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Citizen participation in flood reduction planning: Strategic choices in Peterborough, Ontario

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March 2010

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March 2010
ICLR Research Paper Series – Number 47

Published by
Institute for Catastrophic Loss Reduction
20 Richmond Street East, Suite 210
Toronto, Ontario, Canada M5C 2R9

Cover photos: DanEagleton.com

ISBN: 978-0-9784841-4-9

ICLR's mission is to reduce the loss of life and property caused by severe weather and earthquakes through the identification and support of sustained actions that improve society's capacity to adapt to, anticipate, mitigate, withstand and recover from natural disasters. ICLR is achieving its mission through the development and implementation of its programs *Open for Business™,* to increase the disaster resilience of small businesses, *Designed… for safer living*, which increases the disaster resilience of homes, and *RSVP cities*, to increase the disaster resilience of communities.

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Executive summary

This paper explores the role of citizen participation in a post-disaster flood hazard mitigation planning program in Peterborough, Ontario. Recognizing that citizen participation is an integral element of hazard mitigation planning, a review of the relevant literature identifies six strategic planning choices that should be considered in the design of a citizen participation program. The strategic choices include (from Brody, Godschalk & Burby, 2003):

1. **Administration –** whether or not to include participation in the planning process and how to staff citizen involvement efforts;
2. **Objectives –** whether to simply educate citizens, seek their ideas and preferences, or actually grant them influence in decision making;
3. **Stage –** when to start encouraging and allowing citizen participation in the planning process;
4. **Targeting –** which types of stakeholder groups and segments of the population to invite to participate in the planning process;
5. **Techniques –** what types of approaches are employed to generate citizen participation;
6. **Information –** what types of information and dissemination processes are used to inform participants.

The study uses this framework to analyse the strategic choices made during the Flood Reduction Master Plan (FRMP) process undertaken in Peterborough following a severe flood event in 2004. Many successful elements and several opportunities for improvement of citizen participation in the planning program are found. Based on a simple four-point scale (excellent, good, fair, poor) the study evaluates the level of success of the decisions made for each strategic choice in terms of the standards set in the literature:

Administration – excellent	Targeting – fair
Objectives – fair	Techniques – excellent
Stage – excellent	Information – good

The analysis performed by this case study can be generalized to make recommendations that would apply to other hazard mitigation planning programs that include citizen participation. The first five recommendations are based on successful aspects of citizen participation in the FRMP process. Recommendations six to eight are based on aspects of citizen participation that limited the potential of the planning process.

1. Include citizen participation at the earliest stages of the planning process.
2. Depoliticize the planning process by granting the project team freedom from political and administrative pressure in conducting the study and creating the plan.
3. Hire additional consultants with specialized skills and experience if necessary.

4. Use a wide variety of participation techniques to generate and foster citizen participation.
5. Promote honesty to build trust in the working relationship between project team and citizen participants.
6. Clearly define the intended level of citizen participation early in the planning process.
7. Establish a Technical Review Committee before the terms of reference are set and ensure that the committee is involved in setting the terms. Provide the opportunity for the committee to conduct a technical peer review of the engineering calculations and models used in the planning process.
8. Employ both social targeting and geographic targeting as strategies to generate citizen participation.

Two additional recommendations aim to contribute to the development of accepted citizen participation theory, specifically Arnstein's Ladder of Citizen Participation (1969) and the six strategic choices identified by Brody *et al*. (2003), and were developed through the experience of applying that theory to the case study.

1 Introduction

1.1 Heavy rainfall events in Peterborough

On June 11, 2002, the city of Peterborough, Ontario experienced a heavy rainfall event that caused extensive flooding in low-lying areas of the city. The storm generated approximately 73 mm of rainfall within a 24-hour period (Lacey, 2005; UMA, 2005). This rainfall caused damage to several residential and commercial properties due to overland flow flooding and sewer backup. Provincial disaster relief was provided to property damage victims but many Peterborough residents and business owners were dissatisfied with the actions taken by the City to protect citizens from flooding. The heavy rainfall was estimated to be a 1 in 100 year event (UMA, 2005), which may explain the lack of urgency following the storm to take steps to reduce future flood damage. Citizens and City officials may have thought they had just suffered the flood of their lifetime. It would not take their lifetime to be proven wrong.

On July 14, 2004, a weather system that had moved across the country stalled above the city of Peterborough and produced a severe storm that generated 229 mm of rain in 24 hours. An incredible 87 mm of rain fell in one hour during the peak of the storm (Lacey, 2005; UMA, 2005). The storm began overnight and many Peterborough residents awoke to find their streets, yards, and basements flooded. Extensive flood damage was sustained and an estimated 6000 to 8000 properties were affected. Direct physical damages to private and public property exceeded $100 million (UMA, 2005). A state of emergency was declared by the City of Peterborough in the days after the storm, qualifying citizens for provincial financial aid. This heavy rainfall event was estimated by some to be a 1 in 290 year event (Hammond, 2004), although it is practically impossible to put an accurate figure on such a rainfall (Interviewee 4, 2007).

The citizens of Peterborough were devastated by the enormous impacts of this second flood within 25 months. Many residents and business owners had just recovered from damages caused by the June 2002 flood, and they considered it unacceptable to have sustained further flood damages. The weeks and months after the July 2004 flood were a difficult and emotional time for many members of the community, and the desire to assign blame for the damages suffered was strong. Many people directed their anger and frustration at the City for not being adequately prepared for such an event, despite experiencing similar consequences of heavy rainfall so recently. Citizens demanded that the City take action to reduce future flood losses.

1.2 Flood Reduction Master Plan

The City of Peterborough responded to the demands of the community by initiating efforts to discover the causes of the July 2004 flood damage and the steps that should be taken to reduce future potential flood damage. The City commissioned UMA Engineering Ltd. (UMA) to conduct a study and create a master plan that would address these issues. UMA commenced the study in August 2004 and eight months later, in April 2005, released the Flood Reduction Master Plan (FRMP) (UMA, 2005). Citizen participation was emphasized as an important element of the study and planning process. The local knowledge and experience, and the interest to reduce future flood losses, that existed within the Peterborough community was used to inform the study and influence planning and decision making.

1.3 Sustainable hazard mitigation

There exists a significant body of literature pertaining to the integration of hazards mitigation and land use planning, and the inclusion of citizen participation in these processes. The benefits of this complex integration have been well documented for some time and the base of relevant literature has exploded in recent decades. This paper is an attempt to contribute to this body of literature by documenting one Canadian case study and framing it in a construct created by authors currently positioned at the leading edge of this field.

Since Gilbert F. White first promoted a "human adjustment to floods" in 1945 the field has matured to the point where not only has there been a philosophical shift to an increased importance placed on non-structural hazard mitigation, but where citizen participation in land use planning to achieve this is considered necessary and has been championed by the leaders in the field. Sustainable hazard mitigation (Mileti, 1999) employs comprehensive land use planning as a key method of hazard mitigation while achieving the broader goals of sustainability.

Coinciding with the development of the hazard mitigation literature was a trend in urban planning literature and practice that called for an increasing emphasis on citizen participation in decision making. Over time, citizen participation in planning has evolved from a token commitment to the principles of democracy to an accepted, and expected, part of planning and decision making (Brody, 2003b; Godschalk, Brody and Burby, 2003). This development is due, in part, to the contributions of several key authors (including Arnstein, 1969; Burke, 1979; Day, 1997; Fagence, 1977; Fainstein and Fainstein, 1985) who have argued for the value of including citizen input in government land use planning and advocated wider citizen representation in decision making. Thus, sustainable hazard mitigation theory was influenced by the wider trend toward greater citizen participation in urban planning, and such participation is now widely recognized as an integral part of hazard mitigation practice (Mileti, 1999).

2 Context

2.1 Integrating hazard mitigation and land use planning

Hazard mitigation and land use planning share enough common objectives to inspire the integration of these two fields. They are both oriented to meeting future needs, proactive rather than reactive, and attempt to meet long term goals with short term actions (Godschalk, Kaiser & Berke, 1998). As Mileti (1999, p. 156) explains:

> Land use planning, environmental protection, hazards mitigation, and sustainable communities are related concepts with a similar vision – communities where people and property are kept out of harm's way from natural disasters, where the mitigative qualities of natural environmental systems are maintained, and where development is designed to be resilient in the face of natural forces.

The integration of hazard mitigation planning and land use planning can provide a number of benefits, some of which are outlined by Mileti (1999). First, plans can provide information about the location and potential impact of various hazards, ensuring that the risks of developing hazardous areas are known to elected officials, government staff, developers, and citizens. Secondly, by formally recognizing the most appropriate uses of land through zoning regulations, plans allow local governments to restrict development in hazardous areas. Third, land use planning can be used as a means to involve members of the community in government decision making.

Widely accepted as a critical element of the call to integrate hazard mitigation and land use planning is the incorporation of citizen participation in decision making processes. Citizen participation must be recognized as a fundamental component of sustainable hazards mitigation, and increasing emphasis must be placed on this important element (Godschalk *et al*., 1998; Mileti, 1999). Effectively including and using public input in planning for sustainable hazard mitigation has been a subject of recent study within the field and may help contribute to the general aim of reducing the human and economic costs of natural hazards.

2.2 Citizen participation in planning

Citizen participation in planning was initially supported by local governments to show a commitment to the principles of democracy (Brody, 2003b). Over time, participation has generally become ingrained in community planning processes in Canada and the US. Both academics and practitioners have argued in favour of including citizens in land use planning decisions, and several key authors have contributed to the foundation of the understanding of the principles of citizen participation. Arnstein (1969), Burke (1979), Day (1997), Fagence (1977), and Fainstein and Fainstein (1985) are among the authors that have argued that these principles "include the rights of individuals to be informed, to be consulted,

and to have the opportunity to express their views on governmental decisions" (Brody, Godschalk & Burby, 2003, p. 246). These authors also stress the need for better representation of the interests of those groups who are traditionally disadvantaged and powerless (Brody, 2003b). Arnstein's well known *Ladder of Citizen Participation* (1969) influenced a generation of planners with its radical call for the transfer of decision making power to citizens[1].

Day (1997: p. 422; p. 423) notes that citizen participation in planning has been the subject of a great amount of both theoretical and empirical research, and provides a very useful and thorough review of an "untidy" literature as she puts forward the question of whether citizen participation is an "essentially contested concept". Although the subject of citizen participation has attracted much scholarly activity, research has often been less than clear about what exactly it is and what it should accomplish. It is therefore important to clarify the meaning of citizen participation.

For the purpose of this paper, citizen participation is the "direct involvement of the public in decision making through a series of formal and informal mechanisms" (Schatzow, 1977 in Day, 1997: p. 422). This is different than 'public influence', which refers to the effect of the public on decision making, in that although participation may occur, the input and opinions of citizens may be ignored by decision makers (Day, 1997). In other words, citizen participation is when members of the public are given the opportunity to participate in decision making, and actually use that opportunity to add their input to the process. It does not necessarily mean that decision makers will let public input influence their decisions.

Citizen participation is widely accepted by planners as an important part of making successful plans (Brody *et al*., 2003). Citizen participation can be a key factor in generating the "trust, credibility, and commitment" between the public and government that is required to adopt and implement successful plans (Brody *et al*., 2003, p. 246). Including citizens in decision making early in the planning process can give participants a sense of ownership of the final plan, which may result in a higher quality plan. Participation early in the process also ensures that all necessary information is made available at the outset of the process so that unexpected participation by other potential stakeholders does not cause unnecessary delays during the implementation of the plan (Day, 1997). A sense of ownership may also reduce conflict over the long term, because those involved feel responsible for making the plan work (Brody *et al*., 2003). Perhaps most importantly for the purposes of this paper, the literature recognizes that citizen participation in the planning process "makes an important and positive contribution to the cornerstone of planning activity: the formulation of the comprehensive plan" (Day, 1997, p. 425). If it is important that hazard mitigation planning be incorporated into comprehensive planning, and it is widely accepted that participation is a key part of comprehensive planning, citizen participation should thus be recognized as a critical element of hazard mitigation planning.

[1] See Appendix A for a figure of Arnstein's Ladder of Citizen Participation (1969).

2.3 Citizen participation in hazard mitigation planning

American scholars Godschalk, Burby, and Brody have published extensively about citizen participation in land use planning for hazards mitigation, and have provided a solid foundation of research and literature in this subject area. They note that it has been difficult for governments to generate high levels of citizen participation in hazard mitigation planning. Despite the increasing economic cost of disasters, planners have not had much success in involving citizens in the creation of plans to reduce the impacts of hazards (Burby, 2003; Godschalk *et al*., 2003).

Godschalk *et al*. (2003) offer three explanations for an apparent lack of interest of citizens to be involved in hazards mitigation planning. The first is that many citizens, and even planners, believe that hazard mitigation and emergency response are sufficiently addressed by other government departments. The second reason is that citizens often feel that they lack the knowledge to provide competent input on technical issues (i.e. engineering measures, building codes, zoning regulations) involved in hazards mitigation planning. The third explanation is that most citizens do not believe that natural hazards have a direct impact on their daily lives, and are more interested in being involved in neighbourhood issues that affect their immediate interests, such as protection from unwanted development or relief from traffic congestion (Godschalk *et al*., 2003).

Hazards researchers identify two main types of plans that exist in the natural hazard mitigation field: specialized, stand-alone emergency management plans that address hazards; and comprehensive land use plans that contain hazard mitigation measures (Godschalk *et al*., 2003). The field of emergency management has traditionally used stand-alone plans. While both types of plans have advantages, Burby (1999) and Godschalk *et al*. (2003) strongly advocate for incorporating hazard mitigation into comprehensive land use planning. They argue that decisions regarding land use, as well as transportation, infrastructure, and the environment are good opportunities to advance hazard mitigation efforts. Furthermore, comprehensive planning is a practice that is already established with government and elected officials and exists as a way to generate citizen participation (Godschalk *et al*., 1998; Godschalk *et al*., 2003).

2.4 Six strategic planning choices

Brody, Godschalk and Burby (2003) have identified six critical choices that should be considered in the design of the citizen participation element of a planning program. Decisions about these choices may be made by municipal planners, consultants involved in the planning project, elected officials, or a combination of these individuals. The strategic choices are constructs that have been created by the authors from their experience conducting citizen participation and hazards mitigation research. The choices are as follows (from Brody *et al*., 2003):

1. **Administration –** whether or not to include participation in the planning process and how to staff citizen involvement efforts;
2. **Objectives –** whether to simply educate citizens, seek their ideas and preferences, or actually grant them influence in decision making;

3. **Stage –** when to start encouraging and allowing citizen participation in the planning process;
4. **Targeting –** which types of stakeholder groups and segments of the population to invite to participate in the planning process;
5. **Techniques –** what types of approaches are employed to generate citizen participation; and
6. **Information –** what types of information and dissemination processes are used to inform participants.

These choices can serve as a lens through which to study the decisions for flood reduction that were made in Peterborough following the July 2004 flood event. Analyzing a hazard mitigation planning program involving citizen participation in terms of the six strategic choices proposed by this framework serves to apply theory found in the current literature to planning practice in order to better understand sustainable hazard mitigation.

3 Research methods and case study background

3.1 Research methods

In order to discover how citizen participation has or has not influenced planning and decision-making for sustainable hazard mitigation, a case study of a community experiencing previous flood damages (Peterborough, Ontario) was conducted. Yin (2003) states that case studies are the preferred strategy when "how" or "why" questions are being asked, when the researcher has little control over events, and when the focus is on a recent issue within a practical context. The research conducted on the situation in Peterborough meets each of these criteria. Furthermore, the case study is a common research strategy in community planning (Yin, 2003). As noted in the previous section, hazard mitigation planning has not traditionally embraced community involvement to the same degree as land use planning. This assertion and the call to integrate hazard mitigation with land use planning further support the case study method as the most appropriate strategy of research for this situation.

The case study's unique strength is its ability to deal with a variety of evidence, including existing documents, archival records, interviews, direct observation, participant-observation, and physical artefacts (Yin, 2003). For the purposes of this case study research program, existing documentation, semi-structured key informant interviews, and direct observation were most heavily relied upon.

3.1.1 Key informant interviews

Semi-structured, in-person interviews conducted with fifteen (15) key informants were an important data gathering tool in the research. These individuals were chosen because of their involvement in one or more aspects of the flood reduction program, or because they had a vested interest in the outcome and success of the flood reduction program. Key informants and their roles in the flood reduction program were discovered through preliminary research of existing documentation found on the City of Peterborough's website, the Flood Reduction Master Plan and articles published in local and National newspapers, and through the snowball method of sampling (Babbie, 2004).

Interviews of the key informants can be divided into five categories based on the Interviewee's role or interest in the FRMP process. The categories and the number of key informants interviewed in each category are as follows[2]:

1. City of Peterborough senior staff (n=4)
2. Private consultants involved in creating FRMP (n=2)
3. Otonabee Region Conservation Authority staff (n=3)
4. Representatives of citizen or community groups (n=4)
5. Other (n=2)

[2] See Appendix B for a more detailed list.

In the "Other" category, two people were interviewed. The first individual was a former graduate student who wrote a Master's thesis about initial flood perceptions in Peterborough shortly after the July 2004 flood and presently works in the hazards research community. The second individual was a university Environmental Studies professor who lived in Peterborough during the July 2004 flood, and whose personal property was directly affected by flood damages. While neither of these key informants were able to comment on direct experience with the FRMP process, both provided valuable advice and guidance on how to best proceed with the research program.

Key informants were asked to share their knowledge of the FRMP process as well as their opinions on its successes and shortcomings. A standard set of question themes[3] were followed in all interviews and the researcher referred to this guide to maintain the focus of the interview. The researcher attempted to keep the interviews as much like a conversation as possible, and allowed the key informant to digress and provide unsolicited information if he or she was willing to do so. This was an ideal strategy for encouraging the maximum amount of information to come out during the interview.

Many key informants readily offered the information that is most important from their perspective. This willingness was helpful in that it gave a clear idea of what information was considered most important from each perspective. Key informants were then asked questions from each theme that had not yet been addressed. The knowledge gained from each interview further guided the researcher to more appropriately adapt to the case. Throughout the research the question themes were modified and extended as new information came to light; this allowed a more accurate exploration of the topic areas most relevant to the FRMP process.

The interviews were conducted in-person by the author. Most of the interviews (thirteen out of fifteen) were conducted in Peterborough. Of the other two interviews, one was in Toronto and the other in Waterloo, Ontario. The average length of time of the interviews was approximately fifty (50) minutes. A few were significantly longer than that at approximately one hour and twenty minutes, and some were shorter at approximately thirty minutes. All interviews were tape recorded so that the details of the interviewees' responses could be captured and so the researcher could concentrate on the conversation and asking appropriate questions rather than on taking notes. The recordings of the interviews were then transcribed verbatim in order to have a written record of the interviews. The transcriptions were then analyzed and referred to during the remainder of the research stage and throughout the writing process.

Each transcription was analyzed in three ways. The first method was to look for original or unique content and particularly compelling quotes that described the case study situation. These were then extracted from the document. The second method was to look for specific themes that were mentioned by many key informants and extract what each of them said about that theme. Responses for each theme were then pooled for the five different stakeholder groups, and these pooled responses were then compared across the different stakeholder groups (e.g. City staff, consultants, ORCA staff, community group representatives, or 'other' informants). The third method was to extract information that specifically addressed the six strategic choices outlined by Brody *et al*. (2003).

3.1.2 Limitation of the research

A possible research limitation is a result of the nature of the six strategic choices framework. The framework proposed by Brody *et al*. (2003) divides the decisions that must be made in the design of a participation program into six separate categories, but in reality it is nearly impossible and somewhat impractical to separate these choices so neatly. The result is that there exists some apparent overlapping of information when the framework is applied to the flood reduction planning process in Peterborough. This overlapping of information may make the categories appear blurred and less than distinct, and give the impression that there are too many categories that attempt to distinguish between choices that may be inherently mutually related. It is suspected that most planning programs involving citizen participation present decisions or choices that are difficult to pull apart and put into six different categories without missing or overlapping some of the information. This difficulty is due to the fact that most aspects of a planning program are related to one another and all decisions that are made affect other aspects of the program.

3.2 Description of case study and study area

Peterborough, Ontario was selected for this study due to an interest in the post-disaster flood reduction planning efforts made by the City after the July 2004 flood event. Peterborough makes for a generally interesting study area for flood-related issues, partly due to suffering two large-scale flood events in June 2002 and July 2004. The city of Peterborough is located 127 km north- east of Toronto, Ontario in an area of the province known as The Kawarthas. The 2006 census population of Peterborough was 74 898 (Statistics Canada, 2007).

3.2.1 Severe rainfall events in Peterborough

On June 11, 2002, the city of Peterborough experienced an estimated 1:100 year heavy rainfall event that generated approximately 73 mm of rainfall within a 24 hour period (Sandink, 2006; UMA, 2005; Lacey, 2005). Little more than two years later, on July 15, 2004, the city was struck again by a heavy rainfall event. This storm event was significantly more severe, and resulted in 229 mm of rain

in a 24 hour period (Lacey, 2005). An astounding 87 mm of rain fell during the peak hour of the storm; the volume that is expected during a 24-hour, 100 year design storm (UMA, 2005). The July 2004 heavy rainfall event was estimated by some to be a 1 in 290 year event (Hammond, 2004), although it is practically impossible to put an accurate figure on such a rainfall (Interviewee 4, 2007).

Both rainfall events caused significant damage to private and public property in the city. Flood damage caused by the 2004 rainfall event exceeded $100 million in direct physical damages to private and public property (UMA, 2005). More than $87 million of the damage was covered by insurance (IBC, 2005). Indirect damages were also suffered as a result of both events, including disruption in residential living conditions, loss of business, and loss of income (UMA, 2005). It is estimated that approximately 6000 to 8000 properties were affected by the July 2004 event, while the June 2002 heavy rainfall event affected considerably fewer properties (Sandink, 2006).

Rainfall from the July 2004 event was most heavily concentrated on Peterborough's downtown core (UMA, 2005). Several key informants marvelled at the city's unfortunate luck and shared a similar sentiment that "the storm seemed to sit on top of the city" (Interviewee 1, 2007; Interviewee 3, 2007; Interviewee 4, 2007). Damages were suffered throughout much of the city but were most heavily concentrated downtown. Due to the nature of Peterborough's topography, the condition of the infrastructure, and the concentration of impervious surfaces in the older parts of the city, flooding and sewer backup were most severe in the downtown core (UMA, 2005; Sandink, 2006).

3.2.2 July 2004 flood causes

The Flood Reduction Master Plan was created by UMA Engineering Ltd. and completed in April 2005. It reports the findings of the FRMP study and offers recommendations on how the City of Peterborough should proceed to reduce the potential for flood damages in the future. The City has used the FRMP as the foundation of the ongoing Flood Reduction Program and as a tool to guide and justify future actions. The FRMP identifies the following major causes of flood damage: unprecedented heavy rainfall; insufficient storm sewer capacity; poorly defined overland flow routes; and, unwanted water getting into the sanitary sewer system (UMA, 2005).

4 Results and interpretation

After the July 2004 flood event, feelings of loss, pain and sadness quickly turned to anger and frustration for many members of the Peterborough community. Residents and business owners were upset about the damage they had suffered and held the City at fault for not being adequately prepared for such a rainfall event. Many citizens felt that the City had not taken strong enough action to mitigate the flood hazard, despite the reality of being susceptible to flooding made apparent just two years prior. Members of the community demanded that the City take action to protect its citizens from future flood losses.

City and UMA staff made several decisions, some perhaps more intentionally than others, about how citizen participation would be incorporated in the planning process. This case study is a practical example of citizen participation in hazard mitigation through land use planning. It is useful to analyse the case in terms of the six critical choices identified by Brody *et al*. (2003). Examining the decisions made by City and UMA staff will serve to apply theory in the current literature to a local, recent event in order to more fully understand sustainable hazard mitigation (Mileti, 1999) in practice.

4.1 Choice 1: Program administration

The City of Peterborough responded quickly to the public outcry by initiating a unique flood reduction planning program. Early in the planning process, the City mandated that the program must involve citizen participation in decision making. One of the first steps of the flood reduction program was for the City to hire an outside, independent consulting firm to study the cause and impacts of the July 2004 flood and to create a master plan, and this firm was at least partially responsible for the citizen participation approach used.

The consulting firm awarded the contract was UMA Engineering Ltd. (UMA) of Mississauga, Ontario. The City worked with UMA at the beginning of the planning process to establish the Terms of Reference of the study. It was agreed that citizen participation would play a large and influential role in the creation of the FRMP, with the intention of satisfying an unhappy population while using local knowledge to benefit decision making. When the City handed over control of the project to UMA it was with the assurance that UMA had the capabilities to gather and utilize public input (Interviewee 1, 2007; Interviewee 3, 2007; Interviewee 4, 2007).

The City made the decision to hire a consulting firm to perform the study and create the plan for two main reasons. First, the City simply did not possess the resources and staff required for such an undertaking (Interviewee 3, 2007). City planning and engineering staff were busy with their normal workloads and could not devote the necessary time to the flood reduction program. They also lacked the specialized training, skills and experience required to study urban flooding and prepare a detailed report with appropriate recommendations.

The second reason the City decided to hire a consulting firm was to depoliticize the planning process by making it independent from City council and staff (Interviewee 3, 2007). Since this post-disaster planning program was such a contentious issue, the City thought it best to keep the process at 'arm's length' from City councillors and staff. This way the process would not be affected by political pressure caused by councillors who may consider their ward constituents' interests before the needs of the greater community. In this same vein, the flood reduction program was created under the Office of the Chief Administrator, rather than within the Engineering or Planning department, so that the program would not be the responsibility of any single department of the City. The intention of this decision was to help foster the attitude that all City staff should contribute to the planning program without assuming an unfair responsibility for it (Interviewee 3, 2007).

In addition to 'in house' staff assigned to work on the project team, UMA hired another outside consultant to facilitate the public information meetings to ensure effective citizen participation. The facilitation consultant possessed specialized skills in running effective public meetings and proved invaluable in generating smoothly run meetings with fair and equal citizen input (Interviewee 1, 2007; Interviewee 3, 2007; Interviewee 4, 2007; Interviewee 5, 2007). UMA also hired a media relations advisor to help ensure that information was properly and accurately communicated to the public in order to raise awareness of the process and gain maximum involvement. This consultant enjoyed established contacts within the local media that benefitted the flow of this information (Interviewee 3, 2007; Interviewee 4, 2007).

4.2 Choice 2: Objectives to guide citizen involvement

The objectives of the FRMP study and planning process included educating citizens, seeking their preferences on alternatives, and granting them influence in decision making (UMA, 2005; Interviewee 3, 2007; Interviewee 4, 2007). An important aim of the process was to empower citizens to influence the outcome of the final plan. In order for citizens to make competent contributions to the planning process, the project team had to first provide some technical education to participants about how municipal infrastructure accommodates heavy rainfall. Education was not a one-way communication though – participants also educated the project team about what happens on their properties and in their neighbourhoods when there is a heavy rainfall. Beyond simply educating citizens, UMA sought the preferences of citizens as to what is most important to them to come out of the study. UMA asked participants early in the planning process whether structural or other mitigation measures should be used and what areas of the city should be addressed first.

It is important to recognize that there was some difference in perceptions between individuals interviewed about the level of citizen participation that existed in the planning program. In other words, in terms of Arnstein's *Ladder of Citizen Participation*[5] (1969), there was a discrepancy in opinions regarding which "rung" of the ladder most appropriately represented the level of participation throughout the process. When asked to choose a rung of the ladder that most accurately describes the level of participation in the flood reduction program in Peterborough, it was apparent that answering this question created difficulty for the key informants. Many of the key informants were hesitant to provide an answer to this question, and most provided one of two common explanations. Some informants were hesitant to attach their opinion to a question that so clearly represented what they thought of the process. They were afraid that, despite assurance that their answers would be kept confidential, somehow other people would discover that perhaps their personal opinion did not line up with the official stance of their organization, or what they should have thought.

Other informants were uncomfortable with some of the language used to describe the rungs of Arnstein's Ladder (1969). They felt that the words that represented some of the rungs of the ladder inaccurately described the corresponding level of participation, or that the words were 'loaded' and had other underlying meanings (Interviewee 1, 2007; Interviewee 2, 2007; Interviewee 5, 2007; Interviewee 8, 2007; Interviewee 12, 2007). This question proved the most difficult for most key informants to answer.

There was significant variation in the responses of the nine out of fifteen key informants that provided an answer to this question. No more than two of nine informants agreed on the level of participation used in the planning program. Two informants answered that they felt the level of participation could be most accurately described by the seventh (Delegated Power) or eighth (Citizen Control) rung of the ladder. Two informants thought that the sixth (Partnership) rung of the ladder was most appropriate. One informant was of the opinion that the level of participation should be classified as the fifth (Placation) rung; another answered the fourth (Consultation) rung; and another thought that the third (Informing) rung most accurately reflected the level of participation that existed in the planning program. One informant believed that the fourth (Consultation) or fifth (Placation) rung of the ladder represented the participation level. The other informant felt that the range of rungs from 3 (Informing) to 5 (Placation) was the most appropriate way to answer the question. These key informant responses are summarized in Table 2 at the end of this section. The difference in perceptions between individuals involved in the planning process shows that despite efforts to include citizen input in decision making, it is a difficult challenge to satisfy all participating stakeholders.

[5] See Appendix A for a figure of Arnstein's Ladder of Citizen Participation (1969)

4.3 Choice 3: Stage of the planning process when citizens first involved

Due to the nature of the flood reduction program, citizens were involved from an earlier stage in the process than is often the case in other planning programs. The creation of the FRMP was different than a more traditional planning program (e.g. for a proposed development) because the situation being planned for (i.e. damage due to flooding) had already occurred. For this reason, citizens were necessarily involved early in the process because they were intimately aware of the 'planning problem', and were seen by planners as an important resource in the gathering of information and knowledge required to understand the flood hazard and to propose possible solutions.

UMA was retained by the City in August 2004, within one month of the July rainfall event (UMA, 2005). UMA initiated the FRMP study immediately in August and the study was carried out over the following eight-month period to May 2005. UMA commenced the citizen participation element of the planning process just two months after the flood disaster, doing so by inviting members of the public to an initial round of public information meetings. This first round of meetings included five separate meetings on different dates in late September and early October 2004. One meeting was held in each of the City's five municipal political wards. UMA notified the public of these meetings by putting information notices in both Peterborough local newspapers on four dates in mid-September.

During this round of public information meetings, citizens were consulted to help UMA discover the specific details of what happened during the course of the July 2004 heavy rainfall event. UMA used the information and data gathered during these meetings to inform the study and in the creation of the FRMP. The first round of public information meetings was well-attended, with an estimated combined total of approximately 600 citizens present at the meetings (Hammond, 2004; UMA, 2005). Participation at the meetings was spirited and lively, reflecting the passion for this issue that existed in the community at that time (Interviewee 3, 2007; Interviewee 5, 2007; Interviewee 11, 2007).

UMA held a second round of five public information meetings in late February and early March 2005. The meetings followed a format similar to those of the first round, and the public was again notified in both local newspapers several weeks prior to the meetings. In addition to newspaper notices, notification letters were mailed to citizens who signed a mailing list during the first round of meetings. During the second round of meetings, UMA presented the findings of the study and the FRMP to citizens for their comment.

4.4 Choice 4: How many and which types of groups to target

Geographic targeting was the only method of targeting used by UMA to generate citizen participation in the FRMP process. There was no evidence that other forms, such as targeting specific sectors of the population or groups within the community for participation, was used in the planning process. UMA chose to target five different sub-populations within Peterborough that were determined by geographic area. These five geographic areas already existed as municipal political wards, and served as established arbitrary boundaries within the community.

The decision to target citizens for participation in this manner was made for two main reasons. First, the population of the City of Peterborough was thought to be simply too large to hold general public information meetings that invited citizens from across the city (Interviewee 3, 2007; Interviewee 4, 2007). Attendance at one of these mass meetings, even if several of them were held, would have been too high to allow for an effective and productive meeting. Several hundred people would have been in attendance, rendering effective participation impossible. There would have been simply too many people to allow everyone who wanted to participate the chance to do so. Not having the opportunity to participate would have increased frustration at the process and discouraged further participation.

The second reason for targeting the populations of each geographic area separately was to gather location-specific information and input at the meetings (Interviewee 3, 2007; Interviewee 4, 2007). It was thought that concentrating on the specific concerns and needs of different areas of the city would allow for a better understanding of each area to result. Targeting participation from the populations of these areas, the people who have the most knowledge and best understanding of the areas, would provide the most accurate and informed contributions to the planning process. It may have also encouraged additional participation as citizens felt that they could contribute to a specific local issue, of which few people would have similar knowledge. This geographic area targeting strategy may have been successful in garnering some additional citizen participation at the public information meetings. Groups of citizens within the community with special interests or specific needs, however, were not intentionally targeted to participate and offer their perspective to the planning process.

4.4.1 Flood Relief Committee

Many citizens were provided assistance in recovering from property damage caused by flooding and sewer backup by the City of Peterborough's "Flood Relief Committee". This committee distributed financial assistance provided by the provincial government to citizens in need who had uninsured damage (Interviewee 1, 2007; Interviewee 3, 2007; Interviewee 7, 2007; Interviewee 10, 2007). Citizens receiving this assistance were not asked for input regarding the FRMP study (Interviewee 10). This may be considered a missed opportunity. However, it cannot be expected of people in such a difficult situation to be concerned about planning issues when more pressing challenges exist.

4.5 Choice 5: Techniques for obtaining citizen input

UMA used several techniques to obtain citizen input throughout the FRMP process. The primary method of soliciting citizen participation was through two rounds of public information meetings, totalling ten meetings. During these meetings the project team used several different techniques to obtain input from participants. In addition to the public meetings, UMA gathered information from citizens by conducting door-to-door interviews with residents and business owners in the areas of the city that suffered the most damage, basement flood surveys and comment forms.

The purpose of the first round of meetings, held in late September and early October 2004, was to ask citizens to share knowledge and information about how their property was affected by flooding or sewer backup. The second round of meetings was held in late February and early March 2005, and allowed UMA the chance to present the findings of the study, propose the FRMP, and ask for comments from the public. Each of the meetings during both rounds was held at the same time in the evening and structured in the same format. It was estimated that approximately 600 citizens attended the first round of public information meetings (Hammond, 2004; UMA, 2005).

The meetings began with an informal drop-in/roundtable working session. During this time, citizens could meet individually or in small groups with UMA and City staff to share their personal experience and knowledge of the flood. This session was followed by a formal presentation and question and answer session. During the first round of meetings, the presentation was very brief and served to inform participants about the study and planning process. The question and answer session that followed gave participants the opportunity to give comments, identify their concerns and ask questions to UMA staff about the process that would be undertaken during the subsequent months. It also gave citizens a chance to hear the concerns raised by other members of the public.

In the second round, UMA staff gave a formal presentation of the study findings and master plan, followed by a question and answer session. During this round, UMA and City staff were present at the front of the room to answer questions and receive comments from participants. The City was present in an official capacity during this round of meetings because the freedom of plan-writing stage was coming to a close and the City was transitioning back to taking ownership of the final plan product (Interviewee 3, 2007).

During the first round of meetings citizens were also asked to complete a basement flooding survey. This survey provided another opportunity for the public to document the damage sustained to their property and to contribute to the recording of damages throughout the city. Surveys were available to the public from October 2004 to the end of January 2005. A total of 429 completed surveys were received (UMA, 2005). During the second round of meetings participants

were given a comment form to complete at their leisure. The purpose of this form was to assist UMA in confirming the causes of the flooding, prioritize new works projects, and identify additional alternative solutions that UMA did not propose in the master plan. The technique of using comment forms is especially helpful in soliciting feedback from those citizens who prefer to participate by contributing their input in a more private manner. UMA received a total of 120 of these comment forms before the March 18, 2005 closing date (UMA, 2005). However, given that the master plan was accepted and published on April 5, 2005, a relatively short amount of time was granted for the input provided by the comment forms to influence the outcome of the final plan.

4.6 Choice 6: Providing citizens with information

It was necessary for the project team to provide technical information to citizens in order for them to make informed contributions to the planning process. The City and UMA shared responsibility for providing information and educating citizens as part of the mandate of the flood reduction program and their mutual interest for knowledgeable and competent participation in decision making. Due to expertise in different aspects of the program, the City and UMA were able to provide assistance to citizens that covered their various gaps in knowledge. City staff took primary responsibility for educating citizens about how the municipal storm and sanitary sewer systems respond to heavy rainfall, overland flow routes, and waterway maintenance in the City (Interviewee 2, 2007; Interviewee 3, 2007). Staff were able to inform participants about the City's role preparing for, and responding to, a heavy rainfall event that causes flooding. UMA staff educated citizens about more specialized flood and engineering information, such as storm interval calculation, computer-generated flood models, and engineering flood mitigation measures (Interviewee 4, 2007).

Several issues created confusion and misunderstanding among the citizens of Peterborough and participants in the planning process. One issue that proved to be a major point of confusion was the calculation of storm intervals. UMA estimated that the June 2002 storm was a 1 in 100 year rainfall event and that the July 2004 storm was an approximately 1 in 290 year event (Hammond, 2004; Interviewee 4, 2007; UMA, 2005). Peterborough residents generally accepted the June 2002 storm as a rare event, or a fluke, and after it occurred figured that they would never experience anything like it again. Many residents believed that there would be at least 100 years before another rainfall event like that would occur again (Leblanc, 2004). Under this impression, many citizens could not understand how two heavy rainfall events of such magnitude, which were supposed to happen only once in a lifetime or more, could possibly occur within just over two years. Residents who participated in the program expressed anger, frustration and helplessness upon learning these figures. These feelings led to a mistrust of statistics among some participants, which threatened to undermine the working relationship between UMA and City staff and citizen participants (Interviewee 3; 2007; Interviewee 4, 2007; Leblanc, 2004).

Two separate groups were created by the City to oversee the FRMP process on behalf of the public: the Technical Review Committee (TRC) and the Citizens' Advisory Panel (CAP). The TRC was established to review the work of the project team from a technical perspective throughout the planning process. Members of the committee, representing various public and private agencies, offered their professional expertise to ensure the findings made by UMA were technically sound. The CAP consisted of eleven Peterborough citizens who were recruited to represent the community and chosen for their significant local knowledge. The members of the panel did not represent any of the government offices or agencies that were represented on the TRC. The function of the CAP was to provide input and advice on the study and public consultation process from the perspective of the community. The CAP was also a 'watchdog' to make sure that the study and planning process was not being interfered with by the City at a staff or political level. UMA presented its progress to both the TRC and the CAP at meetings held at key times throughout the study process before UMA presented information to the general public. Following the approval of the FRMP by the City, the TRC and CAP were seen to have fulfilled their purposes and were subsequently dissolved.

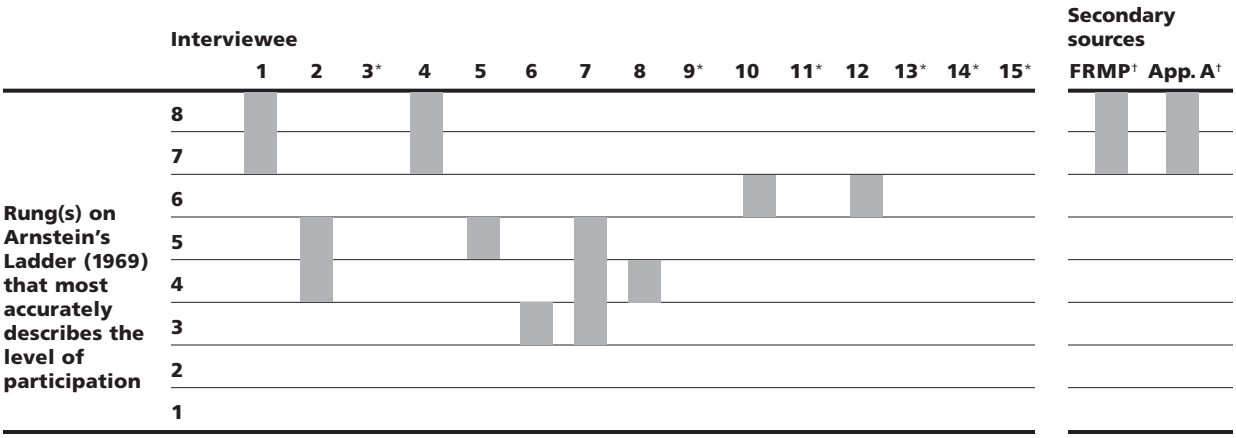
4.7 Summary of case study findings

Table 1 is a summary of the case study findings presented in this section. The most important findings are summarized for each of the six 'strategic choices' identified by Brody *et al*. (2003). Since there was much discrepancy in perceptions regarding the level of participation that existed in the planning program, Table 2 displays these differing opinions on the 'Objectives' choice by identifying the rung of Arnstein's Ladder (1969) that each key informant believed most accurately describes the level of participation.

Table 1. Summary of findings

Strategic choices	Summary of findings
Administration	City contracted UMA to create FRMP
	Citizen participation considered important
	Two other specialized consultants also hired
Objectives	Difference in perceptions regarding the level of citizen participation that existed
	See Table 2 for Interviewee perceptions of which 'rung' most appropriately represents the level of participation throughout the FRMP process
Stage	Citizens involved at early stage in planning process
Targeting	Geographic areas were targeted for participation rather than sectors of the general population
Techniques	Many participation techniques used within two rounds of five public information meetings
Information	Technical information was shared carefully to maintain honesty and trust in working relationship
	Some confusion but mistrust of statistics was largely avoided

Table 2. Perceptions of citizen participation



* Represents no comment/response or perspective on the situation

† Indicates author's judgement

5 Discussion and implications

The six strategic planning choices that have been identified by Brody *et al*. (2003) are a useful lens through which to analyse the flood reduction program in Peterborough as a hazard mitigation planning program that involves citizen participation. This section will discuss the findings of such an analysis, and comment on the relevance and implications of these findings. The section will identify and discuss five aspects of the process that improved the quality of the final plan and three aspects of the process that presented opportunities for improvement. A discussion of some limitations of a post-disaster hazard mitigation planning effort like the FRMP is then offered.

5.1 Aspects of the process that improved the plan

5.1.1 Participation early in the planning process

The decision to include citizen participation at such an early stage of the process was influential to the success of the program and the outcome of the final plan. The nature of the FRMP study may have made this decision easier than it may have otherwise been if it was a more traditional planning program. Since the objective of the program was to create a plan to reduce the negative impacts of a heavy rainfall event like the ones that occurred in June 2002 and July 2004, an important part of the beginning of the study was gathering information from citizens that were affected by the events. The project team consulted citizens to learn what happened during these events on their properties and in their neighbourhoods in order to make well-informed decisions and be better able to propose appropriate solutions. This necessitated the involvement of these citizens in the process from an early stage.

The opportunity to be involved at an early and important stage of the program did much to satisfy the need of many citizens to contribute their input and feel that someone of some authority was listening to them. The public demanded that the planning process be initiated quickly after the July 2004 event, and many citizens were eager to offer their input to the process. The City met this demand by commissioning UMA to conduct the study in August 2004, approximately one month after the event and during the height of community backlash to the issue. UMA also responded to community demands by offering the first round of public information meetings by the end of September.

This decision is in keeping with the academic literature, which advocates that in order to be meaningful, participation must be included in the planning process "early, often, and ongoing" (Wondolleck & Yaffee, 2000, p. 103). Brody *et al*. (2003) state that "early participation injects community knowledge and expertise into the planning process when it is most needed" (p. 250), which was precisely the case for the FRMP study. The authors also note that at the early stages of a planning program, the issues considered are often too general or abstract to generate accurate or useful contributions from potentially affected stakeholders (Brody *et al*., 2003). This was clearly not the case for this program, as participants had very specific ideas about the problems with the City's infrastructure, how they were affected by overland flow flooding or sewer backup, and actions that should be taken to reduce damages in the future. Since citizens had information and strong opinions they wanted to offer to

the project team immediately, it was a challenge to organize this information and encourage participants to contribute at the appropriate time. Rather than the issues being too broad or general, they were instead very specific and focused for participants who knew what they wanted to get out of the planning program.

The literature also states that participation that is introduced during the later stages of a planning program may be able to generate focused and well-informed input from participants, but may be too late to have an actual effect on the final plan (Alterman *et al*., 2004; Brody *et al*., 2003). The experience of the flood reduction planning program in Peterborough would extend this theory, adding that participation that does not occur at the early stages of the program actually makes the quality of the final plan worse, because the information that is required to make competent decisions throughout the process is incomplete and possibly inaccurate. This would result in misinformed decisions that may lead to a plan that does not serve the best interests of the community or affected stakeholders. The inclusion of citizen participation early in the planning process is the only way to ensure that the foundation of information from which decisions are made is complete and accurate and can at the very least provide the opportunity for competent decisions to be made later in the process. If participation is not included until too late in the process, this opportunity may never exist.

Furthermore, Brody *et al*. (2003) state that citizen participation that does not begin until the later stages of the planning process may result in "an adversarial, reactionary atmosphere" (p. 250). The experience in Peterborough demonstrates that an adversarial, or even hostile, atmosphere may also be present when citizens are involved during the early stages of the planning process. This observation would suggest that the avoidance of adversarial reactions from citizen participants, at any time during the planning process, may not always be possible. This type of atmosphere though, when kept in control, may actually benefit the planning process. Heated, adversarial dialogue amongst citizens, and between participants and planners, strengthens the quality of the information that comes out of the process by ensuring that many perspectives are represented, and challenged by other perspectives. Having this adversarial discussion early in the planning process may be ideal, because the positive use of this impassioned participation may be maximized at this stage. This atmosphere produces many different viewpoints and opinions, and may actually generate more interest and participation in the process from other citizens. The community may be stimulated by this type of participation early in a planning program. Carefully fostering this participation will create an opportunity to thoroughly gather the information that forms the foundation for decision making throughout the planning process.

5.1.2 Freedom in creating plan

The City of Peterborough made the decision to commission the FRMP study to a private consulting firm for two main reasons that were presented in the previous section. First, the City simply did not have the resources and staff required to conduct the complex study at an appropriate calibre. Second, the City wanted to depoliticize

the planning process by making it independent from City council and staff. The intent of depoliticizing the process was to allow for freedom in the creation of the Master Plan instead of subjecting the process to political pressure that could influence the outcome. The decision to hire a private consulting firm to depoliticize such a contentious issue allowed for a freedom in creating the plan that would not be possible if the City conducted the study.

It was speculated that if elected officials were involved in the study and planning process they would complicate decision making by injecting political motivations. The intention of the city-wide study was to benefit the population of the entire city, and if councillors were involved they may be foremost concerned with the interests of the constituents in their wards. It was feared that councillors would put pressure on staff to place additional importance on meeting the needs of their wards. Another concern was that staff in different departments of the municipality would have different priorities that would introduce a competitive atmosphere. By removing the study from the mandate of City staff and councillors, this decision depoliticized the planning process and allowed UMA the freedom to create the plan while being open and honest with the City and citizens.

This decision, though it may not have been made by a careful review of the relevant literature, heeds the call of the literature precisely. This literature cites many practical examples to indicate that hazard mitigation efforts are often subject to political pressure, and may benefit some people at the expense of others (Maskrey, 1989). Political pressure may exist to the point of making mitigation measures irrelevant or even counterproductive in local situations (Maskrey, 1989). The result of a politicized planning process is that some people benefit over others, which directly undermines the objective of hazard mitigation to create safe and resilient communities. The decision to eliminate political pressure from the flood reduction study and planning process benefitted the entire Peterborough community.

Additionally, in the case of Peterborough, the decision to not include City staff or councillors in any element of conducting the study or planning process fuelled some speculation that senior City officials did not trust staff to carry out the process satisfactorily. There were feelings that senior officials did not believe that staff were capable of creating a satisfactory plan (Interviewee 3, 2007; Interviewee 5, 2007). These feelings resulted in some unrest within the bureaucracy and led to further speculation among members of the community that City staff were incompetent or lazy. There existed reports that some City staff members were upset by this questioning of their value but these feelings did not dissuade the City from hiring a private consultant and there is no reason to believe that these feelings negatively affected the planning process or the final outcome of the plan.

5.1.3 Public Facilitation and Media Relations consultants

The City of Peterborough contracted UMA to create the FRMP by conducting the study with the resources necessary to do so appropriately. In addition to its in-house staff, UMA decided that it must hire two additional private consultants to fill specialized job functions for which UMA did not have the capacity. UMA contracted

a public facilitation consultant and a media relations consultant to add to the project team. Key informants questioned about the additional consultants were unanimous in their agreement that these consultants were a great benefit to the planning process, and their specialized skills and experience strengthened the quality of the final plan. To have such broad and strong support among people involved in the process is a testament to the value of the decision to hire these consultants and the contribution that they each made to the planning program. Moreover, this decision is consistent with recommendations made in the current hazards literature. Brody *et al*. (2003) state that using an outside consultant, with specialized training or experience in citizen involvement techniques, to manage (or facilitate) the participation element of a planning program can help to ensure that citizen participation has a positive impact on the decision making process, and the outcome of the final plan.

The facilitation consultant that was hired is an independent, private consultant that specializes in facilitating public meetings. This consultant had never worked in collaboration with UMA before, had never worked in Peterborough, and was based outside of Peterborough and unfamiliar with members of the public. UMA had learned of this consultant's work through other professional contacts, and invited the consultant to a meeting to share ideas about the situation in Peterborough. The consultant provided some advice on the process drawn from her own professional experience, and UMA decided to take this advice and hired her. The facilitation consultant provided expertise and experience in running effective public meetings so that participants had a fair and equal chance to contribute, and were allowed to share their opinions without being attacked by others. Having a professional facilitator in charge of running the meeting also allowed UMA staff to concentrate their efforts and attention on planning and engineering issues.

The facilitation consultant collaborated with UMA staff to create the citizen participation element of the planning program. Together, they decided on employing a citizen participation technique they called "Constructive Public Engagement" to obtain community input to the planning process (Interviewee 11, 2007). This technique used a variety of citizen participation methods within public meetings, as described in section 4.5. A variety of participation methods were used to try to maximize public involvement in the meetings and minimize frustration for the participants. This strategy proved to be very effective in doing so, and this experience was a professional success 'benchmark' for the facilitation consultant (Interviewee 11, 2007).

An example of the input that the facilitation consultant contributed to the design of the planning program is in regards to the role of municipal councillors at the public meetings. At the beginning of the process there was a lot of concern and discourse over what the function of the elected official should be. There was mounting pressure from some members of the public that wanted to hear from their councillor or the Mayor at the public meetings; they wanted to know what the City is doing to make things better. The facilitation consultant had a strong opinion that nothing positive would be gained by having elected officials speak at the meetings, and advised UMA

that councillors should be there to listen and not one of them should speak. The facilitator drew upon professional experience that elected officials would only be able to speak to political interests and would be unable to offer anything of value in decision making in this situation. The facilitator argued that although elected officials will want to say to their community that they will do everything possible to not have this happen again, a lot of the information is outside their knowledge and decisions are outside their powers, so would result in creating more mistrust in the process. The facilitator said that councillors could show compassion to the public and great interest in finding solutions by simply attending the meetings and listening to citizens, and be acknowledged for doing so.

UMA took the advice of the facilitation consultant and did not allow elected officials to speak or be asked questions by participants at the meetings. This decision was challenged often by participants during the first round of meetings but the project team was convinced it was the correct decision and abided by it. It was the responsibility of the facilitation consultant to defend this decision to the public and explain the reason it was made.

At the public information meetings, the facilitation consultant recorded the questions, concerns and comments from participants on a large-size flip chart at the front of the room. The consultant would write down the main idea of what the participant was saying and then asked the participant to confirm if this accurately captures what they meant. The consultant decided against recording public input verbatim in order to maintain an informal feel to the meetings and encourage participants to be candid in their input. The consultant found from past experience that by putting a tape recorder in front of participants and then transcribing what they said, they were likely to be conscious of being on the record and chose their words much more carefully. Instead, the consultant recorded the main ideas of participant input and later compiled these from all of the meetings and released them to the public as Appendix A of the FRMP. Appendix A serves to document much of the citizen input and provides a helpful resource for understanding many of the questions and concerns of the public at the time of the information meetings. Many key informants expressed their satisfaction that Appendix A was included in the FRMP, as it offers a direct link between citizen input and the plan, and communicates a good sense of the feeling in the community during the months after the flood event.

Although a less public figure than the facilitation consultant, the media relations and public information advisor also had an important role in the success of including citizen participation in the creation of the FRMP. UMA hired this consultant to help ensure that information was communicated to the public in order to raise awareness of the process and maximize participation. The advisor acted as a strategist and liaison to local media so that information about the planning process would be transmitted most effectively and accurately through the media to the public. The advising consultant was a local citizen and business owner, which provided several advantages to hiring an out of town consultant. The advisor was familiar with Peterborough and

the population of the city, and enjoyed established contacts within the business community and among local media outlets, including local newspapers and radio stations. The advisor arranged meetings with the media so that City and UMA staff could provide information about the planning program on their terms and ensure its accuracy and the message that they want to be portrayed. All members of the project team that were interviewed agreed that the media relations and public information advisor was a great benefit in communicating to the public.

5.1.4 Participation techniques

A variety of techniques were used to generate and foster citizen participation in the FRMP process. These techniques consisted of Public Information Meetings, the Citizens' Advisory Panel (CAP), and home and business visits by UMA staff to conduct personal interviews. The primary technique that was used to gather citizen input was the Public Information Meetings. The Citizens' Advisory Panel had a specialized role in the planning process. Rather than simply offering input and information to the study, CAP members used their combined professional experience to oversee the work of UMA on behalf of the community. The personal interviews conducted by UMA staff of home and business owners in the areas of the city that suffered the most damage were undertaken for highly focused data collection and fact-checking purposes rather than to gather opinions. The interviews also assured citizens that they were an important part of the early stages of the study and that their participation was valuable to the planning process.

By using these diverse participation techniques, including the variety of techniques used within the Public Information Meetings, the project team attempted to generate as much, and as broad a spectrum of citizen participation as possible. As noted by Brody *et al*. (2003), a variety of citizen participation techniques can be used to accomplish different objectives. While the Citizen's Advisory Panel and personal interviews had specific participation objectives, the Public Information Meetings were used by the project team to accomplish multiple objectives. These meetings attempted to educate participants as well as provide the opportunity for participants to educate the project team, seek citizen preferences on planning methods and solution alternatives, and grant participants influence on decision making.

An important recommendation made by Brody *et al*. (2003) is that planning programs should use a wide range of citizen participation techniques to ensure that there is "adequate information output, stakeholder preference input, and dialogue between planners and stakeholders" (p. 260). The efforts of the project team to use a variety of techniques to generate participation certainly adhere to this recommendation made by experienced hazards researchers. A valuable suggestion for planners, and one that clarifies what a participation program should accomplish, is to think in terms of creating opportunities for three equally important situations: one-way planner output of information; one-way public input of preferences, and; two-way dialogue (Brody *et al*., 2003).

Although many different techniques were used to successfully generate citizen participation, some may not have been utilized to their fullest potential and other techniques (e.g. delegated decision making) were not chosen to be used at all in the planning program. Factors that influenced the choice of techniques that were used in the planning process were time and budgetary constraints. Time was a constraining factor because there was great pressure from the community to create a plan that would guide action and works projects for the City to take in the immediate future. The deadline to complete the Master Plan was an arbitrary date chosen by the City and UMA, rather than a date decided by necessity. The date was set according to a timeline that was deemed reasonable by the project team to conduct a thoroughly researched study and create a clear and influential plan, while being sensitive to the demands of the community for a product that was finished in a timely manner. The imposed time constraint limited the participation techniques that could be employed in the planning program.

Financial budgetary constraints also limited possible participation techniques. Both the City and UMA had a budget for the project to which they attempted to adhere as closely as possible. Budgetary constraints restricted the number of staff working on the project and the number of hours they could devote to it. The participation techniques that were employed during the Public Information Meetings were staff and time-intensive, and therefore allocated significant budgetary support. Since financial resources were finite, a limit was placed on the amount of the budget that could be spent for the purpose of citizen participation.

5.1.5 The role of honesty in building trust in the working relationship

A critical objective for both City and UMA staff was to strive for honesty and trust in their working relationship with the citizens of Peterborough and participants in the program. The project team attempted to establish a rapport early in the program by leading by example. The City made it clear to the public that UMA was hired to objectively study the situation to learn what caused the damage and suggest actions that can be taken to reduce future flood damage. It was repeatedly stated that UMA would not be making excuses for what happened and that they were given the freedom to be openly and honestly critical. UMA took this responsibility seriously and "took great pains to be as honest and straightforward as possible" (Interviewee 4, 2007). If UMA staff were unsure of the answer to a citizen's question they were instructed to reply truthfully by saying that they did not know, or that they had not looked into that yet, or that they did not know if they would ever be able to answer that question. The project team felt that the openness and honesty shown by staff was greatly appreciated by the public and did much to strengthen the level of trust that existed (Interviewee 3, 2007; Interviewee 4, 2007). It was necessary for this trust to exist between participants in the program and the project team in order for information to be disseminated properly.

The element of trust was also an important factor in permitting the flow of information from citizen participants to UMA staff. Since an important focus of the planning process, especially during the first round of meetings, was placed on participants sharing their knowledge with the project team to inform the study, establishing an appropriate level of trust was essential to participants feeling comfortable enough to do so. Sharing the details of what was for many citizens a traumatic experience required confidence that the information would not be used inappropriately.

UMA enabled a level of confidence by promising participants that they would retain strict access to their personal property damage information and not share it with any other parties. UMA assured participants by stipulating as a condition of gathering information that strict confidentiality would be maintained and that UMA would only present the information in the plan in a consolidated format, such that individuals or properties could not be identified. This promise satisfied would-be participants that they would not be adversely affected for being forthright with personal property information that would benefit the study (Interviewee 4, 2007). UMA included some of this information shared by participants in Appendix A of the FRMP. Being honest in an attempt to build a trusting working relationship brought about a solution that allowed more information to be shared by participants and thus improved the quality of the planning process and the overall plan itself.

5.1.5.1 Avoiding a mistrust of statistics: calculation of storm intervals

An issue that created a great amount of confusion and misunderstanding among participants was the calculation of storm intervals. It was widely reported by the media that the June 2002 rainfall event was an approximately 1 in 100 year event and that the July 2004 storm was a roughly 1 in 290 year event. Despite the difficulties in coming to such estimates, UMA was satisfied that these calculations were sufficiently accurate to use as reference points for discussion (Interviewee 4, 2007). The fact that two heavy rainfall events of such great magnitudes could occur within approximately two years confused, angered and frustrated citizens (Leblanc, 2004). The confusion that was initially caused by these calculations, and the lack of effective initial education by UMA about such measures of flood recurrence, threatened the trust that was being established in the working relationship between the project team and participants.

This issue had the potential to erode the establishment of trust between the project team and participants, and thus diminish the overall success of the program. UMA therefore attempted to handle this difficult issue with great care and sensitivity. UMA devoted additional time and attention to detail to ensuring that most participants understood and were comfortable with these statistics, and understood how they could be possible. By doing this, the project team turned a potentially harmful situation into one that instead improved the existing level of trust, by showing participants that the project team was open and honest, and cared that participants understood the information. Although it proved to be a difficult issue to work through, it provided an opportunity to strengthen the working relationship and further establish the trust necessary for participants to share their local knowledge and information with the project team. In the end, the issue benefitted the process rather than hurt it. UMA did

not attempt to make excuses for the statistics, or justify why two heavy rainfall events of such magnitude could strike Peterborough in just over two years. Instead, the project team shared with participants in the astonishment and disbelief that this could happen, and the feeling of how unfortunate it was. The project team conveyed the feeling that "we are all in this together, that nobody was trying to put anything past anyone, and that we can all help each other through a difficult time" (Interviewee 3, 2007). This approach proved to be very successful in generating trust and benefitted the process, participants' satisfaction with the process, and thus the quality of the final plan. The additional time and careful attention to detail that were required to disseminate technical information to citizens should be considered worthwhile and productive, as an understanding of this information is required if competent decisions are to be made.

5.2 Aspects of citizen participation that left room for improvement

There were three main aspects of citizen participation that limited the potential of the Flood Reduction Master Plan process and should be considered opportunities for improvement.

5.2.1 Perceived level of participation that existed

There was a discrepancy in perceptions between different key informants interviewed about the level of citizen participation that truly existed in the flood reduction planning program. This discrepancy is indicative of the difficulty that arises in attempting to satisfy the desires of all stakeholders. The quality of the FRMP might have benefitted from addressing this difficulty at the beginning of the planning process. By stating an explicit and defined level of participation that was to be the objective of the planning process, the City and UMA might have averted the confusion and disappointment felt by many stakeholders that were left to guess what the intentions of the project team were in terms of participation. Clearly defining the intended level of participation may have given citizen participants a more accurate expectation of the planning process.

A key recommendation of Brody *et al*. (2003) reflects this observation in the literature. The authors advocate for planning program administrators to clearly state the citizen participation objectives of the program. They argue that if an official statement of objectives for participation is published and disseminated, community debate over the role of citizens in the planning process will result (Brody *et al*., 2003). This healthy debate will allow members of the community to voice their opinion specifically regarding citizen participation in the planning program, before the planning issues are even addressed. Consulting citizens on the role they will have in the planning process, and even granting them influence in deciding what that role should be, will serve to give the community a more accurate expectation of the planning process. Defining the intended level of participation could be accomplished by referring citizens to a visual tool such as Arnstein's Ladder (1969), or other equivalent, and identifying the level of participation in terms of corresponding to one of the rungs.

A potential problem with attempting to define the intended level of participation at the beginning of the planning process is that doing so may create acrimonious conflict before the actual process even begins. The subject of this conflict would be the

structure of the planning process rather than the issues generated by the plan itself. Focusing on this subject may not seem to be the ideal way of commencing a planning project, as it would delay conversation about other pressing issues, but would result in a clearer idea of the role of citizen participation for all parties involved. Careful attention devoted specifically to the role of citizen participation at the beginning of the planning process may serve to strengthen the quality of participation throughout the entire process, and thus improve the quality of the final plan.

5.2.1.1 The language of participation

Key informants were asked to choose the rung of Arnstein's Ladder of Citizen Participation (1969) that most appropriately represented the level of participation that existed in the flood reduction planning program. This question provided much difficulty for many key informants. One of the reasons for this difficulty was that some key informants were uncomfortable with some of the language used to describe the rungs of the ladder. These key informants felt that some of the words misrepresented the corresponding level of participation, or that the words were "loaded" and had other underlying meanings (Interviewee 1, 2007; Interviewee 2, 2007; Interviewee 5, 2007; Interviewee 8, 2007; Interviewee 12, 2007). The words that caused the most difficulty for key informants were 'Placation', used to describe the fifth rung of the ladder, and 'Tokenism', used to describe the middle group of the third, fourth and fifth rungs.

Future researchers may avoid this problem by taking a different approach to using Arnstein's Ladder (1969) as a reference tool. Two alternate methods are immediately apparent. The first is to change the words used to describe the rungs to more neutral, unbiased word choices. This method may make it easier to select the most appropriate level of participation, but would not accomplish the purpose of Arnstein's Ladder (1969), which is to provoke citizen power in government decision making. Existing in the literature are alternatives to Arnstein's Ladder (1969) that use language that may be more neutral and less abrasive. Doberstein (2001) identifies levels of citizen participation similar to Arnstein (1969) using alternative language (from lowest level of participation to highest): *persuasion*, *education*, *information feedback*, *consultation*, *joint planning/shared decision making*, *delegated authority*, and *self-determination* (after Rahnema, 1992 and Roberts, 1995). The second alternate method is for the researcher to ask informants to describe how they see citizen participation, and then determine on their behalf which rung most closely represents this description. This method may, however, introduce researcher bias or lead to inaccurate representation of informant opinions.

5.2.2 Role of the Technical Review Committee

Two concerns of a technical nature were mentioned by one member of the Technical Review Committee regarding the creation of the Master Plan. These concerns reportedly stemmed from a general dissatisfaction among some members with the role of the committee in the planning process. The feeling was that the committee existed only to provide information and support UMA in achieving their mission, and members were not given the mandate to provide direction and advice to UMA drawn from their own professional expertise and experience.

The first specific concern was that the Terms of Reference for the study were set by UMA and some senior City staff and were approved before the committee existed (Interviewee 5, 2007). The lack of involvement in the development of the Terms of Reference resulted in limiting the ability of the Technical Review Committee to direct the study and offer input. This was discouraging for members of the committee because they were forced to oversee a study that they had no hand in creating. Committee members may not have even liked or agreed with the Terms of Reference, or believed them to be appropriate for the study.

The second concern was that no chance existed for a technical peer review of the process used to obtain the findings of the study and Master Plan (Interviewee 5, 2007). The technical committee was able to review the final figures and conclusions of the study but was not provided the opportunity to analyze the choices that UMA made in terms of the computer modeling and base figures used to come to those findings. There existed some concern within the committee that they did not have the mandate to look further into the modeling processes used by UMA than the results. The committee was worried that some of the assumptions made by UMA and used in the modeling could aggregate and result in error during later stages of the project. The committee was not overly concerned that the results looked inaccurate or did not 'make sense', they just wanted the chance to ensure that the base numbers were appropriate (Interviewee 5, 2007). Committee members pointed out that the construction phase would be too late to learn that some of the base design parameters were wrong or not appropriate and that the opportunity should exist for the committee to review the figures before that occurred. These concerns resulted in some increasingly divisive debates as UMA neared the conclusion of the study and planning process.

5.2.3 Targeting as a strategy to generate citizen participation

UMA did not use targeting to its maximum potential as a strategy to generate citizen participation. While there was an effort made to target citizens for participation in the FRMP process, it may not have been the most appropriate method of achieving participation from all potentially affected stakeholders. UMA targeted the populations of five different geographic areas (the existing municipal political wards) within the city for participation in the planning process. Two Public Information Meetings were held in each geographic area. This geographic targeting[6] strategy, however, may not have allowed for the most accurate reflection of needs within the community.

[6] Geographic targeting is the subject of an emerging body of literature. Also known as spatial or place-based targeting, geographic targeting allocates resources to specifically defined geographic areas (Thomson, 2008). In the case of citizen participation in the FRMP process, area-specific geographic targeting was used, which "deliberately channels resources to a specifically defined geographic location than is larger than an individual project but smaller than the geographic area over which the entity providing the resource has jurisdiction" (Thomson, 2008, p. 632).

By employing this single targeting strategy, UMA missed the opportunity to gather invaluable input from groups of citizens with special interests or specific needs (which could have been attempted by a strategy known as social targeting[7]). These groups of citizens may represent a relatively large portion of the population. Portions of the population with interests and needs that differ from the rest of the population were not targeted for their perspectives. These groups are an important and significant part of the community, and to not give them due consideration and seek their contribution to decision making is a shortcoming in the thoroughness of the planning process. Representatives of some of these groups were interviewed to discover their thoughts on the planning process. Although they gave a mixed reaction, each said that they were not consulted to their satisfaction (Interviewee 6, 2007; Interviewee 7, 2007; Interviewee 10, 2007; Interviewee 13, 2007).

The failure of UMA to target specific stakeholder groups within the community for participation in the FRMP process should be considered a weakness in the planning program, and may result in negative repercussions for some segments of the Peterborough population in the future. This lack of social targeting should be considered a flaw in that many authors, including Arnstein (1969), Brody (2003), Burke (1979), Day (1997), Fagence (1977), and Fainstein and Fainstein (1985), advocate for better representation of the interests of all members of a community, regardless of their social or economic stature.

The needs of different socio-economic sectors of the Peterborough population were not addressed by asking for input to the FRMP process from representatives of these groups. Of particular concern are the needs of low-income members of the community. Many key informants noted that these citizens were especially adversely affected by the flood and sewer backup for several reasons (Interviewee 6, 2007; Interviewee 7, 2007; Interviewee 10, 2007; Interviewee 12, 2007). Although it was beyond the scope of the research to prove these reasons, several key informants offered much speculation on this topic. They speculated that low-income members of the community are often the people that rent basement apartments. Basement flooding was a major cause of property damage sustained in the July 2004 event (UMA, 2005). Some basement apartments may be illegal because they do not meet building standards. Tenants may be paying rent 'under the table' for these apartments, which makes them affordable places to live. Also, low-income citizens may not have any or adequate insurance coverage because they cannot afford to pay the insurance premiums. This lack of insurance left many citizens particularly hard hit by the event (Interviewee 10, 2007). Additionally, it is well noted in the literature that low-income citizens often may be subsisting day-to-day and are severely vulnerable to disruptions such as a flood event (Blaikie *et al.*, 1994; Maskrey, 1989; Mileti, 1999).

[7] Social, or people-based, targeting allocates resources to individuals or groups who have specific characteristics (Thomson, 2008).

UMA did not directly target any of the poverty reduction or social assistance organizations in the community for their input. This oversight denied giving special consideration to these typically underrepresented sectors of the population. Members of these sectors did have the opportunity to participate in public meetings in their ward of the city but they did not have a formal voice in decision making that identified and distinguished their needs from those of the rest of the community.

It should be recognized that low-income citizens make up an important and significant segment of the population. Not considering them in a major planning project is an oversight that affects the overall community. Acknowledging and attending to the needs of these citizens betters the rest of the city and makes the entire community more resilient to hazards (Mileti, 1999).

When asked pointedly if these groups were targeted for participation or given special consideration in the planning process, City and UMA key informants responded that they were unaware whether organizations representing low-income members of the community existed or were present at the public information meetings. These informants were more concerned about whether these organizations were causing a problem or distraction during the public meetings, and were satisfied if they did not hear anything from these groups. This attitude directly contradicts the literature, which argues that contribution to decision making from a broad cross-section of citizens should be sought, not avoided (Arnstein, 1969; Brody, 2003; Burke, 1979; Day, 1997; Fagence, 1977; Fainstein & Fainstein, 1985). This contribution would benefit not only the planning process, but the final plan would be better suited to the community as a whole.

Intentionally targeting typically underrepresented sectors of the population (e.g. low-income, elderly, infirm populations) for participation in the planning process would create additional work for the project team, and may slow down the process and release of the final plan. Deliberately including these citizens in decision making would mean altering citizen participation efforts to accommodate the needs of these populations (i.e. alternate meeting times, locations, participation techniques). These citizens may add another viewpoint that is not in keeping with those of other citizens, and thus may present additional challenges to the project team. But accommodating these citizens in order to include their input in the planning process is absolutely critical in creating an effective plan that meets the needs of the entire population.

5.3 Limitations of post-disaster hazard mitigation planning

An undertaking like the creation of the FRMP is a highly worthwhile and recommended investment of time and resources, but is not a perfect, solve-all method of hazard mitigation. There exist some limitations which are the products of trying to involve citizens in planning in order to reduce the impacts of future events similar to that which occurred in Peterborough in 2004. These limitations are discussed in this section.

One limiting factor mentioned by key informants was that there is very little interest among citizens to be involved in planning policy development and decision making before a disaster that negatively affects people, like flooding, occurs (Interviewee 4, 2007; Interviewee 5, 2007). Citizens often have little concern for such things as development planning and policy, floodplain mapping and infrastructure upgrades when they have not been directly affected by their inadequacies. After a disaster occurs, the expectation by both citizens and planners is that the public will be involved in planning efforts to mitigate the severity of a future event similar to the one that just devastated the community. One key informant summarized this thought by observing that "acceptance of the risk decreases as soon as the incident occurs" (Interviewee 5, 2007). This comment implies that most citizens do not care enough to be involved in planning for hazards mitigation until they are negatively affected by a disaster.

In many cases after a disaster, the public is consulted and citizens are provided the opportunity to be involved in the planning process. The expectation that they contribute worthwhile and competent input, however, may be somewhat unrealistic given that most citizens were not involved in the decision making that preceded the event and led to the existing conditions and circumstances that produced vulnerability. This is a source of frustration for both planners and citizen participants, as both parties feel that this type of planning process is flawed. Planners and engineers tend to have a good understanding of the factors that led to damages and are familiar with policy and decision making processes. Citizens often have an accurate understanding of how they were affected by the event, and typically have a sense of urgency that their needs are met, yet may be poorly informed about the multiple causes of a disaster. The result is that time must be spent on educating and informing citizens to a level where they can understand the larger scale and make valuable contributions to the process. One key informant expressed concern about this inherent problem: "The problem is that [citizens] are not really involved in the front end and then all of a sudden you have a flood and then you involve them in the back end" (Interviewee 5, 2007).

Another limitation of a planning effort like the Flood Reduction Master Plan is that the product is a stand-alone plan. While the plan sets out general and specific recommendations for further action to mitigate flood damages in the future, it is not yet a part of comprehensive land use planning policy. The plan will be more effective, and have more permanence, when it is incorporated into the City of Peterborough's Official and secondary plans. Recommendations made in the FRMP will then become an intricate part of the foundation for future land use and development decisions in the City, regardless of the budgetary resources or political will that is devoted to flood reduction at the time. The incorporation of a stand-alone hazard mitigation plan into comprehensive land use planning policy is the ultimate way for a plan to have a lasting impact on the community.

6 Recommendations and conclusion

This research project revealed some practical implications of a hazard mitigation planning exercise involving citizen participation that may be generalized to other similar planning efforts. The research identified many strengths and several opportunities for improvement of the citizen participation aspect of the Flood Reduction Master Plan, which were discussed in the previous section. Five aspects of citizen participation were identified as positively affecting the quality of the planning process and final plan. Three aspects were identified as limiting the quality of the planning process. These analyses can be generalized to make recommendations that would apply to other hazard mitigation planning programs that include citizen participation. The first five recommendations are based on positive aspects of citizen participation in the FRMP process and are in no particular order of importance.

1. Include citizen participation at the earliest stages of the planning process.
2. Depoliticize the planning process by granting the project team freedom from political and administrative pressure in conducting the study and creating the plan.
3. Hire additional consultants with specialized skills and experience if necessary.
4. Use a wide variety of participation techniques to generate and foster citizen participation.
5. Promote honesty to build trust in the working relationship between the project team and citizen participants.

The following three recommendations are based on opportunities for improving citizen participation in the FRMP process.

6. Clearly define the intended level of citizen participation early in the planning process.
7. Establish a Technical Review Committee before the Terms of Reference are set and ensure that the Committee is involved in setting the Terms. Provide the opportunity for the Committee to conduct a technical peer review of the engineering calculations and models used in the planning process.
8. Employ both social targeting and geographic targeting as strategies to generate citizen participation.

The final two recommendations aim to contribute to the theory of citizen participation in hazard mitigation and are made from the experience of applying that theory to the thesis case study.

9. While remaining a seminal work and an invaluable foundation of citizen participation research, the language used in Arnstein's *Ladder* (1969) may be considered outdated, thus rendering the *Ladde*r in its original form inappropriate for use in a modern context. Modifying the *Ladder* or replacing the language with other word choices when conducting research may elicit more willing, and accurate, responses from those involved in contemporary planning programs involving citizen participation.

10. In addition to the six 'strategic choices' identified by Brody *et al*. (2003) and used as a framework in this case study, a seventh 'choice' may be appropriate to consider in the design of citizen participation in hazard mitigation planning, and beneficial to the analysis of such a planning program. This seventh 'choice' should be the evaluation of how citizen participation was included in the planning process at the completion of the program, as this case study has done. Analysis of this 'choice' could then serve to keep those involved accountable throughout the process and provide a basis for comparison to other planning programs upon completion.

6.1 Future research

This case study research undertaken in Peterborough is, of course, not an exhaustive study of citizen participation in hazards mitigation planning or of flood reduction planning efforts in Peterborough. Many new questions were raised by this case study and directions for future research are suggested here. Ideally, further research could build upon this work and add to the base of knowledge to which this paper has attempted to contribute. Future research related to that of this paper could be conducted in three areas: research on the Peterborough Flood Reduction Master Plan, research on the hazard mitigation steps taken in Peterborough as a result of the FRMP, and research on similar hazard mitigation efforts beyond those taken in Peterborough.

Research additional to the scope of this project may include conducting a thorough investigation of how citizen input influenced (or did not influence) the Flood Reduction Master Plan. This investigation could be accomplished by conducting a systematic analysis of citizen input documented by UMA in the GIS database, Appendix A of the FRMP and other records, and comparing this information with the FRMP to discover the extent to which citizen input was used. Another valuable future study would be to investigate the long-term efficacy of the FRMP, and by extension, the efficacy of citizen participation in the Plan. A logical time to conduct this research is after the City of Peterborough next updates its Official and secondary plans. This undertaking would present an ideal opportunity to determine if the findings and recommendations of the FRMP are being incorporated into comprehensive land use planning policy.

One major recommendation made in Peterborough's Flood Reduction Master Plan is that the city should be divided into seven sub-watersheds, so that these smaller areas may be studied in greater detail to determine the specific actions that must be taken to reduce future potential flood damage (UMA, 2005). The FRMP suggests that these actions might include, but are not limited to, physical infrastructure changes, municipal purchase of high-risk properties, increased development standards and planning policy updates. The City of Peterborough accepted this recommendation, and an Environmental Study Report (ESR) of each sub-watershed will be conducted independently by a private consulting firm (Interviewee 1, 2007; Interviewee 2, 2007; Interviewee 3, 2007). Several of the ESRs have been completed

to date. Additional research that would extend this research project includes studying the role of citizen participation in each of Peterborough's seven ESR planning processes. The decisions made about how citizen participation is included in each of the ESRs could be analysed in terms of the six strategic choices framework proposed by Brody *et al*. (2003), as this research project has done.

Multiple case studies of planning programs of a similar nature would be a valuable addition to this case study, as comparisons between the studies could be made to discover trends of beneficial and harmful decisions. These case studies could investigate the role of citizen participation in other post-disaster hazard mitigation efforts in similar Canadian urban flood situations. The July 2004 flood event in Edmonton and the August 2005 event in Toronto are two such examples that would provide valuable comparative research. More recently, flooding in Ottawa and Hamilton in 2009 may provide interesting opportunities to study any new flood reduction planning initiatives from the beginning.

Case study research could also be conducted on citizen participation in similar flood mitigation efforts in other developed countries, to discover other 'best practices' and learn how Canadian planning efforts may be improved. Research could extend beyond flood hazard mitigation to the role of citizen participation in mitigation planning for other hazards. Hazard mitigation efforts in developing countries could be studied to discover the role of citizen participation and local knowledge in decision making in different cases. Contributing to the knowledge base of hazard mitigation practices that could be adapted to local situations may help to reduce the number of lives that are too often needlessly lost.

6.2 Evaluation of success

This paper has analysed citizen participation in the FRMP study and planning process in terms of the framework of six strategic planning choices proposed by Brody *et al*. (2003). Table 3 (page 37) is a summary of the sections 4 and 5 analyses of citizen participation in the FRMP, using a common qualitative, four-point scale: Excellent, Good, Fair, and Poor. The Table provides an evaluation of the success of decisions made for citizen participation, and justification for the evaluation based on the analyses.

Table 3. Evaluation of citizen participation success

Choice	Level of success	Justification
1. Administration	Excellent	• Contracted a consulting firm with the expertise necessary to conduct study appropriately; • Depoliticized planning process; • Two additional specialized consultants also hired.
2. Objectives	Fair	• Included citizen participation throughout the study and planning process; • Much discrepancy of opinion regarding the level of participation that actually existed; • Did not define intended level of participation.
3. Stage	Excellent	• Citizens involved very early in study and throughout planning process; • Citizens were a vital part of gathering information early in process.
4. Targeting	Fair	• The populations of geographic areas within the city were targeted for participation; • Stakeholders with special interests or specific needs within the community were not directly targeted for participation.
5. Techniques	Excellent	• Wide variety of participation techniques used.
6. Information	Good	• Much care and attention to detail taken in dissemination of information; • Honest communication built trust in working relationship; • Some confusion early in process but mistrust of statistics largely avoided.

6.3 Conclusion

The City of Peterborough FRMP applied current hazard mitigation theory to planning practice in a post-disaster setting. Citizen participation was judged to be an important part of the FRMP process. This study analyzed the decisions that were made about citizen participation in terms of a recently proposed framework found in the hazards and planning literature. Many strengths and several opportunities for improvement of the citizen participation aspect of the planning program were identified and discussed. Many elements of citizen participation in the FRMP process can be considered successful by the standards set in the literature. Ultimately, research for this paper has revealed that citizen participation in the FRMP has provided a strong foundation upon which current and future flood hazard mitigation efforts in Peterborough can be based, and it is likely that the inclusion of citizen participation has reduced Peterborough's exposure to the flood hazard.

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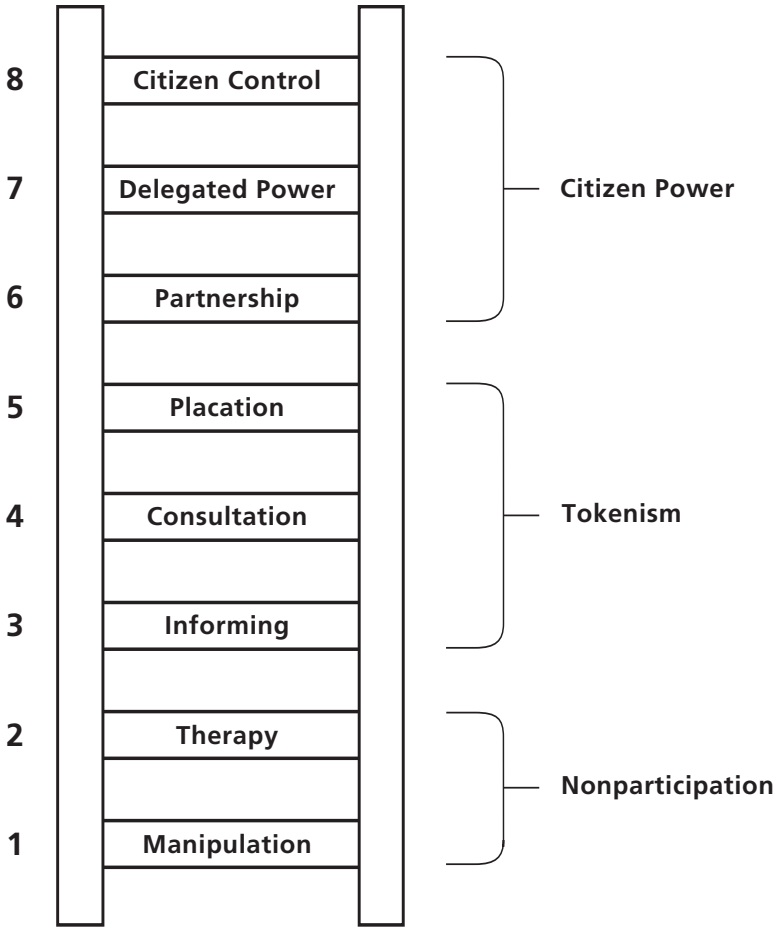
Appendix A: Arnstein's *Ladder of Citizen Participation* (1969)



Source: Arnstein, 1969

Appendix B: List of key informants

Key informant	Position	Cited as
1	City of Peterborough senior staff	Interviewee 1, 2007
2	City of Peterborough senior staff	Interviewee 2, 2007
3	City of Peterborough senior staff	Interviewee 3, 2007
4	Consultant	Interviewee 4, 2007
5	ORCA senior staff	Interviewee 5, 2007
6	Community group representative	Interviewee 6, 2007
7	Community group representative	Interviewee 7, 2007
8	ORCA senior staff	Interviewee 8, 2007
9	ORCA senior staff	Interviewee 9, 2007
10	Community group representative	Interviewee 10, 2007
11	Consultant	Interviewee 11, 2007
12	City of Peterborough senior staff	Interviewee 12, 2007
13	Community group representative	Interviewee 13, 2007
14	University researcher	Interviewee 14, 2007
15	University researcher	Interviewee 15, 2007

Appendix C: Key informant interview question themes

Experiences of July 2004 flood event

- Were you directly or indirectly affected, and if so, how?
- Short-term or long-term impacts, or both?
- In your opinion, was there adequate or inadequate warning and evacuation notice?

What factors contributed to the flood being as bad as it was?

- Land use planning
  - Within and outside city
- Failure of structural mitigation measures
- Storm sewer inadequacy
- Storm severity
- Resource/environmental management (e.g. habitat conversion, river management)
- Warning/evacuation
- Urban runoff (hard surfaces)
- Other factors?

Response by the City of Peterborough (what actions taken, are these adequate?)

- Actions taken during the flood event (emergency assistance, shelter, etc.)
- Longer-term reactions to the flood (governance, planning and management)

Flood Reduction Program

- Were you involved in this program (Why or why not)?
- Did you want to be involved (Why or why not)?
- Were residents of the community involved in the program?
  - Provide details
- Discuss the role of community involvement in the program
  - Degree of community involvement in the planning process
  - How were the ideas and opinions of the community used in the planning and decision making processes?
- To what extent were contributions by the community used in post-flood planning and decision making processes?
- Overall successes and shortcomings of the program (effectiveness)
- Did the program accomplish its objectives?
- Other non-flood related experiences with community involvement in city planning?
- Role of Citizens' Advisory Panel (CAP)
- Role of public facilitation consultant

The contribution of the flood reduction program to the Flood Reduction Master Plan and comprehensive land use planning in the City of Peterborough

- Was this a useful exercise?
- Did the information and knowledge gained through the program influence comprehensive land use planning and decision making?
  - If no, why not?
  - If yes, how?

To what degree is Peterborough a safer and more resilient community as a result of this process?

- Why or why not?

Recommendations for additional contacts or written documents?

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