloundra	*New suburbs selected*	Sippy Downs, Buderim, 4551 Suburbs (Aroona, Battery Hill, Bells Creek, Caloundra, Currimundi, Dicky Beach, Golden Beach, Kings Beach, Little Mountain, Meridan Plains, Moffat Beach, Pelican Waters, Shelly Beach)
	Suburbs selected with participants from workshop only	Bokarina, Buddina