THE EMERGING ROLE OF THE INTERNET

IN MUNICIPAL PLANNING

BY

ANN L. KJERULF

A Practicum
Submitted to the Faculty of Graduate Studies
In Partial Fulfillment of the Requirements
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A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University

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ABSTRACT

This research project examines the role of the Internet in the context of municipal planning during a six-month period beginning in April of 1999 and ending in September of 1999. The research objectives include: identifying current applications of the Internet in municipal planning agencies; describing the planning, design, and implementation considerations for the Web development process; investigating planners' perceptions of the Internet; and considering the future possibilities for the Internet in municipal planning practice.

The Internet phenomenon is first explored in terms of its socio-cultural implications for public participation in planning, issues of access and security, and the perception of community. Next, the evolution of computers in planning is explored and some of the practical applications of the Internet are presented through the use of current examples. The development of such applications is also explored in terms of planning, design, and implementation considerations with the intent to provide some practical guidelines for planning agencies.

Subsequently, the research process is explained with particular focus on an Internet-based survey developed with HTML. The results of this survey are presented and provide insight to the status of Internet usage in Canadian municipal planning agencies. From the results, one can infer that municipal planners feel positively about the use of the Internet in planning practice and that the obstacles to the development of Internet-based applications are trivial compared to the possibilities that exist.

ACKNOWLEDGEMENTS

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CHAPTER ONE

INTRODUCTION

1.1   PROBLEM STATEMENT

The intention of this research project is to examine the emerging role of the Internet in municipal planning from the planner's perspective. It is a relevant and timely topic for investigation given the growing popularity and utilization of the Internet for business and personal purposes.

> The emerging civic structures and spatial arrangements of the digital era will profoundly affect our access to economic opportunities and public services, the character and content of public discourse, the forms of cultural activity, the enaction of power, and the experiences that give shape and texture to our daily routines (Mitchell, 1995, p. 5).

The Internet has implications for the general public, and specifically for how firms do business, how people buy goods and services, and how people obtain and provide information.   The Internet has particular implications for planners because it will influence where people live and work, affect travel to work and shopping habits, shift the need for activities to congregate in physical locations, and provide new ways for organizations to deliver information and services to the public, developers, agents, and other bodies.   It also makes sense that the Internet should be useful and important to planners whose work is inextricably connected to the public, simply because it presents a modern and efficient medium for communication and the transaction of information and services.

The delivery of information and services via the Internet can be beneficial to both planners and their clients. Accessing information digitally rather than physically alleviates the pressure and time spent by the client travelling to a planning office to fill out paperwork or consult planning and zoning legislation. It reduces the environmental impact of automotive transportation. It also frees the planner to perform tasks that can not be automated. Furthermore, it may facilitate contact between individuals and planners where this contact was previously obstructed due to physical or social barriers.

> Information infrastructure is an enabler of both free speech and efficient markets. It can help overcome barriers to information and create opportunities to convene regardless of geographic, physical, or financial constraints (Keller, 1995, p. 35).

The challenge of delivering information and services through a digital medium is in knowing how to approach the problem. If the Internet is to facilitate a positive shift in how people live and how planning activities are conducted, then planners need to have an awareness and understanding of its function and capabilities.

> Massive and unstoppable changes are under way, but we are not passive subjects powerless to shape our fates. If we understand what is happening, and if we can conceive and explore alternative futures, we can find opportunities to intervene, sometimes to resist, to organize, to legislate, to plan, and to design (Mitchell, 1995, p. 5).

There are some common practical and technical issues that would be encountered by any planning agency seeking to develop Internet-based planning applications. These include: technical (computer hardware and software) requirements; system cost and finance; application development; user interface

design; system security; technical support; and system maintenance. Planners must also recognize that there are socio-cultural and policy-related issues which need to be considered including: the anticipated impact of the Internet; how the Internet will redefine planning activities; the effectiveness of delivering information in an electronic format; information quality and the control of sensitive information; fair public access; degrees of access; legal liability; how the Internet will redefine our notion of 'community'; and the expected role of the Internet in the future.

Because the Internet is a new and emerging technology, this research should be of special interest to planning practitioners, both in the private and public sectors, who are interested in staying on the leading edge of technology and being innovative in their practice. There are several examples of planning applications on the Internet and lessons that may be learned from planning practitioners who have experience in this area. It is the intention that some clear guidelines for implementing Internet-based planning applications will be created as a result of the research process. These guidelines should provide practicing planners with a framework for implementing their own Internet-based planning applications.

1.2 PROJECT OBJECTIVES

The general intention of the research has been stated. The specific objectives of the research are:

   i. to identify current applications of the Internet in municipal planning practice;

ii. to define the planning, design, and implementation stages of the Web development process;

iii. to investigate planners' attitudes toward and approach to the Internet as a planning tool; and

iv. to consider the future role and relevance of the Internet in municipal planning practice.

The research methods employed during this study are reflective of the project objectives. In an attempt to satisfy the first objective, to identify current applications of the Internet in municipal planning practice, the related literature was reviewed, online research was conducted, and various municipal Web sites were explored. The results of this research are summarized in Chapter 2. The planning, design, and implementation stages in the Web development process are described in Chapter 3, thus fulfilling the second objective. These stages were identified through the related literature, online documents, and through telephone conversations with municipal planners. The nature of the third and fourth objectives, to investigate planners' attitudes toward and approach to the Internet as a planning tool and to consider the future role and relevance of the Internet in municipal planning practice, demanded that a survey be conducted of municipal planning professionals. Considering the focus of the study on the Internet in municipal planning practice, it is only reasonable that their wealth of knowledge and experience should be drawn upon.

1.3 RATIONALE

The concept of utilizing the Internet for planning activities has already materialized but holds promise for further development. However, there is a need to substantiate the use of the Internet for planning activities and to explore the implications of the Internet for planners and the public. In this time of technological change, there are coincidental socio-cultural changes that are occurring. People are being exposed to new forms of information and service delivery and are becoming accustomed to receiving these almost instantaneously. Planners must be aware of the implications of socio-cultural changes and how these may demand changes in the policies and practices of planning agencies.

1.3.1 Public Participation

One very important role of planning departments is to inform and receive feedback from constituents. This is often one of the most difficult tasks facing planning departments (Hedrick, 1998). Many people do not have the time to visit planning offices or attend public meetings. Instead, they want instantaneous access to information and services without the need for physical travel. The modern World Wide Web has presented a forum that can satisfy this public demand. With current technology local governments, and specifically planning agencies, can electronically publish and distribute information to their constituents in a cost-effective and time-efficient manner (Hedrick, 1998). Planning agencies can also receive public input and feedback on a twenty-four

hour basis and Web sites can easily be modified to continually provide up-to-date information. This distribution of information is vital because the more it is shared and used, the greater society's ability to evaluate and address the wide range of pressing environmental, social and economics issues (Onsrud and Rushton, 1995).

Networked computing in the form of the Internet and World Wide Web can facilitate direct interaction between citizens and government through the development of digital democracy or an electronic commons. Using the Internet for providing town planning information encourages citizen participation and public debate, provided that the majority of citizens have access to the network (Shiode, 1998). Possibilities such as online voting, attending hearings or city council meetings, public-opinion polls, and easy access to public information all exist within the scope of digital democracy. However, the concept of digital democracy is very new and little is known about how it will impact upon municipal agencies. In a report by Dawes *et al.* (1998), several questions are raised regarding the viability of public participation in a digital medium:

> What knowledge and technologies must citizens possess in order to participate in electronic governance? Does the existence of electronic means of communication improve citizen participation in government processes? What is the potential for intelligent agents and customized interfaces to change the way citizens participate in government? How must the processes of governance change to account for electronic participation? How does electronic participation effect citizen trust in government? Will instant expressions of personal and public opinion enhance or degrade the quality of public discourse and formal policy deliberations? (Dawes *et al.*, 1998, p. 25).

It is not the intention nor within the scope of this research project to address these questions. In fact, they may only be answered in time following a significant amount of research or trial and error.

1.3.2 Access to Information

Another important issue in the utilization of the Internet for planning applications is that of access to information. There are two components to this issue: how access to planning agencies via the Internet can be fair and equal; and what information and services should be accessible. Firstly, the issue of access to information must be addressed in social terms.

> Who will have access to information resources and what difference will it make? If information access is distributed in proportion to economic power and social status, then it may simply become a means for the rich to get richer. If complex equipment and skills are required, it may also filter out certain elements in society (Chrisman, 1997, pp. 268-269).

Access to information should not be limited to the "haves" who have the necessary skills and resources in their possession to access digital information. Despite the popularity of the World Wide Web, not all households have computers that are connected to the outside world. For this reason, planning agencies would have to be careful in not limiting information and service delivery to an electronic medium. Traditional forms of information would still have to be accessible, at least during a lengthy transition period, if not indefinitely. However, in order to ensure access to the Internet and an egalitarian system, planning agencies would have a responsibility to promote electronic access

through public-use terminals or kiosks in, for example, libraries, community centres, and government offices.

Physical and economic limitations to access could also be countered by not-for-profit community information networks. Community or civic networks typically use network technology to serve public interests and increase public access to information. In general terms, civic networks improve access to information for the general public or to targeted members of communities who are traditionally underserved (Vu *et al.*, 1994). Still, there is a concern that community networks will create a division between those who can participate in the discussion of community and governance and those who have no access to the system (Beamish, 1995).

The difficulty in using the World Wide Web, regardless of how or where it is accessed, is that it requires a somewhat educated public which can read and interpret the contents of digital media. The shift from traditional forms of communication such as speaking in person or over the telephone to a digital interface will require that users have the ability to read and understand the written languages being communicated. In order to provide feedback or submit information, citizens will also need to know how to write in these same languages. Hence, there will be an emphasis on having a good command of spelling and grammar. Furthermore, there may be many citizens who are unfamiliar with digital media. For this reason, it might be important to have

personnel available to assist first-time or infrequent users of this technology. With the development of Internet technology, difficulties in understanding written languages may eventually diminish. For instance, voice recognition systems and verbal communication may become key components of Internet communication thus reducing the reliance upon keyboard entry and the ability to read written languages.

The benefit of using the World Wide Web is that it is generally attributed to a simple interface based on point-and-click commands, which requires very little training.

> By public access we mean not only establishing physical connections to the network, but also ensuring that those connections are easy to use, affordable, and provide access to a minimum set of information resources. In particular, network use should not be limited to the passive receipt of information. Instead, the environment should be open, distributed, and easily navigable. Even the most basic connection should enable users to act as information sources as well as destinations (Keller, 1995, p. 35).

Internet-based planning can effectively serve to convey current information to the public. Dynamic Web sites have the potential to be empowering by allowing users to actively interact with planning agencies through the exchange of information. It is possible for external users to access the internal databases that are maintained by planning agencies thereby promoting information access and public awareness. However, the greater the degree of interactivity, the greater the risk to the security of an agency in maintaining the integrity of its data. This raises another issue--what degree of access the public should have and what

information should be made public in order to protect the privacy of citizens, to ensure a planning agency's security, and to avoid legal difficulties.

1.3.3 Security Considerations

Modern network technologies--particularly electronic mail and the World Wide Web--offer the potential for significantly enhancing communication between planning agencies and citizens. However, because this communication typically involves the transmission of sensitive information, the full potential of these new media will not be realized until means are developed for secure interactions (Neu, Anderson, and Bikson, 1998). Consequently, electronic communication of sensitive information via the Internet should be highly secure. Furthermore, a system that supports extensive government-citizen communication should embody strong protections for:

i. privacy where the information being transmitted cannot be read by unauthorized parties;

ii. integrity where the form and content of the message have not been altered; and

iii. authentication where citizens and government agencies must be sure that they are communicating with the intended party (Neu, Anderson, and Bikson, 1998).

Municipal planning agencies typically deal with information of a sensitive nature such as property assessment information or individual addresses. In order to

ensure the privacy of that information while allowing public access to internal databases, such agencies would have to pursue the development of security policies.

1.3.4 Perception of Community

It can be argued that the Internet has the potential to make a positive contribution to our lives based on the notion that it offers a supplementary form of communication.

> Electronic communication can facilitate the ability for people to interact within the physical parts of their community and it can also provide people faster access to a richer set of information they need to control the quality of the physical portions of their community (Quay, 1997, par. 1).

The Internet may also accommodate the development of online communities. There are countless numbers of chat-rooms and discussion groups that exist in cyberspace. These generally involve groups of people with common interests sharing in forms of discourse related to those interests. In this sense, the idea of community has taken on a distinctly different form.

Over time, communities have existed in many different forms (Porterfield and Hall, 1995). Wilhelm and Skelton (1996) studied the use of the term, "community", in planning literature and were able to categorize the various attributes assigned to communities into two groups: the concept of community as defined by relations within a specific geographic location; and the sense of community as defined by a sense of belonging among individuals with shared

interests (Wilhelm and Skelton, 1996). Hence, a community may be a physical place such as a town, city, or neighbourhood. A community may also refer to a social group sharing common interests, whether these are social, professional, occupational, or religious.

Ultimately, it is difficult to know what the societal impact of Internet communication will be on communities, regardless of how they are defined. On one hand, there is the belief that our perception of community is strongly tied to where we physically live, work, and play and that electronic communication has the potential to strengthen and enhance this perception of community. Antithetically, there is criticism that a level of socialization separate from physical contact will isolate and distance us from our neighbours and result in a fragmented society (Beamish, 1995). Mechanized transportation, for instance, has provided a level of mobility which has allowed people to transcend geographic boundaries and become involved in communities not related spatially. The Internet offers yet another level of mobility. Because of this, individuals may seek to associate themselves with others sharing similar interests through virtual communities (Beamish, 1995).

Indeed, "cyberspace... will help increase the opportunity for us to explore and communicate in a different means" (Shiode, 1997, par. 21). Similarly, planners should recognize that the communities they plan in the future will not be purely geographically-based; they will also be social communities.

1.4 REPORT OVERVIEW

Thus far, the subject of this report--the emerging role of the Internet in municipal planning, has been introduced and examined from a conceptual perspective. The succeeding chapters will further explore the emergence of computer technology in planning from its inception to its increasingly dominant role in present day practice. In Chapter 2, the evolution of computer technology in planning over the past four decades is observed. There is particular focus upon current applications of the Internet in municipal planning. The Internet application development process is described in Chapter 3 with insight to the required planning and design considerations and focus on the uses of the technology in addition to implementation and maintenance issues. The general design of the research and process of developing an Internet-based survey are described in Chapter 4. The results of the survey are presented, analyzed, and summarized in Chapter 5. Finally, Chapter 6 presents an overview of the report, the research conclusions, and recommendations for future research.

1.5 NOTES

There are a couple of issues that should be further clarified. First, the terms "Internet" and "World Wide Web" may be used liberally throughout this report. The terms are often used synonymously by the popular press and individual users but they are not one and the same. The Internet can most easily be described as a global network of computer terminals or a tangible set of objects.

The most logical way to describe the World Wide Web (WWW) is as an organized approach to information sharing. It is the current technology, which allows us to visualize the information transmitted over the Internet in a user-friendly format. In essence, the Internet is the animate structure and the World Wide Web is the inanimate form of communication used within the Internet. Both the Internet and World Wide Web are described further in section 2.1.4.

Second, it is important to explain that this study is inextricably tied to a specific time frame, the period beginning in April of 1999 and ending in September of 1999. The content of this report and the design of the survey instrument reflect the status of Internet technology during this time. It is very likely that Internet technology will have progressed significantly since the publication of this report and hence, it should be noted that Internet applications in planning will have evolved as well. Similarly, the tools used to conduct Internet-based surveys will also have progressed. For instance, the survey used in this case was HTML-based and required tedious preparation. However, there are now numerous software packages available that allow Internet-based surveys to be created quickly and easily and without any knowledge of HTML programming.

CHAPTER TWO

COMPUTER TECHNOLOGY IN PLANNING

2.1   EVOLUTION OF COMPUTER TECHNOLOGY

Over the last forty years, computer technology has changed rapidly and has become an increasingly common aspect of planning. There has been a positive progression from the large main-frame computers of the 1960's to the typical multi-purpose desktop computers of today. Four "waves" of technology can be described over this time period.

2.1.1   The First Wave

The 1960's represented the "first wave" of computing technology which was characterized by a "systems approach" where large amounts of data could be processed through a predefined system of monolithic proportions. This first introduction of computers to municipalities in the late 1960's was limited to accounting applications; bookkeeping, payrolls, and basic accounting became standard computer tasks and so computer facilities were organized to serve finance departments (Aronoff, 1989).

2.1.2   The Second Wave: Statistical Analysis and CAD

In the 1970's, computer-aided drafting (CAD) was developed and computers began to be used for such graphic applications as drafting, map production and updating, and surveying, in addition to cost-control and project management. For

planning activities, computers became a tool in statistical analysis, land use mapping, predicting community service needs, and development planning (Aronoff, 1989). With such applications, planners were provided with analysis tools for the decision-making process. In addition, large amounts of data could be processed and there was an opportunity to improve the presentation quality of documents and maps for public communication purposes. However, this era of computing in planning was also problematic. Municipalities were faced with multiple and fragmented computer systems that could not share information. This resulted in the storage of multiple copies of information; since different copies of the same information could not be simultaneously updated, the same information could be more out-of-date on one system than on another, creating accuracy problems (Liley, 1987).

The "second wave" brought the personal computer to the fore in the 1980's. Rather than using the disjointed systems of the 1970's, planning departments began to capitalize on networked systems to ensure convenient data input and storage using pre-programmed software packages. On PlanWeb's 'computing and planning' page (http://www.plannet.co.uk/olp/comp.htm), four main areas of computer applications in planning during the 1980's are identified:

i. analytical applications such as modelling and forecasting, survey and census analysis;

ii. development, maintenance and integration of management databases;

iii. operational management or administrative uses, including planning application processing; and

iv. communication based applications, including mapping and graphics.

2.1.3 The Third Wave: Geographic Information Systems

Geographic information systems constitute the "third wave" of computer technology in planning. Though the first geographic information systems (GISs) began in the late 1960's, GIS has progressed most over the last decade. Planners seeking an effective tool for spatial information management, processing, dissemination, and communication have readily adopted this technology. Typical applications for GIS in planning have included land use and development planning, predicting demographic change, identifying transportation corridors, service delivery such as 911-EMS dispatch and route allocation, environmental planning, and recreation planning such as in the identification of trail networks.

> Planning agencies were among the first to embrace GIS as a tool that promises to enhance planners' understanding of planning situations and problems and improve data processing and analysis, plan and policy development, decision making, and communication among participants in the planning process (Nedovic-Budic, 1999, p. 284).

2.1.4 The Fourth Wave: The World Wide Web

The World Wide Web, or the "fourth wave", is a global phenomenon that has emerged from the Internet technology developed in the U.S. under the guise of the ARPANET project in the 1970's for the purpose of connecting military

computers and exchanging military data. The introduction of Web browsers such as Internet Explorer and Netscape Navigator in the early 1990's facilitated a global connection of Web servers and exchange of information, a phenomenon that evolved into the "World Wide Web". Today, the Internet and, more commonly, the World Wide Web exist as a fundamental part of daily living giving people easy access to current information on numerous subjects and the ability to communicate through such entities as email, newsgroups, list-serve discussion groups, and chat rooms. There are widespread implications of this phenomenon, particularly to the field of planning. The World Wide Web has the potential to be an efficient and effective mechanism for the distribution of information while providing a means for data access and sharing. Furthermore, with World Wide Web and FTP (file transfer protocol) programs, data can theoretically be accessed by or transmitted to a user almost instantaneously as opposed to much slower traditional routes such as postal service or facsimile.

2.1.5 Virtual Communities

The "fourth wave" and other advances in computer technology have facilitated the creation of virtual communities that, unlike typical communities, have no physical bounds. The only limiting factors to virtual communities are the shortcomings of modern technology. Virtual communities can range in quasi-geographic scope from local to global. Within these communities, a wide range of human activities and interaction can occur, albeit not in the same manner as they would within physical communities. Perhaps one of the greatest opportunities for

Internet-based planning is that of connecting to a greater community information network, or virtual community. In this type of scenario, users have access, not only to planning information, but also to other local government departments and services in addition to non-governmental sources (i.e. links to the business community, hospitals, or schools).

An excellent example of a virtual community is the Blacksburg Electronic Village (http://www.bev.net) developed through a partnership between Virginia Tech, Bell Atlantic, and the Town of Blacksburg, VA. The Blacksburg Electronic Village provides a comprehensive set of information, links, public forums, and services for the community and is not a "city government site", but a true community information network.

The concept of virtual communities is a powerful one. The emergence of virtual communities is consistent with activities such as "telecommuting" where working at home, one can have access to many of the resources that exist in the physical workplace. Certain forces have influenced the act of telecommuting:

i.   community desire to reduce trips to reduce air pollution;

ii. corporate desire to improve productivity and economics of labour by reducing stress and economics of commuting;

iii. personal desire to regain control over stress and time; and

iv. rapid proliferation and acceptance of electronic communications in the business community (Quay, 1997).

2.2 INTERNET-BASED PLANNING APPLICATIONS

The same forces that have influenced the movement toward telecommuting can be applied to an Internet-based planning system. Many of the planning activities that have typically been conducted in person can be translated to an electronic medium. For example, it is possible to have a planning permitting system where clients can retrieve information about and apply for permits online. The result is that the client saves the time of travelling to a planning office in person and associated transportation and environmental costs and the planner is freed to work on tasks that cannot easily be automated. Typical activities such as permit processing and the submission of digital plans may regularly be conducted via the Internet in the near future although this idea has been slow to manifest itself on a wide scale. Nonetheless, the Internet is the latest realm for computer applications in planning and many planning agencies are capitalizing on the Internet as a new, cost-effective, wide-reaching, and communicative technology. This technology is primarily being employed for two general purposes: research and data collection; and the dissemination of information. There are also some examples where planning agencies have embarked on interactive Internet-based applications including Internet GIS (or Web GIS) and online permitting systems.

2.2.1 Research and Data Collection

There is a growing body of information available on the World Wide Web to assist planners in dealing with the issues facing their communities. This

information can be readily accessed using common search engines such as Metacrawler (http://www.metacrawler.com), AltaVista (http://www.altavista.com), or Lycos (http://www.lycos.com). There are also key sites for the collection of planning information. At the Planning Commissioner's Journal Web site (http://www.plannersWeb.com), users can access online articles and links to numerous planning resources. Cyburbia (http://www.ap.buffalo.edu/pairc/), hosted by the State University of New York at Buffalo, School of Architecture and Planning, is the most comprehensive Web search site for planning information (Pierce and Senville, 1998b).

Currently, these online sources can supplement, but not substitute, the information collected from traditional sources. For example, there are few academic journals which have been posted on the World Wide Web yet there are many that sit on the shelves of university libraries. There are also many planning reports and studies which have yet to be placed on the World Wide Web for universal access. It is likely that, as Web technology becomes more common, such documents will become available and reliance upon traditional sources of information may consequently diminish.

The Internet can also be utilized for generating dialogue on planning issues. For instance, the Cyburbia Web site not only serves to provide a directory to several other planning Web sites and documents but is also a forum for online discussion groups dealing with various planning-related topics. Planners can also post

questions for other planners or the general public through newsgroups and mailing lists. Using these mechanisms, researchers can easily access a large audience that may be able to provide useful information. A customized mailing list can be particularly useful in targeting individuals with specific types of knowledge or similar backgrounds and interests. It may, however, be difficult to determine the accuracy and reliability of information collected through forums such as discussion groups or newsgroups (Pierce and Senville, 1998b). Due to the accessibility of the World Wide Web, a researcher may not be able to validate his or her sources and may receive information that is based on personal biases rather than fact or academic reason.

Conversely, local government agencies are capitalizing on the accessibility of the World Wide Web to better interact with their constituents. The King County government, based in Seattle, Washington, wanted to be more effective in bringing its residents into the democratic process than it had in the past. As a result, the "Cyber Democracy" Web site was developed. This site, located at http://www.metrokc.gov, allows residents to read budget proposals and other documents at any time of the day, then submit testimony without having to attend city council meetings. Since its inception, the Cyber Democracy program has proved to be highly effective in involving the community in the county's decision making process (Dingle-Gold, 1999). The majority of planning agencies has yet to incorporate this type of online interaction with their constituents in order to participate in public meetings and the like. At most, planning Web sites generally

provide a "questions or comments" link that is directed toward a departmental email address.

2.2.2 Providing Information Online

In addition to gathering information, planning agencies have begun to disseminate planning information via the Internet. Pierce and Senville (1998a) have identified six categories of information distributed by planning commissions and departments:

   i.   providing basic information;

   ii.   announcements and agendas;

   iii.   zoning ordinances and comprehensive plans;

   iv.   permit application assistance;

   v.   neighbourhood information; and

   vi.   economic development.

One of the simplest methods of delivering planning information is by creating links to HTML documents on a city government's Web site. In Canada, the municipal government of Grande Prairie, Alberta (http://www.city.grande-prairie.ab.ca/homepage.htm#CyberCity_Initiative) has embarked on the Cyber City Initiative whose intent is to explore ways in which Grande Prairie and its residents can prepare for the information age and benefit from global information exchange (City of Grande Prairie, 1999). The site provides several links to community services and government departments. Grande Prairie's planning

department has placed numerous reports and plans online for public viewing. There are also several references to papers dealing with the issue of governments on the Internet.

Another good example is the Web site belonging to the Philadelphia City Planning Commission (http://www.libertynet.org/philplan/). This site provides links to city demographic and economic information in addition to recent planning reports and activities. Users can also find information about commission meetings, link to related agencies' Web sites, or view area maps. The PCPC site is also used for public announcements and contains links to archived meeting agendas.

Many other municipal planning agencies have brought planning information to the Web. Some excellent Canadian examples of this phenomenon include the sites maintained by the Cities of Edmonton, Vancouver, and Calgary. All of these sites provide descriptive information about planning services and contact information. The City of Edmonton's planning section homepage which can be found at http://www.gov.edmonton.ab.ca/planning/ provides information about upcoming community meetings, planning services, land use and zoning, permit processing, and departmental contact information. The Community Services Department at the City of Vancouver provides similar information on its Web site (http://www.city.vancouver.bc.ca/commsvcs/index.htm) with the addition of a weekly update page. This is unique in that it outlines work presently being done

in planning that may lead to policy or regulatory land use changes affecting development opportunities in various parts of the city. Included are: current development applications; current rezoning applications; and pending or current policy development.

The City of Calgary provides planning and related information including specific procedures for filing permit applications and public notices regarding rezoning, development permits, subdivision and development appeals, and road closures on the City's Planning and Building homepage which is located at http://www.gov.calgary.ab.ca/planning/. The City of Calgary has taken service provision to another level by presenting development permit application forms on the Web in Adobe pdf format. Users at remote locations can connect to the Planning and Building and Homepage, link to permit information, and download and print the forms that they need. The intention is to make the permitting process convenient for customers in allowing them to access and complete the applications before arriving at the planning office.

Government agencies have also embarked on ambitious endeavors, linking the resources of several agencies and making them accessible from one convenient site. CERES and LUPIN are two examples of such projects that have been created by the California Resources Agency (http://www.ceres.ca.gov). CERES, the California Environmental Resources Evaluation System, is an information system that was developed to facilitate access to a variety of electronic data

concerning California's different environments. The goal of CERES is to improve environmental analysis and planning by integrating natural and cultural resource information from multiple contributors and by making it available and useful to a wide variety of users. LUPIN, the Land Use Planning Information Network, is a subset of CERES located at http://ceres.ca.gov/planning/index.html. LUPIN is an information service to support and address land use and planning via CERES. At the LUPIN Web site, users can search for a wide-range of information by a number of different methods: by geographic area (i.e. county or bioregion); by theme (i.e. economics, demographics, natural or built environments, legal or regulatory); by organization (i.e. county, state, federal, ngo's); and by data type (plans, zoning ordinances, environmental assessment documents, reports and publications). LUPIN and CERES together form a comprehensive resource for detailed environmental and planning information concerning the State of California.

2.2.3 Interactive Applications

Beyond performing research and providing general information, planning departments have the potential to provide interactive online services. These types of services go hand in hand with the concept of telecommuting and have the most promise for improving the efficiency of planning agencies and their ability to connect with constituents regardless of geographic or other obstacles. Two types of interactive planning applications that are emerging on the World

Wide Web and will be discussed here include Internet GIS and online permit processing.

Geographic information systems have evolved as an extremely useful tool for planning, particularly in the management of large data sets and such activities as growth forecasting and scenario modeling. The rise of the Internet and Web technologies has resulted in the development of Internet GIS (also referred to as Web-based GIS). The Internet is a means for GIS users and the general public to exchange GIS data, conduct varying degrees of GIS analysis, and present GIS output (Peng, 1997). For municipal governments, the Internet is becoming a viable medium for spatial information exchange. The deployment of an Internet GIS can provide employees, members of the local community, or anyone from around the world with the ability to access and query spatial data from remote locations, without physically utilizing any GIS software. This can be an extremely powerful tool for planners who want to communicate information of a spatial nature and also to empower the public with the "hands-on" ability to perform their own queries.

Pierce County, Washington has developed an interactive and user-friendly Internet GIS entitled "Map Your Way" (http://triton.co.pierce.wa.us). After users have reached the main page, which contains a JavaScript program that produces active scrolling text, they click on a button to start mapping and are brought to a page with three different alternatives. At this stage, users are given the ability to

begin their queries of the system by clicking on a map, entering an address, or entering the name of a feature such as a school or hospital (see Figure 2.1).
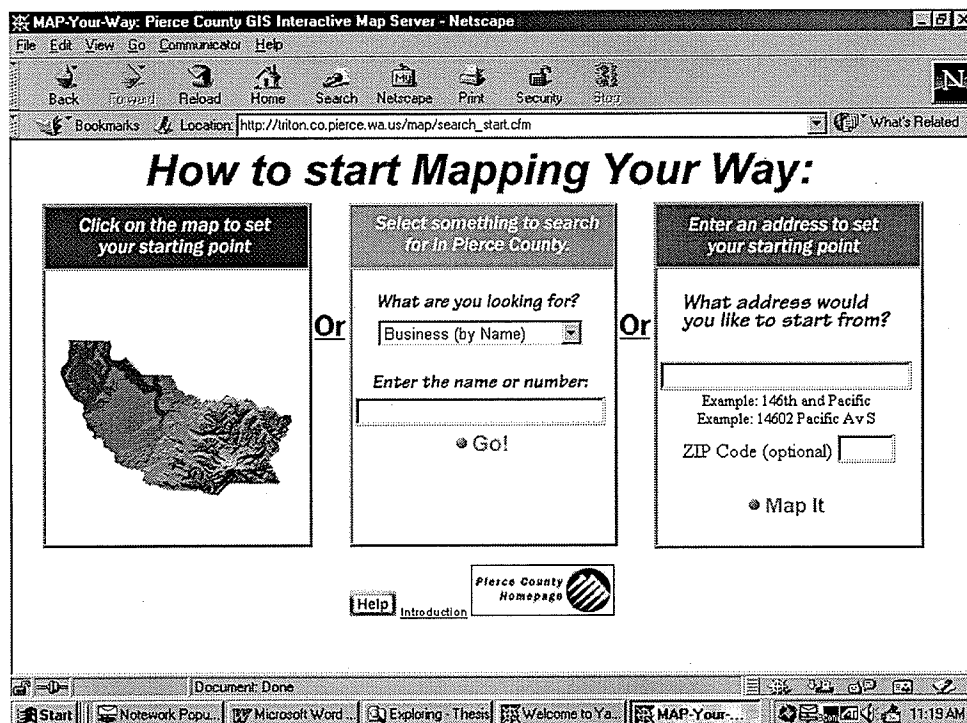
Figure 2.1: Map Your Way, User Choice Screen (http://triton.co.pierce.wa.us)

The result of the initial query is a generated map of the requested location or feature(s) (see Figure 2.2). After the new map has been generated, users have the ability to select the themes or map layers that they want to have displayed; they can zoom in or out, pan, and redisplay the map; and they can also perform further queries on the county's database using various selection tools. The types of queries that can be performed are relatively simple but the application gives users the ability to make mental associations between features and their relationship with other features.
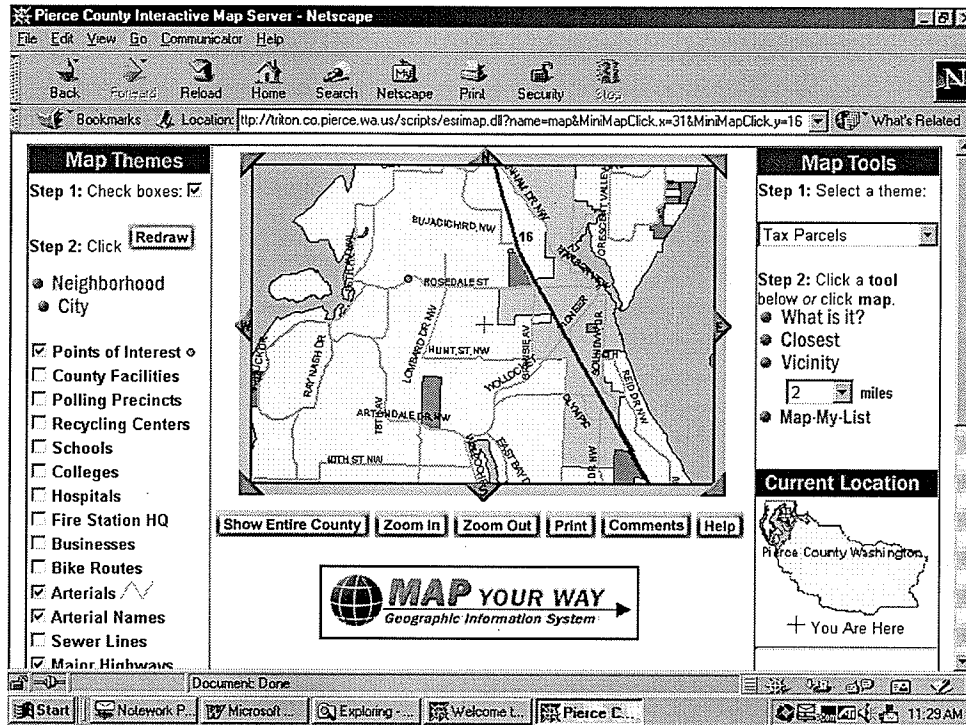
Figure 2.2: Map Generated at the Map Your Way Site (http://triton.co.pierce.wa.us)

Like many other planning agencies, the Montgomery County Planning and Inspections Office (http://www.bev.net/community/montgomery/planning) has placed zoning, subdivision, street-naming ordinance information, and records of past and current public hearings and planning meeting minutes into an online format. In addition, a county "Internet Parcel Look-up System" (IPLUS) has been developed. IPLUS is a Web-based mapping system designed to give the citizens of Montgomery County efficient access to property information (cadastral mapping and data) within the county and local communities. This is a tax parcel information system that allows interested users to look up information relating to specific parcels of land. They can search by: owner's name, parcel number, account number, deed book and page, will book and page, plat book and page,

tax map/block/lot or street address; users can also query by clicking on a digital

map of Montgomery County (see Figure 2.3).
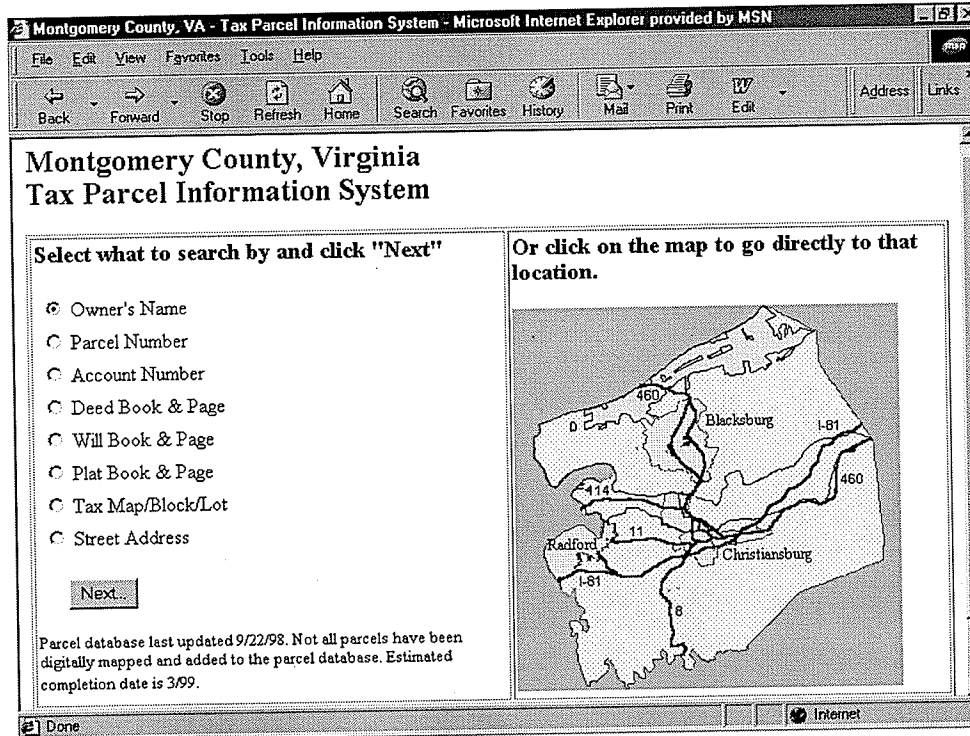
Figure 2.3: Montgomery County Internet Parcel Look-up System - Main Query Page
(http://www.bev.net/community/montgomery/planning)

The result of a specific query is very descriptive information about the owner,

address, land and building values regarding that parcel of land (see Figure 2.4).

Albeit, the extent of the information provided with similar applications may be

somewhat dependent upon local policies or laws concerning the disclosure of

certain types of information to the general public.
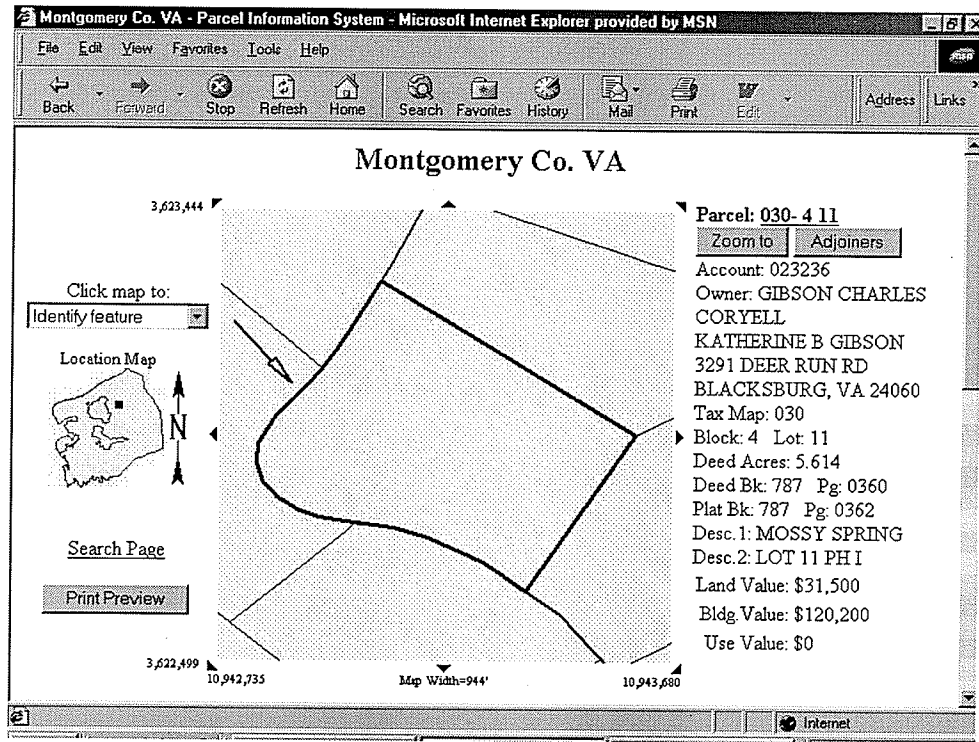
Figure 2.4: Montgomery County Internet Parcel Look-up System - Query Results
(http://www.bev.net/community/montgomery/planning)

Map Your Way and the Montgomery County Internet Parcel Look-up System are just two examples of Internet GIS applications. Such applications can be extremely valuable to planners who wish to convey spatially related information to the public in an easily accessible and visual format. Internet GIS technology is rapidly advancing and it is highly likely that remote users will be given more powerful capabilities in the future.

With the demand for a new model of service delivery, online permit processing is also emerging as an interactive planning application. In January of 1999, the City of Milpitas, CA unveiled its Online Express Permitting program (http://209.196.180.126/). The program allows any of community residents who are online to apply for building permits twenty-four hours a day and seven days a week.

The online permit application consists of a series of data-entry pages (forms). Users enter the project type, location, property owner, credit card information and an e-mail address. An "application assistant" in the right column of each page gives applicants a graphical view of their status in the application process. A key component of the site is a declaration page on which applicants acknowledge, by clicking a box, statutes and local codes that apply to their work and agree to comply with all city and county ordinances and state laws relating to building construction. Permit fees are calculated at the time of issuance and sent to the applicant in a confirmation e-mail message. Between January and June of 1999, about 30 percent of all applications received by the city's building department were filed online (Byerly, 1999).

The Milpitas Online Express Permitting program was developed under the "Smart Permit" umbrella project (see Appendix A). The Smart Permit project is a joint venture between several cities in Silicon Valley including Milpitas, Santa Clara, Mountain View, San Carlos, Sunnyvale, Palo Alto, and Fremont. Each city is

currently in various stages of streamlining their permitting and development approval processes under this joint venture with the shared goal of creating common application standards that strive to improve efficiency, public service delivery and the costs of doing business with government agencies (http://www.jointventure.org/initiatives/smartpermit/). A long-term goal of the Smart Permit project is to have each city eventually develop its own "electronic city hall".

Beyond the scope of Silicon Valley, the City of Santa Rosa, California (http://santarosa.onlinepermits.com) has also implemented an online permit tracking system. Contractors, architects, engineers, owners and other interested parties may check the status of permits where the permit number is already known. They can access parcel information if the parcel number is known. Registered contractors may also review and schedule inspections.

Houston, Texas has taken permitting one step further by integrating permit processing and tracking into one convenient site that can be found at http://houston.onlinepermits.com. Users can apply for new permits (commercial and residential buildings, plumbing & fire sprinkling systems, sidewalks and driveways, curbs and gutters, culverts, and parking lots, and electrical or HVAC); users can also check the status of permits or check for sold or approved permits (see Figure 2.5).
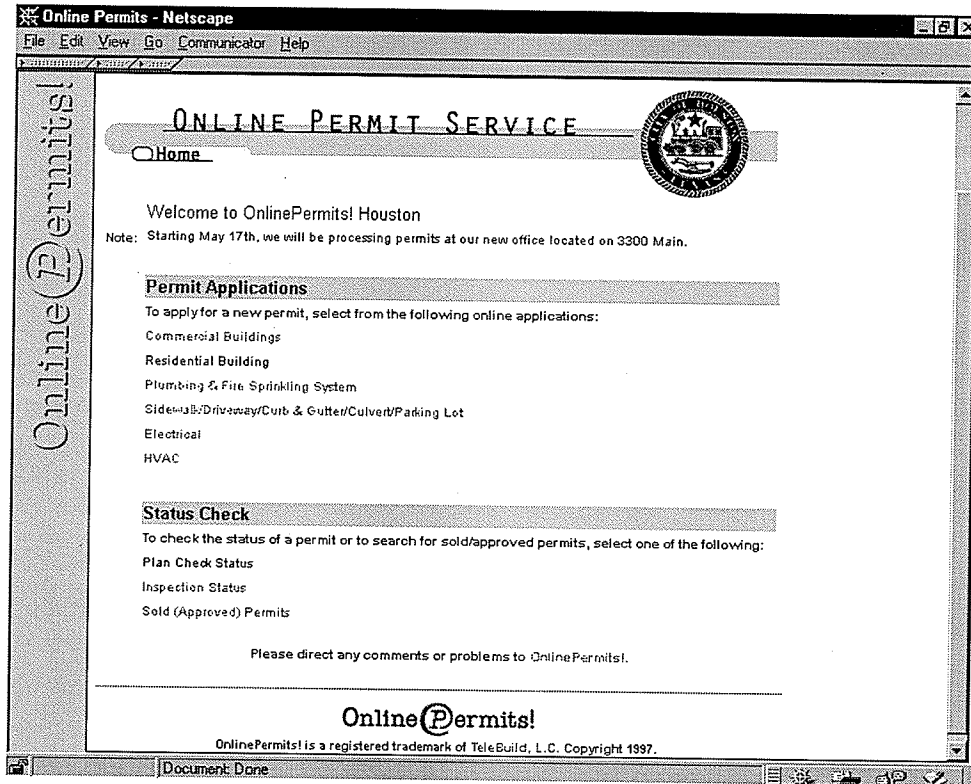
Figure 2.5: City of Houston Online Permit Service (http://houston.onlinepermits.com).

The provision of interactive services is an area of Internet technology that has not yet been widely adopted by planning agencies. This may be due to financial constraints, or lack of the human and technical resources required to implement these types of systems. However, it is inevitable from the examples given and with the tremendous rate of technological innovation and infusion of computer training in planning education that more interactive applications such as Internet GIS and online permitting will emerge.

This chapter has provided a concise account of the evolution of computer technology in the context of planning agencies. It has also presented a number of examples of Internet applications that are currently emerging from planning

agencies. The examples shown range in their quality and complexity. This may reflect the fact that different agencies have different resources available to them to pursue activities such as Web development. The next chapter will examine some of the essential considerations for planning agencies pursuing the development of Web sites and applications.

CHAPTER THREE

WEB DEVELOPMENT CONSIDERATIONS

3.1 PLANNING CONSIDERATIONS

There are several considerations to be made prior to implementing Internet-based planning applications. These range in scope and detail from macro-level considerations such as organizational goals and values and user needs to micro-level considerations including hardware and software requirements and application design and development.

The process of creating Internet-based applications will undeniably vary in complexity depending on the complexity of the applications to be employed. The types of applications that municipal governments choose to put on the Internet should equally reflect their needs and the needs of their municipalities. For instance, a simple informational site may sufficiently serve a small municipality. A large municipality, on the other, may benefit more from a local government Web site with complex applications such as online permitting and Web GIS. The scope of the applications placed on the Web will also be determined by the resources that the agency has to support them. Critical resources include the technical ability of the agency's staff, time, motivation, and financing.

Inevitably, the development of a municipal planning Web site should require careful thought and planning prior to implementation. This may represent a

significant achievement for most local government agencies. In some cases the envelope may be pushed even further; a number of municipalities may coordinate their efforts and pursue a joint effort in the area of Web technology. This is exemplified by the Smart Permits Project, an endeavor that has involved the coordinated efforts of various agencies and a great deal of time, effort, and money (see Appendix A). Many municipalities would not have the resources or political will to embark on an endeavor of this scale. Nevertheless, it is possible to bring planning information and services to the Web with fewer resources. In either instance, the range of macro- and micro-level considerations should be addressed.

Planning professionals who have been involved with developing Web sites for their own agencies have suggestions for others embarking on the same type of venture. Julie Crisp from the City of Portland suggests the following:

i. if committing to putting information online, it is necessary to make a commitment of resources of time and staff and maintaining current information;

ii. it is a good idea to create a mission or a goal for site growth and to have a clear policy for what will be on the site, who will be linked to it, and how it will be maintained;

iii. an agency should begin with a small, manageable amount of information and build on it;

iv. any Web development plan should be evaluated and organizational goals should be revisited on a regular basis; and

v. a Web site should be designed for its intended users (adapted from Pierce and Senville, 1998).

Chris Ryder, formerly a planner and currently a network administrator for the City of Pasadena, also suggests:

i.   that the process should involve a coordinated effort by members of different city departments and the community;

ii.   that it is critical to standardize the design of the individual page to develop a cohesive-looking site; and

iii.   that the user's perspective and navigation of the site should be considered (Ryder, personal communication, January, 2000).

Above all else, a planning agency considering Web development should define its purpose and have an understanding of what it hopes to accomplish through the use of the Internet. This rationale could be in the form of a mission statement or statement of purpose. This statement of purpose can serve to guide the agency throughout the development process.

3.2   THE USER-CENTERED APPROACH

A dominant theory of web design is that to implement a Web site which users will find effective, efficient, and satisfying requires a user-centered process (Bevan,

1997). Jeanette Fuccella, an IBM Human Factors Engineer and Jack Pizzolato, an IBM Web Site Designer, also suggest using a user-centered approach based on user expectations and feedback in order to create a successful Web site.

> This relatively straightforward method has been used with the IBM Corporation to create a wide variety of Intranet and Internet Web sites. It has resulted in higher satisfaction ratings, increased visit rates, positive write-in feedback, and most importantly, longer design life (Fuccella and Pizzolato, 1999, par. 2).

The process which Fuccella and Pizzolato describe involves four steps:

i. defining the target audience;

ii. identifying their requirements and tasks;

iii. organizing the information; and

iv. creating a wire frame of the site.

3.2.1 Defining the Target Audience

Fuccella and Pizzolato (1999) suggest that the easiest and most cost-effective means for collecting audience definition data is to conduct a survey. Conducting a survey may require an experienced CGI programmer depending on the complexity of the survey. Database software that provides an interface to the Web to collect and process survey data can be utilized to reduce the demands on the programmer in compiling survey data. Furthermore, specialized software is available to streamline the survey distribution and data collection process; this would be applicable to large and complex surveys. A survey should be designed to determine the user's professional profile (i.e. what the user does for a living), the user's surfing profile (i.e. how, when, and why the user utilizes the Web), and

site usage (i.e. what the user likes or dislikes and what tasks the user likes to perform) (Fuccella and Pizzolato, 1999).

Once a survey has been developed, either active or passive collection methods can be employed to elicit responses. With active survey collection, individuals are actively approached to complete a survey. Via email, it is possible to send a survey directly to potential respondents. Alternatively, respondents can be pointed to an existing Web site where they can complete a survey. An email survey can also be posted to online discussion groups.

With passive survey collection, a survey is hosted on an existing Web site and the Web site owner places a pointer to the survey from another location on the site, such as the home page. Visitors to the Web site may notice the link to the survey and if they are so inclined, may choose to complete it. Hence, in a situation where a local government has already established a Web site but its planning department's component has not yet been developed, a simple way of collecting public input might be to provide a survey link on the city's home page to determine what kind of planning information and activities potential users would want to access. Because this would be a less aggressive way to elicit responses, the survey link should be made noticeable to users browsing the site. Additionally, some advertising might be necessary to generate public interest and participation in the survey.

3.2.2 Identifying User Requirements and Tasks

Once the target audience has been defined, a planning agency will need to determine what the Web site content will be. Fuccella and Pizzolato (1999) refer to content requirements as "objects". An object is any piece of information that can be found on a particular Web site. Examples of objects that could be included in a planning department's Web site might include planning documents, zoning code excerpts, frequently asked questions (FAQ's), and downloadable application forms. If an agency is creating a new site or wants to enhance an existing site, it should gather information to determine what users expect. There are several methods for collecting requirements for a Web site. Table 3.1 provides brief descriptions and comparisons of some of these different methods.

Table 3.1: Comparison of Five Requirements and Task-gathering Methods (adopted from Fuccella and Pizzolato, 1999).

Method: Focus Group		
Description	**Pros**	**Cons**
Focus group sessions are conducted using one of two methods: traditional or electronic. In traditional focus group sessions, moderators lead verbal discussions with small groups of individuals (usually less than ten). Because data capture is difficult during these sessions, they are often videotaped and transcribed.	Companies can collect large amounts of data in short periods of time.	Focus groups can be costly and may require trained moderators.
	Sessions can be short and easy to conduct.	A focus group is generally limited to fewer than twenty participants.
	Detailed reports can easily be generated after sessions are completed.	Traditional sessions may require significant time for analysis and interpretation prior to producing reports.
Electronic focus group sessions use groupware software to capture electronic "discussions" among participants.	Because discussions are captured electronically, report data is available	Electronic focus groups are more structured than traditional focus groups but

	immediately after the session is concluded. Additionally, because electronic focus group sessions encompass a variety of different activities, participants may tolerate longer sessions than are practical with traditional focus group sessions.	accommodate less discussion due to the fact that electronic focus group discussions typically depend on keyboard entry by participants.

Method: Iterative Surveys

Description	Pros	Cons
Using a series of surveys, requirements can be gathered and prioritized. The first survey includes open-ended questions. Participants may be prompted with a list of known requirements or may not be given any cues.	Remote participation is free because no travel is necessary.	The entire process takes between two and four weeks to complete
	Large sample sizes can be used without significant increases to cost or overall data analysis time.	After collecting the data from the first survey, duplicate entries must be removed and vague responses must be clarified.
The second survey asks participants to rank the compiled list of requirements based on their importance.		
If needed, follow-up surveys can be used to gather more detail on specific requirements.		
Note: The results from this method should resemble the output of an electronic focus group.		

Method: Exploratory Surveys

Description	Pros	Cons
If a large survey is planned, the simplest and most cost-effective method of gathering requirements data is to simply ask users to list the specific content items they would like to have on the site.	The survey is simple and inexpensive.	Data may be difficult to analyze and compile and a follow-up survey is needed to prioritize requirements.
	A large sample size can be surveyed in a relatively short period of time.	

Method: Scenario-building Exercises

Description	Pros	Cons
Scenario-building exercises can be done in conjunction with other task-gathering activities	This method is simple and inexpensive.	This method works best in a one-on-one

with little or no additional cost.		situation because respondents should receive detailed instructions and example scenarios.
	The results compliment other data on tasks and requirements.	
	A questionnaire gives users a context in which to specify tasks and requirements.	.
Method: Competitive Review		
Description	**Pros**	**Cons**
This method can be conducted with or without users. After identifying completed Web sites, a thorough and systematic review of these sites is conducted. The review should focus on content and functions missing from the existing site.	Competitive review is simple and inexpensive.	Competitive reviews can be time-consuming, especially if conducted with users.
	Competitive reviews are based on users' comments and a company can gain insight into the value of specific content and features.	Without users, it is difficult to gauge the value of the content and features found.

The methods presented in Table 3.1 can provide some guidance to planning agencies in determining user requirements and tasks. These have been compiled by experts in the field of Web development. Many of the sites that can be found on the World Wide Web have clearly been developed for the purpose of marketing or selling products. This differs from the intent of many municipal planning Web sites, where the intention is more likely to educate and empower constituents, provide easier access to planning information, and reduce the demand on staff to provide information that can easily be accessed via the Internet. However, the methods presented in Table 3.1 are still relevant to planning agencies. The competitive review method is particularly relevant where

planning agencies can learn from and evaluate each other to determine how their respective sites are deficient and can be improved.

Once an agency has determined its user requirements and tasks, it can create a strategy to develop its Web site. If an agency has found that its users require extensive information and accessibility, it may choose to create a flexible design where the complexity of its site is gradually increased over time. As has already been suggested, it is important to begin with a small, manageable amount of information then gradually increase the site's complexity. Fuccella and Pizzolato (1999) suggest that taking the longer view will help to create a flexible design that can accommodate expansion over time, including new categories of Web objects.

3.2.3 Organizing Information

Once an agency is aware of the kinds of information that its users are seeking, it has to determine how this information will be organized and structured. Again, taking the user-centered approach, the information should be organized in a way that makes sense to the people that will be using it. For instance, alphabetical lists of information might make sense to one group. Another group might prefer lists of subject categories. One approach to determining the logical structure of a Web site is to recruit some representative users to help organize the information content of the site in a way that seems most logical to them. Card sorting is a

technique currently being used by IBM for organizing information on Web sites. Card sorting involves:

i. creating cards of topics the site will cover where each card represents an object;

ii. asking representative users to sort the cards into logical groups; and

iii. analyzing the groups that the users created and determining the optimal organization structure for the site (IBM Corporation, 1999).

During the user analysis, an agency may have performed a task analysis to determine how people will accomplish the tasks that the Web site will facilitate. This analysis can be used to organize the steps within the tasks according to user preferences.

Another approach to organizing Web site content, which could also supplement the card-sorting technique, is to create a flow diagram. A flow diagram defines the site's structure, identifies all pages within the site, and shows the pathways linking each page. At an even more detailed level, an agency may also wish to list all of the elements and links for each page within the flow diagram. In other words, an itemized list would be constructed for every page included in the Web site. Such a list might include text, images, sounds, video and audio clips, image maps, animated GIFs, Java applets, downloadable items, controls such as print buttons, and all links. Creating lists may help to organize information, avoid redundancy, and prevent certain elements from being forgotten.

3.2.4 Creating a Wire Frame

A "wire frame" is actually a simple model or prototype of what the final Web site may be. The wire frame is the result of previous step, where the structure of the content has been determined. The wire frame is the skeletal representation of the Web site containing the logical framework of all pages within the site and the logical pathways for finding information and accomplishing various tasks. The wire frame should not contain any graphics so that users focus on content rather than the "look" of the site (Fuccella and Pizzolato, 1999). Once a wire frame model has been created, it can be evaluated and refined. It can then become the basis for the final Web site design.

3.3   DESIGN CONSIDERATIONS

To this point, general planning considerations have been discussed and methods have been presented for determining the target audience, user requirements and tasks, organizing information, and creating the skeletal model of the final Web site design. Another important consideration to be made is how this content will be arranged and presented to the target audience.

3.3.1 The Aesthetic Component

Abdalla and Cooper (1998) argue that the concepts of design in terms of communication on the Internet must be considered as they have an impact on the interaction with users and their perceptions of a city's identity. In other words,

users are likely to judge a Web site by its appearance. For this reason, not only should Web development be taken seriously with respect to the quality of the content and organization of information, but visual quality should also be considered. Abdalla and Cooper (1998) further contend that the morphological elements of the Internet including graphics and textual information can be compared to those of the traditional city whose elements include urban landscape, urban fabric, and buildings. If the Web is a metaphor for physical environments, Web design for a municipal government should be treated like "place-making" in urban design. Mitchell supports this notion:

> simply making computers available and providing some kind of electronic access to civic information and discourse is not enough to create successful public cyberspace. Just as parks and squares must be pleasant and welcoming to a diverse population in order to function effectively, so must the interfaces to public areas of cyberspace (Mitchell, 1994, p. 128).

Figure 3.1 is an example of a Web page that is both inviting and user-friendly. The City of Pasadena's Planning and Permitting site exemplifies one of the key criteria for designing Web sites which has already been discussed, that is designing the site for the user. Users can access a number of different links at the Planning and Permitting Department home page by either clicking on various locations on the image or by clicking one of the links on the left of the screen. By using a colourful image, the designer of the Web page may have been trying to create a place where people feel comfortable searching for information and will likely return.
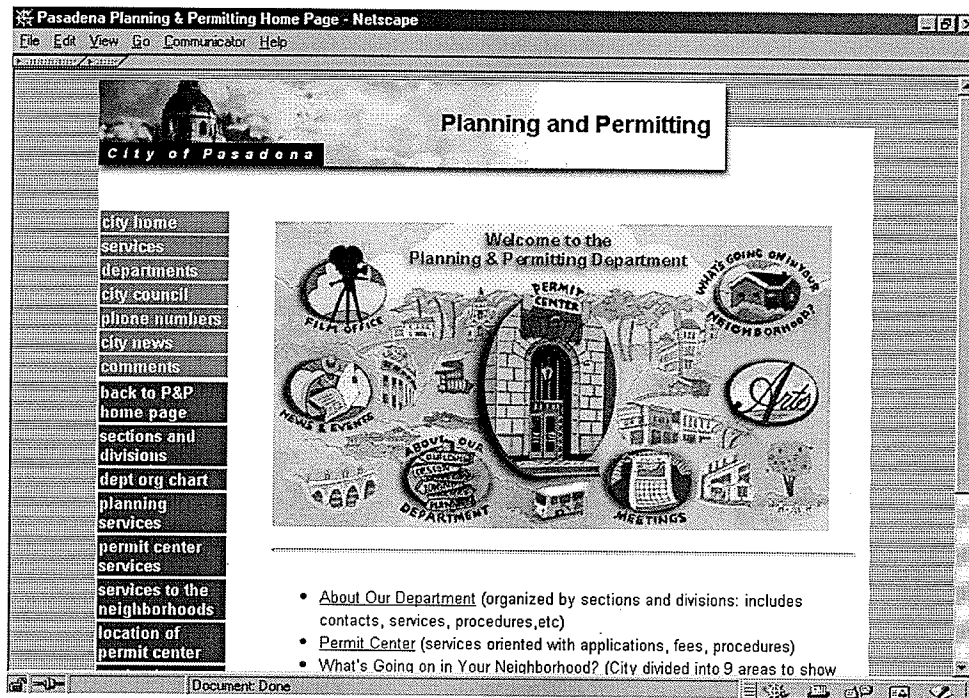
Figure 3.1: The City of Pasadena Planning and Permitting Department Web Page
(http://www.ci.pasadena.ca.us/permitcenter/)

3.3.2 Designing for the User

According to Hal Shubin, a Web design consultant, the organization of a Web application should be based on an understanding of how users perceive the objects and activities involved in the operation of the product (Shubin, 1999). To reiterate what has already been discussed, a user-centered approach can be used to make this determination. However, Shubin takes a slightly different approach and, in the absence of active user participation in the Web development process, hypothesizes that by creating and analyzing scenarios based on typical users and their tasks, Web sites can be designed so that they are easy to use and respond to how people want to use them.

To illustrate this concept of user modelling, Shubin designed a Web-based hotel reservation system with the assumption that 50% to 60% of users would be making a new reservation. As a result, he made the default choice of starting the application on a new reservations page. However, understanding that users would have different criteria for visiting this site, Shubin also considered task order. The paths that users would likely follow after reaching the main reservations page were considered. Hence, users were provided with pull-down menu choices where they could choose to select a particular hotel to find available dates, select stay dates to find available hotels, or select both stay dates and hotels.

Translating Shubin's approach to a municipal planning context, it would be beneficial prior to Web site deployment, to have an understanding of the kind of information that users would be searching for most often then creating a site where that information would be easy to find. For instance, a site designed primarily for the use of architects or developers would ideally contain information such as design guidelines and zoning legislation. On the other hand, a site intended for use by the general public might contain information about the development process, community planning, a section containing frequently asked questions, or the ability to search for parcel information. The reasonable alternative to either approach would be to create a main page with several links to accommodate users with different needs and different levels of technical ability. Again, using the City of Pasadena's Planning and Permitting site as an

example, the user is given a broad range of choices. He or she can choose to find information about permits, fees, or applications; plan-submittal requirements; code compliance; or meetings and upcoming agendas. The user can also leave messages for planning staff via an email link. The site can be perceived as successful for a couple of reasons. Not only is it visually appealing, but it appears to have been designed for its intended users. Notably, the City of Pasadena's Planning and Permitting site won an award from the American Planning Association in 1998. A description of the Web site, the planning and development process, and award criteria can be found in Appendix B

3.3.3 Navigation and Page Layout

How potential users will navigate through a Web site is a critical consideration in the design process. If users can't find the information that they want or the information that they are supposed to find according to the intent of the Web site, then it is unlikely that the site will be successful. Fellenz, Parkkinen, and Shubin (1998) have identified three classifications of Web usage: browsing, performing transactions, and running applications.

Browsing is the simple process of clicking on links to go from one page of static information on the Web to another. This is the simplest form of Web activity in which a user can participate. Transactions generally involve getting information from the user and providing information to the user, while interacting with a database on a remote server. Transactions may involve making changes to a

database; this is the case with e-commerce sites where goods or services are purchased online. They may also make inconsequential changes to a database, as occurs when a search engine such as Lycos or Metacrawler is utilized. Web applications such as Web GIS are the most complex form of activity in which a user can participate. These are similar to desktop applications but rely on information provided from a remote server rather than the user's machine.

Regardless of the type of activity in which the user is involved, there are important considerations that must be made by a Web designer to ensure that users do not become disoriented. For instance, if a user is browsing and enters a site via a link or a bookmark, he or she may become disoriented if the new site does not contain location reference information. It is useful to have information about the structure of the site and the user's relative location on every page in a site (Fellenz, Parkkinen, and Shubin, 1998). Navigational aids such as page names, logos, banners, icons, background colours can be used as visual clues for users (Shubin and Meehan, 1997). Reference information is also important for users involved in transactions. It is important for Web designers to provide clear information to the users on how they can correct errors, cancel the transaction, or complete the transaction (Fellenz, Parkkinen, and Shubin, 1998). For users involved in an application, it should be possible to move forward or backward or quit a task at any time. For this reason, navigational controls should be provided in an application window--controls, which are independent of the browser. Seeing a clearly defined exit link might help users remember to finish

what they are doing before leaving an application. It could check that a task is complete and ask the user to confirm when exiting. The benefit to the user increases by using such a link if a reward is offered, such as a review of the changes made during a session or a receipt (Shubin and Meehan, 1997).

Designers should also be wary of using frames. For instance, if a user follows a link from one frame to another page containing frames, he or she can end up with frames inside of frames. Frames are also difficult for users to bookmark because the technology to reference an anchor inside of a frame is not currently available. One method of overcoming the potential "frames inside frames" problem is to open a new browser window when a user selects a link. This way, a user can jump back and forth between browser windows and close either when he or she has completed a task.

3.4 IMPLEMENTATION AND MAINTENANCE

The development of a Web site will depend on the kinds of resources that an agency has on hand. The technology requirements for building a Web site should be considered early in the planning stage so that the agency understands how it would be able to meet the needs of its users.

3.4.1 Web Enabling Technologies

There are many Web Development Tools available today, with varying degrees of complexity. Hypertext Markup Language (HTML) is the primary technology

used to create all Web sites. It is the simplest to use and can be learned and implemented easily. HTML editors such as Microsoft FrontPage and Netscape Composer are available so that novice Web developers can create pages quickly. Planning agencies involved with Web development should be careful if using such a tool--the resulting Web pages can easily reflect amateur input to the design process.

Web design can be given a greater level of sophistication and complexity through the use of CGI programming and scripting languages such as JavaScript and VBScript. An even greater level of complexity can be integrated through the use of Java Applets. For an agency whose main intention is to provide information and to have its users perform simple browsing activities, it may be possible to create a Web site based solely on hypertext markup language. However, if an agency wants its users to have the ability to perform transactions or run applications, it will likely require the services of an in-house information technology expert or an external consultant with experience in developing Web sites for these purposes.

3.4.2 Hardware and Software Requirements

An agency's hardware and software requirements will depend on the level of complexity to be integrated into its Web site. Again, for a simple informational site where a user will mainly be browsing, an agency may simply require Web server software and a server capable of housing the information to be provided

on its Web site. However, if an agency is interested in delivering a Web application such as Web GIS, it will require specialized software and perhaps, costly licenses to run the software. Additionally, it may require a dedicated server to house the data to run the application. For instance, a Web GIS server should be capable of delivering images to remote clients (i.e. users at home) relatively quickly so that users don't become bored or frustrated waiting for pages to load. Again, the hardware and software requirements of an agency will be directly dependent upon the types of functions that will be available on its Web site.

3.4.3 Management and Maintenance

An important consideration in the management and maintenance of Web sites is the level of technical ability possessed by staff. In some cases, training may be required so that a designated individual in an agency can be responsible for and be able to competently monitor and expand an agency's Web site. Bevan (1997) has several suggestions for managing Web sites that a competent Web site manager should be able to follow:

i.   monitor feedback from users;

ii. monitor the words used when the site is searched;

iii. monitor where people first arrive on the site and support these pages as entry points;

iv. check for broken links and update links regularly (Web sites frequently become obsolete, outdated, or are removed from the Internet); and

v. compare the agency's site to other comparable sites as Web browsers and Web design evolve (Bevan, 1997).

The maintenance of an agency's Web site should also involve a regular evaluation of content and design. The evaluative process may even be as extensive as the original planning and design process where users are consulted, surveyed, or involved in some way so that the agency's site can be improved to meet changing user needs and demands or so that the site can be expanded to accommodate advances in Web technology.

3.5   SUMMARY

Although Web Development has been presented in this chapter as a sequential process, consisting of planning, design, and implementation, it should in fact be viewed as an iterative or cyclical process. It is inevitable that during any stage of the process, discoveries might be made causing one to revisit the previous stage. For instance, a planning agency may begin to develop a prototype, which it believes is based on good information.   However, as the agency sees the prototype develop, it realizes that it needs to reconsider some aspect of the original idea. Building a degree of flexibility into Web sites in their initial stages may save a lot of work from being repeated later on.   A regular evaluative process will allow an agency to continually be able to improve its appearance and capabilities on the Web.

CHAPTER FOUR

RESEARCH DESIGN

4.1   SURVEY DESIGN

4.1.1 Rationale

Given the context of the research, an online survey seemed to be a viable method for pursuing respondents. It was thought that this type of survey would be fast, convenient, and economical. With the desire to expedite the research process, the Internet survey was considered a better choice than traditional methods such as mail or facsimile.

The convenience for both the survey respondent and researcher result from the use of an HTML form and, of course, the speed at which information is transferred via the Internet from one computer to another. A form is simply a Web page prepared in HTML (hypertext markup language) format that, rather than being static, allows users to easily enter and submit information. Forms may consist of features such as edit boxes, check-boxes, pull-down menus, and radio buttons--tools designed to make the form simple and user friendly. With the use of a form, a survey can be completed while the user is connected to the Internet and submitted within a matter of minutes. This eliminates the need for paper, ink, and postage, making it a good choice economically. In theory, the ease of use should also improve the likelihood that a survey will be completed and returned.

Another reason for utilizing an online survey was simply to demonstrate one of the potential applications of the Internet in municipal planning practice. Given the context of the research, neither a mail- nor facsimile-based survey would have been a logical choice.

4.1.2 Participant Selection

In order to satisfy the research objectives, it was necessary to limit the survey to municipal planners. In order to gather accurate results and create a representative sample, participants were identified through two seemingly reliable sources.

The first group of participants was selected from the CIP membership directory. Several members had provided email addresses along with their contact information in the directory. First, a preliminary list of all of the members with email addresses in the directory was created in alphabetical order. Then, a final list was created by eliminating multiple representation for the same municipality. In other words, if there was more than one representative for a municipality on the preliminary list, only the first representative on the list (based on alphabetical order) remained. The other representatives were discarded. Approximately 120 planners were selected using this method.

The second group of participants was to be drawn from ScenarioPlus email list. ScenarioPlus is an online email-based newsletter that is distributed biweekly to a

growing list of subscribers interested in planning issues. The number of readers was estimated in January of 2000 as being over six hundred. For the purpose of conducting an online survey, this would seem to be an excellent source for participants. Unfortunately, as will be discussed later in Chapter 5, no survey responses were generated through the ScenarioPlus email list.

4.1.3 Internet Survey Development

The Internet survey developed for this study and corresponding source code are shown in Appendix C and Appendix D respectively. The survey questionnaire comprised a series of closed-ended and short open-ended questions. The survey consisted of ten major questions and ten additional sub-questions. Some of the major questions were broken down in order to explore various issues. For instance, certain questions were filters for subsequent sub-questions. Sometimes it is necessary to ask a respondent one question in order to determine if he or she is qualified or experienced enough to answer a subsequent one. This requires using a filter or contingency question (Trochim, 1999). Where it was easy to anticipate the most frequent or important types of responses, close-ended questions were asked. Where the intention of the questions being asked was to be exploratory and generate new information, open-ended questions were asked. Respondents were also given ample opportunity to share their thoughts, particularly when asked at the end of the survey to provide any supplementary information that they felt might be relevant.

The survey was intended to be fairly easy for most people to complete and to not take much time. It was structured in a way that all of the planners in the sample, regardless of their varying levels of technological awareness, would be able to answer the questions. The intent of the survey was also to generate both qualitative and quantitative results. Although it is probably easier to compile and analyze the results of a strictly quantitative survey, a qualitative survey, being open-ended and exploratory, can provide detailed information and raise issues that a researcher may not have been aware of in the first place. The survey utilized both open- and closed-ended questions in order to both quantify and qualify participants' responses.

The questions posed in the survey were specifically designed to determine the potential for municipal planning agencies to implement or further develop their own Web sites and Web-based planning applications. "Potential" was based on the types of activities normally conducted in planning offices which might benefit by having a Web presence, the level of computer technology currently being utilized, the anticipated level of computer technology in the future, planners' perceptions of the Internet and the resources available to enhance this technology, and the current limitations to the implementation of Web technology. The results of the survey are presented in the next chapter.

CHAPTER FIVE

SURVEY RESULTS AND ANALYSIS

5.1 AGGREGATE RESULTS

The results of the survey have been formulated based on responses from twenty-six individuals. This represents thirty-three percent (33%) of the survey pool with the exclusion of thirty-six of the one hundred and sixteen respondents who did not receive the survey due to transmission errors. Though this is a relatively small number of survey participants, some preliminary conclusions can be drawn from the results of the study.

5.1.1 Distribution of Planning Activities

The purpose of asking survey respondents to provide a breakdown of their typical planning activities was an attempt to identify the tasks most commonly performed in municipal planning agencies. The intention was also to identify the tasks that could most benefit planning agencies by becoming Web-enabled. The results are summarized in the table below:

Table 5.1: Question 1 – What percentage of time is spent by your organization on the following planning activities?

Task	Average (%)
Responding to Public Inquiries	16.4
Permit Processing	13.2
Plan Preparation	5.7
Map Production	2.8
Site Inspection	5.4
Development Review	21.8
Report Preparation	14.8
Research	6.2
GIS Analysis	3.6
Meetings	10.1

The survey results reflect a heavy emphasis on development review activities (21.8%), followed by responding to public inquiries (16.4%), report preparation (14.8%), and permit processing (13.2%). Interestingly enough, with the probable exception of report preparation, these key activities could potentially be transferred to a Web-based format.

5.1.2 Population Served

In Question 2, planners in the sample were asked to indicate the size of the population being serviced by their respective agencies. The intention was to try to draw comparisons between types of Internet-based services being provided and population size. Due to the limited number of responses to the survey, this type of analysis was not possible. However, it should be noted that the smallest municipality represented had a population of 4500 residents and that the largest municipality represented had a population of 850,000 residents. Despite this difference in size, it is interesting to note that both municipalities were reported as providing similar types of Internet-based services.

5.1.3 Computer Usage and Applications

Questions 3a, 3b, and 3c were asked in order to determine the extent of computer usage among planners in the sample. Not surprisingly, all of the planners who responded to the survey indicated that computers were being used in their organizations. Furthermore, all of the respondents also indicated that they were regularly using word-processing and Internet technology. Ninety-two

per cent of the respondents indicated that they were involved with geographic information systems (GIS) and map production. Eighty-five per cent of the respondents indicated that they were involved with database management and with the use of a computer-aided drawing (CAD) package. Seventy-seven per cent of the respondents reported using a permit processing software package.

5.1.4 GIS Usage and Applications

Questions 4a, 4b, and 4c were asked in order to determine the extent of GIS usage among survey respondents. Again, ninety-two percent (92%) of the respondents reported using geographic information systems (from question 3b). All of the respondents who reported using GIS indicated that it was being used to create map products. Only fifty-seven percent (57%) of those respondents were also using GIS for analysis or regulatory purposes. Of the respondents who were not using GIS, none indicated that GIS would be used in the future.

5.1.5 Necessary Resources for Internet Applications

Question 5, "Does your organization have the necessary resources to implement Internet-based planning applications?" is obviously very subjective in its nature. It was understood that different respondents might have different opinions regarding the necessary resources to implement Internet-based applications. However, the survey responses reflect a measure of an individual's confidence in its agency to implement Internet-based planning applications. Sixty-nine per cent

(69%) of the survey respondents believed that their agencies had the necessary resources to implement Internet-based planning applications.

5.1.6 Internet Usage, Applications, and Perceptions

Questions 6a, 6b, 6c, and 6d were asked in order to determine the extent of Internet usage, the types of Internet-based applications currently being used in planning agencies, and respondents' perceptions toward the Internet-based applications currently being utilized in their agencies. Again, all of the survey respondents indicated in question 3b that the Internet was being used in their organizations.

Table 5.2: Question 6b – "Indicate the uses of the Internet in your organization."

Internet Uses	Average (%)
Community Information	84.6
Plans and Documents	30.8
Zoning Information	38.5
Permit Information	30.8
Permit Processing	0.0
Meeting Minutes	46.2
Economic Development Information	23.1
Web-based GIS	7.7
Conducting Research	46.2
Conducting Online Surveys	15.4
Conducting Discussion Groups	7.7
File Transfer	38.5
Email	100.0

According to the breakdown of activities in Table 5.2, it is apparent that all of the respondents had basic email functionality. With the exception of email, the most common form of Internet-based planning activity reported was that of providing community information (84.6%). The next most popular included conducting

research and providing online meeting minutes (both 46.2%). Other significant activities included providing zoning information (38.5%), online plans and documents (30.8%), and permit information (30.8%). None of the respondents indicated permit processing as an Internet-based service although further investigation indicated that one agency represented in the survey was providing permit applications in downloadable pdf format. Another respondent indicated that his planning agency accommodated digital plan submission.

In question 6c, survey participants were asked to comment on the success and usefulness of the Internet applications being used in their organizations. The following responses were collected:

- *great access to Council Reports, agendas, minutes (searchable); good basic information, mainly text-based*
- *only in initial stages of development so too soon to tell*
- *general information provided only--success and usefulness is mitigated*
- *have received no public complaints or negative feedback*
- *can be a successful tool in providing alternative access to information, especially on a 24-7 basis*
- *there is a time benefit to accessing information online rather than physically travelling to a planning office*
- *helps speed up research for models, procedures, protocols, etc.*
- *very efficient for timely review of plans prior to final submissions*
- *response has been good when the Internet is used for public consultation*
- *Internet can be used increasingly to inform the public about new developments and policy initiatives*
- *too early to tell*
- *useful for email and research*
- *current applications are successful and additional applications are being developed*
- *no access to spatial information or development activity*
- *current usage is very limited in scope--system is not efficient thus work is often duplicated*
- *the organization has not yet allocated sufficient resources to make full use of Internet capabilities*

- *we are not very good yet but demand will necessitate our improvement in the very near future*
- *Internet feedback from public is self-selected and not objective as with a random sample survey*
- *time is spent by individuals on the Web that is not job-related*

The comments suggest that the current use of the Internet for planning activities is somewhat limited to providing general planning information. However, the respondents recognized the Internet as a good tool for increasing accessibility to information and also the associated time benefit. There were negative comments referring to the use of the Internet by staff for activities that are not work-related and to generate feedback that may be biased. With the exception of these two comments, the overall impression gained from the results is that the Internet is not currently being used to its full potential but that the respondents are optimistic about its use in the future.

5.1.7 Organizational Limitations

The intent of questions 7a and 7b was to determine the types of limitations being experienced by organizations with respect to Internet application development.

Table 5.3: Question 7a – "Identify the limitations experienced by your organization with respect to the implementation of Internet-based planning applications."

Limitation	Average (%)
Financial Costs	61.5
Lack of Technical Expertise	46.2
Lack of Motivation	38.5
Lack of Time	53.9
Lack of Awareness	38.5

In response to question 7a, survey participants were asked to select from five types of limitations. The most popular limitation experienced by survey participants was that of financial costs (61.5%), followed by lack of time (53.9%), lack of technical expertise (46.2%), and lastly, lack of motivation and lack of awareness (both 38.5%). In question 7b, survey participants were asked to elaborate on the specific limitations experienced by their organizations and to indicate potential solutions, if possible. The following comments were received:

- *Internet-based solutions will evolve from intranet applications*
- *there has to be a reallocation of staff to dedicate time/resources to identifying and creating more internet applications*
- *there is limited IT staff*
- *lack of interest by council members--unable to view the economic benefit of providing Internet applications*
- *management has a strong desire to utilize the Internet for planning applications; however any change at the City of (omitted) takes at least twice as long as was originally planned*
- *limited technical capabilities and lack of time, staff, and money*
- *there needs to be a community learning/awareness process*
- *the solution is to add staff, resources, and money*
- *small organization with limited resources and no dedicated IS personnel*
- *need to provide more opportunities for self-service over the Internet--all of the mentioned limitations are present and inhibiting interest and delivery--until there is a compelling demand, the limitations will persist*
- *lack of sufficient numbers of staff with appropriate technical expertise*
- *fear of technology*
- *lack of understanding of how the Internet works (i.e. staff have the opportunity to put documents on the Web site but do not)*
- *we have no idea how many people have access to the internet to support idea of creating applications*
- *lack of time -- first priority is Y2K compliance*
- *we don't really know how to approach the task of putting information on the Internet*

The limitation most often noted was that of the lack of staff with the technical expertise needed to perform Web development activities. Lack of staff resources

is inevitably linked to lack of financial resources and time constraints due to other project commitments. Respondents also noted the lack of political will by councils, the lack of public demand, and lack of understanding at the staff level of how the Internet works and how to pursue Web development activities. These comments reflect the need for educating staff, councils, and the public with regard to how the Internet can be utilized for planning activities. This is supported by one of the respondents who stated, "there needs to be a community learning/awareness process".

5.1.8 Viability of the Internet for Planning Applications

Questions 8a and 8b refer to the respondents' opinions of the viability of Internet applications in planning. Ninety-two per cent (92%) of the respondents indicated their belief that the Internet is a viable tool for planning activities. Respondents were also asked to identify strengths and weaknesses of Internet applications in general. The following strengths were identified:

- *wide, easy access to common information base and communication tools*
- *many questions can be answered online without staff assistance*
- *information can be archived and easily accessed by the public*
- *instantaneity and the ability to reach a wide audience*
- *another method of supplying information to the public*
- *information such as maps, drawings, and other documents will no longer have to be physically submitted, cutting down significantly on paperwork and storage and filing problems*
- *convenient, communication via email is better than playing telephone-tag*
- *can send drawings/plans electronically*
- *Internet would provide an easily accessible means for public to obtain information from the organization (i.e. online meeting agendas, minutes, plans, maps)*
- *good self-service tool, good information sharing media and good communications device*

- *research and data retrieval*
- *as more government and non-profit agencies go on line and develop Web sites, the research potential of this tool expands*
- *its primary value as a research tool is the breadth of information available and the speed at which it can be acquired*
- *the Internet increases the opportunity for two-way communication*
- *putting zoning information on the Internet would alleviate time spent explaining code to local citizens*
- *sounds promising at least for professionals and developers*
- *allows clients to serve themselves thus reducing staff time to deal with inquiries*

The most common strengths of the Internet identified by respondents included its capacity to provide an additional level of communication with the public, the accessibility to planning information on a continuous basis, and the resulting reduction in paperwork and staff time spent on public inquiries. The respondents also noted the Internet's strength as a research tool particularly with respect to finding information quickly. In summary, the respondents viewed the Internet as a mechanism for enhancing communication with the public while allowing planning agencies to operate more efficiently.

The following weaknesses of Internet applications were identified:

- *limited access for certain people (i.e. low income, ESL community)*
- *requires dedicated staff for maintaining/updating the Web site*
- *hardware cost, information liability*
- *face to face contact between the planner and the applicant is decreased--this should not be underestimated*
- *lack of personal contact when using computers -- you can't negotiate*
- *to keep the information up-to-date would probably require considerable staff resources and corporate budget*
- *not everyone has access to the Internet, so this could be viewed as a limitation*
- *preconsultation is required element of process and this would be difficult to accomplish over the Internet*

- *formal certification of application by commissioner could not be done over the Internet*
- *the Internet can not replace other public consultation techniques (e.g. public meetings) because they allow for more focussed dialogue between many individuals at once*
- *need to constantly update information*
- *reviewing digital drawings is difficult--requires expensive equipment and significant training*

The planners in the sample recognized some critical weaknesses in using the Internet for planning activities. The most common response referred to the inability of Internet communication to replace personal contact between two or more people. Negotiation, for instance, is difficult to accomplish via the Internet. The next most common response referred to the need for dedicated staff and a budget for maintaining and updating information on a regular basis. Maintenance of the system would also require technical expertise and both hardware and software resources. Some of the respondents also raised the critical issue of accessibility. There is a concern that certain groups such as low income or ESL communities may have difficulty accessing and understanding Web-based information. In regard to a Web-based system being costly or requiring time to maintain, this is probably true for any type of information system that is intended to enhance the efficiency of an organization. The comments about the Internet concerning the lack of accessibility for certain groups and the lack of personal contact typical of Internet communication actually reflect positively on planners and demonstrate their intention to provide fair and equitable access to all of their constituents.

5.1.9 Potential Internet Applications

Questions 9a and 9b asked respondents to identify the potential applications of the Internet in their organizations and also, the requirements for those applications to be developed. Potential applications that were identified by survey participants included the following:

- *increased access to spatial data; tracking progress of development activities*
- *maps served online*
- *online project application*
- *provide economic development information*
- *online permit submittal*
- *planning and planning process information will be more readily available to the public*
- *submit drawings electronically*
- *conduct online surveys and community bulletin-boards*
- *give more information to the public*
- *online surveys*
- *online plan submission*
- *Internet GIS*
- *tracking application status, providing online zoning information, providing reports*

The survey participants further identified the requirements necessary for these applications to be developed and implemented:

- *spatial data conversion, creation, maintenance; organizational changes; new tracking software implementation; staff training*
- *more staff time/resources and better computers*
- *money*
- *time, money, education*
- *money*
- *political will*
- *purchase server-based email service with desktop email addresses*
- *system and process development*
- *time to set-up*
- *technical staff, education*
- *time, technical expertise*
- *installation of software/servers to access our database in a secure manner*

- *development of facilities for charging for services*

The wide range of potential applications identified by the planners in the sample suggest that there is a level of awareness of how the Internet could be used to accommodate typical planning activities and improve the overall function of planning agencies. The requirements identified as being necessary for those applications to be developed were not surprising. Most of the respondents recognized the need for dedicated staff, time, money, and training. There were also individual comments regarding the need for political support, data creation and management, database security, a method of receiving payment for products or services via the Internet, and the need for system and process development.

5.1.10 Supplementary Information Provided

In Question 10, respondents were simply asked to provide any supplementary information that they felt was relevant to the survey. These final remarks were received:

- *great potential for internet use in planning in both regulatory and policy-making arenas*
- *more experience and research is needed on most effective use of this technology*
- *there are two ways to read some of your questions--Internet applications might mean sending in an application for development or rezoning on the net or it might mean computer programs (applications)*
- *please provide the aggregate results of the survey*

The statements reflect an interest in the research topic and the potential for Internet- or Web-based planning applications, but also the realization that more in-depth research is needed regarding the use of the technology.

5.2 TECHNICAL DIFFICULTIES

5.2.1 Survey Transmission

The survey was sent to the first group of participants targeted through the CIP membership directory. An email message with the survey attached as inline text was sent to a total of 116 email recipients. Within minutes, delivery failure notices were received for 36 of those intended recipients. This may have occurred for various reasons.

i. A municipal government may have configured its Internet server to block email attachments as a security measure.

ii. Recipients may not have been capable of receiving the survey as inline text with HTML tags.

iii. An intended recipient may not have existed or may have had an email change since the time that the CIP membership directory was printed.

iv. The email address of an intended recipient may have been entered incorrectly when the original message was sent.

5.2.2 Survey Responses

Another of the difficulties was the problem of not receiving the responses entered by a participant once he or she had clicked on the "submit survey" button at the

end of the survey. Instead of automatically submitting the results, the browser software being used by the respondent would bring up a mail message window. This problem was identified through considerable email correspondence with one municipal planner in British Columbia. Her responses to the survey were later acquired via a telephone interview. In the future, it would be worthwhile to investigate various methods for submitting a survey via the Internet.

5.2.3 Survey Format

All of the responses to the survey came from the first round of distribution, when participants were targeted via the CIP directory. The survey would have been received in HTML format (see Appendix C). There were no responses received following the second round when distributed with the Scenario Plus newsletter. This is not surprising because the survey was sent in simple text format. In text format, none of the radio buttons or edit boxes are visible hence there is no opportunity for a respondent to answer questions immediately on line. This would lead one to believe that the visual appearance and user friendliness of a survey is important. With the text-based version of Scenario Plus, a survey respondent would have to copy and paste the survey into a text editor (i.e. MS Word, Notepad), complete the survey, then send it as an email attachment.

In an attempt to mitigate the problem, it would have been beneficial to acquire a list of the Scenario Plus subscribers and email them an HTML version of the survey directly. It is likely that if the survey were received in this format, there

would be a healthy response rate. However, according to Dwight Mercer, the editor of the Scenario Plus newsletter, a policy exists which prohibits the release of members' email addresses (Mercer, Personal Communication, September, 1999).

5.3   SUMMARY OF RESULTS

The development and distribution of an Internet-based survey proved to be a good learning experience. Some valuable information was acquired from various municipal planners from across Canada. The research suggests that there is a greater emphasis in municipal planning agencies on development review and responding to public inquiries than other activities. On a positive note, planning agencies seem to have the basic computer technology or tools (i.e. word processing and the Internet) to at least bring some text-based information to the Web. It was also positive to find that most of the respondents were using GIS in their agencies. Whether the GIS is being used for mapping or analysis is irrelevant; it indicates, rather, a level of acceptance to technological tools which can be of benefit to planning activities. The fact that sixty-nine per cent of the respondents believed that their agencies had the necessary resources to implement Internet-based planning applications reflects a degree of confidence in the use of the Internet for planning applications in the future. It was also positive to find that many of the agencies represented in the survey were already using the Internet to provide, at the very least, general community information. It was encouraging to find that some agencies were also providing more specific

information such as plans and documents, zoning information, and permit information. Overall, the results of the survey were a positive indication of the widespread use of the World Wide Web.

The comments regarding the success and usefulness of the Internet in planning provided some insight to planners' attitudes toward this tool. Many of the respondents' comments referred to the convenient and efficient nature of the Internet to support research activities and public information dissemination. Comments also referred to the fact that the Internet allows instantaneous access to information at any time of the day or week and that this information can be obtained without physical travel to a planning office. The respondents also expressed that current Internet applications are limited in scope. One comment referred to the failure of the Internet to gain unbiased survey information from the public as opposed to a random-sample survey. The same comment could be made regarding the survey used in this research project. The respondents were selected based on the fact that they were municipal planners who had provided email addresses in the CIP directory. Perhaps the fact that they had provided their email addresses indicates a higher level of capability and interest with respect to the Internet. This may have skewed the results of the survey from the onset.

With respect to organizational limitations, all of the respondents indicated that their agencies were hampered to some degree by either one or a combination of

basic limitations (i.e. financial costs, lack of technical expertise, lack of motivation, lack of time, lack of awareness). One of the comments heard repeatedly by survey participants was that their agencies were being held back by the lack of qualified information technology staff to work on Internet development activities. Other comments, which deserve mention, referred to the lack of political will to drive Internet development, the "fear of technology", and the lack of a viable process to follow in order to create Internet-based planning applications and services.

The Internet received strong support from the respondents in terms of its viability for municipal planning practice. It was noted for its strengths including accessibility, the capacity to deliver large amounts of information, the ease and convenience of use, the ability for customers to save time searching for information, and the opportunity for planning staff to reallocate time for other activities. However, some important concerns or weaknesses were also raised. For instance, the use of the Internet as a communication device cannot at this time replace the personal contact and interaction between the planner and the public. As an example, it is difficult to negotiate via the Internet. There is also the issue of access to the Internet. It is reasonable to assume that, currently groups such as people with low incomes or members of ESL communities may not be able to access the Internet in the language available to them. On the technical side, data has to be maintained and updated regularly. This requires dedicated staff. If information types such as digital plans are to be reviewed, this

requires trained staff and the appropriate, possibly expensive, computer hardware and software to handle the information. There is also the issue of information liability. Planning departments have to consider the quality and content of information placed in a public forum. Further, there is the issue of authentication and how planning agencies can determine the validity of information submitted digitally.

Provided these types of issues can be resolved, there are several potential Web-based planning applications that were identified by the survey respondents. From the survey responses, it can be inferred that planners in the municipal arena share a desire to translate the activities associated with the entire development process to the Web. Online project applications, online permit applications, digital plan submission, and permit tracking were a few of the individual suggestions which were used to draw this conclusion. Respondents also suggested the implementation of Web-GIS, the use of the Internet to perform surveys, and simply, the provision of more planning and planning process information to the public.

Obviously, there are several prerequisites that have to be met in order for these types of applications to be developed. As noted by the survey respondents, there is a need for money, technical expertise, time, and the appropriate hardware and software. Furthermore, some very important issues were raised. For instance, in the public sector it may be difficult for planners to proceed

quickly with Internet technology development without "political will" and the support of councils. One of the respondents suggested the need for "secure" systems. Whenever there is the ability to access internal databases and transfer information, there is the potential for data to become corrupted. Hence, security systems have to be implemented and monitored in order to protect the integrity of data. This is dependent on the technical expertise of staff. Another respondent mentioned "system and process development". This may refer to the technical process of creating Internet applications and is likely what the respondent intended. However, the response can be read differently and interpreted to mean that there is a need for a concise planning process when an agency intends to develop Internet applications. This process may involve performing a needs assessment, determining organizational requirements, and collecting public input. This is one issue that is particularly important. Unfortunately, there is currently a limited amount of planning process information available to agencies wishing to develop Web sites or Internet applications.

The process of performing the survey also identified some of the potential difficulties in using the Internet as a research tool. To reiterate, of the one hundred and sixteen surveys that were sent out, thirty-six failure messages were received, and twenty-six surveys were completed. Removing thirty-six surveys from the survey pool yields a response rate of thirty-three per cent. For a typical mail-out survey, this would probably be considered a healthy response rate. However, for an Internet survey, the researcher believes that the response rate

could have been higher. This may be due to the reasons already mentioned although it reflects the need to have a good understanding of how online surveys function. In retrospect, more thought may have been given in the selection of the survey pool. Despite the difficulties with this type of survey, it was both an interesting and educational experience. In the future, online surveys may become quite common especially due to the fact that they can be distributed and returned much more quickly than typical surveys.

CHAPTER 6

CONCLUSION

6.1   PROJECT OVERVIEW

This research project has been an attempt to investigate the emergence of the Internet in municipal planning prior to the year 2000 and during the period beginning in April of 1999 and ending in September of 1999. The general intent was to develop some guidelines for implementing Internet-based planning applications and it is the researcher's belief that the project has succeeded in satisfying this intention. During the course of the research, the potential of the Internet has been examined with respect to practical applications in planning agencies. This may allow planners to realize what is possible for their agencies in the future. The planning, design, and implementation considerations that have been identified may inform the Web development process and provide some guidelines for planning agencies embarking on Web development activities. Another dimension was added to the research with the responses collected from the planners who participated in the online survey. They introduced some important information regarding the capacity of their organizations to embark on the development and application of Web technology. They also raised some critical issues concerning the obstacles to the implementation of Web technology both inside their organizations and in the municipalities for which they are responsible. Most importantly, the research revealed that planners are

interested in the use of the Internet within their organizations and are optimistic about how it may be used in the future.

6.2   SUMMARY OF RESULTS

It is evident, simply by visiting a variety of municipal Web sites, that the Web is already being used for many different types of planning activities. There are sites that provide basic information such as meeting schedules, agendas, and minutes or municipal code information or information about planning services. There are also sites that are interactive and involve the use of GIS technology or transactive forms to help users find spatially related information such as parcel data.

From the survey results, one can infer that municipal planners are supportive of the use of Internet technology in their agencies. Generally, they view the Internet as a mechanism to increase the degree of communication with customers. Not only can a large volume of information be distributed to customers but information can also be gathered through the use of online surveys or email. The Internet can also be a tool that increases an agency's efficiency by effectively providing customers with planning, development and information services while recovering time for staff to work on priority activities.

Planners' concerns about the use of the Internet seem to relate mainly to the financial costs of the technology and to a lesser degree, the lack of time,

awareness, technical expertise, and motivation required to implement Internet-based applications. It also seems as though a degree of awareness by both planners and elected officials is necessary before the Internet can become a significant tool for public agencies.

One important outcome of the research, which evolved from the results of the survey and from speaking with Chris Ryder at the City of Pasadena, is that there is a need for an organized and methodical planning process in the development and implementation of planning Web sites. Pasadena provides one example (see Appendix B) and the user-centred approach described in Chapter 3 provides another. However, it does not appear that such methodologies have been adequately documented as they relate to the creation of planning Web sites. This is undoubtedly due to the extreme youth of the World Wide Web.

On a positive note, with the tremendous growth of the Internet and related computer technology, new applications for Internet-based planning will surely emerge. Public exposure to, acceptance of, and demand for Web technology will undoubtedly be forces that drive the implementation of such applications in municipal agencies.

6.3 EVALUATION OF THE RESEARCH PROCESS

This research project has evolved over the course of several months, and not without difficulty. There have been both technical challenges and motivational

challenges. It has also been difficult to remain committed to the original project statement. As the body of knowledge grew while performing this research, it became difficult to stay focused and follow the original research objectives. Having new information made it tempting to pursue avenues that were tangential to the intended research.

Another difficulty was realizing late in the research process that there are things that could have been done differently, particularly in the development and delivery of the survey for this research project. In this case, more time and effort could have been devoted to ensuring that the survey would have been received by a greater number of people. For example, the survey could have been hosted on a Web server rather than being physically sent to respondents. Instead, the individuals targeted could have been sent a simple text message via email informing them of the location of the survey if they were interested in participating. This may have generated a better response rate, particularly from the ScenarioPlus subscribers.

A greater effort could have been made to identify planners working within organizations where Internet usage was not prevalent or existent. It can be assumed that because the survey was Internet-based, the planners who participated were already using the Internet within their organizations. Those individuals who responded may also have had a high level of technical expertise or interest in using the Internet. This may have been the impetus for their

participation in the survey. Hence, alternative mechanisms for distributing the survey, such as mail or facsimile, could have been used to include those agencies who did not have access to the Internet or who may have had adverse opinions about using the Internet within their organizations. Such a process may have effectively yielded more substantial or possibly even different results.

Retrospectively, the research focused on current applications of the Internet in municipal planning but failed to explore some of the possible and more innovative uses. One possible innovative use of the Internet might be live video-conferencing during public meetings where planners can elicit real-time feedback from constituents who can not choose to not be physically present. Another possible innovative use might be an on-line design workshop where groups including planners and the public can work together to develop design strategies. This can be accomplished independently of temporal and spatial barriers. One other area of technology that deserves mention is virtual reality. It might be tremendously beneficial to allow members of the public to utilize the Internet in order to experience a place in virtual reality prior to it being physically created or altered. Adding a three-dimensional quality might allow people to better understand and evaluate a development proposal. The survey, itself, could have been more specialized to identify potential uses such as these and may have generated a greater amount of feedback regarding the role of the Internet in municipal planning in the future. In this particular case, the research was more beneficial with respect to how the Internet is being used currently.

6.4 RECOMMENDATIONS FOR FURTHER STUDY

There are a number of recommendations and ideas that have been generated as a result of the research process. These relate to the technical aspect of the research as well as the content and scope of the research.

Regarding the technical aspect, the primary vehicle for conducting the research was an Internet-based survey developed using HTML. Since the survey was developed and conducted, there have undoubtedly been tremendous advances in Internet technology. There are, for instance, software packages available to assist researchers in developing surveys for the Internet which do not require knowledge of HTML programming. Use of such software would be beneficial in making the survey development and distribution processes occur with more speed, ease, and reliability.

This research project has been a preliminary investigation of the viability of using the Internet for planning activities. Using the knowledge gained through this study, a similar and less technically flawed study could be conducted. It would be interesting to compare those survey results with the results generated in this study. Much more specific research could also be undertaken in the future. For example, the same type of process could be applied on a smaller, regional basis. On a microcosmic level, it would be interesting to dissect the planning process applied in individual cases such as with the City of Pasadena or with the Smart

Permits project. These cases provide excellent examples of what is possible with Web development for planning agencies. On a much broader scale, the research process could also be applied to the investigation of the scope of global Internet usage for planning activities.

Detailed studies could also be pursued with respect to the various components of this research paper. For instance, there could be further study of planning process development for implementing Internet-based applications. It would also be useful to closely examine the development review process and how this may be enhanced through the use of the Internet. On a theoretical level, there could be an investigation of the sociological impact of using the Internet for planning-related activities.

This particular study has been conducted from the perspective of the municipal planner and is heavily reliant upon the thoughts and opinions of practicing planners. A logical step in further research of the topic would be to investigate the use of the Internet for planning activities from the perspective of the customer or user. Ultimately, the possibilities of the Internet in planning are vast and more in-depth research is needed to lay the foundation for how planning will occur in the future.

APPENDIX A

THE SMART PERMITS PROJECT

The Smart Permits umbrella project is a good example of a large-scale and complex endeavor to enhance the ability of city governments to communicate with their constituents via World Wide Web technology. Smart Permits is a product of the Joint Venture: Silicon Valley Network, a non-profit regional collaborative, whose charter is "to sustain the economic vitality and quality of life in Silicon Valley" (http://www.jointventure.org). In 1993, Joint Venture produced a document, *Blueprint for a 21st Century Community*, presenting 13 initiatives that Silicon Valley, with more than 1000 community participants, identified as priorities for regional rejuvenation. Smart Permits subsequently emerged from this visionary document as a collaborative effort between private industry and public participants, fueled by the exponential growth in the acceptance and use of the Internet; the numerous technological advancements that have occurred in networking, software and desktop tools; and the demand to streamline the delivery of public services in government.

The Smart Permits project has been an extensive six-year planning process which has involved numerous public and private interests. Additionally, a great deal of time, effort, and money has been injected into the Smart Permits project and this commitment has resulted in tremendous progress for the communities involved. Several cities are in the process of developing or have already

implemented online permitting systems. The communities involved are unique in that they are not only bringing their services to the web, but they have tried to create an open architecture for information sharing to achieve a standardized permitting process for the development industry.

APPENDIX B

THE CITY OF PASADENA PLANNING AND PERMITTING WEB SITE

The City of Pasadena's Planning and Permitting Department launched its web site in September of 1997. The Web site was developed to enhance service delivery to the department's customers by providing access to some services on a twenty-four hour, seven days per week basis. This Web site was designed to offer maximum flexibility in navigation. This includes links to the City of Pasadena homepage, links to the main sections of the Web site and links to related pages. All of the links are consistently in the same place so users can navigate throughout the site quickly and easily. For added flexibility in navigation, users are provided with a search icon on every page. The Planning and Permitting Department homepage (http://www.ci.pasadena.ca.us/planning) opens into seven main sections of the Web site:

1. About the Department

This area is organized by sections of the Planning and Permitting Department to give information about available services, how-to information, as well as pages with an on-line zoning code, general plan, design guidelines, code enforcement issues, graffiti removal, etc.

2. Permit Center

The Virtual Permit Center provides 24-hour access to many of the department's permit services. Customers can download applications, access information, link

to a virtual zoning code and other codes and regulations, learn about the development review process, calculate fees and get instructions on submittal requirements. Forms and applications can easily be printed.

3. What's Going on in Your Neighborhood?

Pasadena is organized, by census tracts, into nine planning areas. Within each area, customers can obtain information about various activities and meetings, such as variances, CUPS, specific plans, zone changes, large controversial projects, or many other planning related activities. They can also find out about planning projects in their area, view the photo gallery, and link to other agencies in the city such as CalTech and the Rose Bowl.

4. Meetings

This section includes links to upcoming agendas and minutes from past meetings for various commissions and public hearings.

5. News/Special Events

A resident or customer can find out about upcoming planning-related news and events that may not be tied to a specific meeting, such as special events, change of hours, tours of historic homes or neighborhoods, added services or requests for proposals.

6. Arts Services

This section provides information about the City's Public Art Program, Artists in

Schools, Community Arts Programs and special cultural events that provide art experiences to residents and visitors. Users can also take a virtual tour of some of the public artwork in Pasadena.

7. Pasadena Film Office

This section includes on-line filming applications and information, historical information, and a scouting library with over seven hundred photographs. This site has greatly enhanced the reputation for filming in Pasadena.

PROJECT OVERVIEW

An intradepartmental project team was formed to design the Web site for the Planning and Permitting Department, with representatives from each department section. Prior to launching the site, the team met weekly for a year to develop standards, collect data, and discuss the overall role and design of the Web site in the community. The team used a process of creating a draft Web site then presenting it to community representatives, including architects, builders, and neighbourhood groups; the feedback received from the community was used to revise the draft site and create a final structure which was used by a consultant to develop the actual pages. The team currently meets as needed to continue the development of the site and to make practical alterations and updates. One difficulty the planning and permitting department has had during the process has been the standardization of the site so that it has the same "look" as other department sites at the City of Pasadena. This has resulted in a great deal of work having to be repeated; the Web master for the Planning and Permitting

Department now utilizes templates so that close to one thousand pages can be easily updated or modified when required.

The second and third phases of the Web site project will establish greater two-way communication links between customers and staff. Ultimately, this site will offer on-line access to real-time property data information with GIS capabilities, as well as increasing the public participation by the community. Currently, the Planning and Permitting Department is developing E-Apply and E-Pay services so that customers can apply and pay for permits online. These services are being created by Tidemark Systems.

Criteria for Success

Pasadena' planning Web site received an award from the American Planning Association in 1998. This achievement was based on the success of the Web site in fulfilling particular criteria. The following is a synopsis of the submission that the Planning and Permitting Department made in competing for the award (Ryder, 2000).

Originality

The Pasadena Planning and Permitting Department Web site is unique in many ways. Whereas many cities and companies hire consultants to create their Web pages, the Planning and Permitting Department Web site was designed by Pasadena planners and staff who understand the department, how it functions

and who their customers are. The staff worked with a City focus group and other city and community representatives to create a Web site where both developers and citizens can easily find the information they need. The most critical decision that staff made was to create a Web site which could respond to the services and questions that customers are looking for, not just a list of departments and their descriptions. Staff also decided to wait to implement a comprehensive Web site instead of creating a few pages early with little information. Staff observed that other cities, and even other departments at the City of Pasadena, had their own web sites, but there were usually few pages, little information, and too many "under construction" images. Staff wanted to make sure that when their site went live, it would be ready for use. Thus far, there has been a tremendous response from customers

Quality

Planners and staff met once a week for a year, developing the overall goals of the Web site and determining who it should be promoted to, how it should look, ease of use, speed of use, and accessibility to different users. The consistency of the pages was a major concern. They did not want customers confused and frustrated when searching for information, so a consistent look was created for all of the pages along with easy navigation tools. Since pages were created by more than one Web team member, the quality and look of the pages was examined thoroughly. This, along with input from staff and the focus groups, helped to develop simple, high quality pages for customers. Staff is continuously

trying to enhance the graphics of the pages. Since graphics can take a long time to download, they are constantly deciding when the extra download time for graphics will be beneficial to the user. If the graphics don't help the user get the information they need, fewer images will be used on the pages. They are also using a program called Webtrends which allows staff to monitor the site and determine which pages are most frequently used and by whom. This should assist in the development of pages in the future. This, along with on-line forms and surveys, will virtually guarantee that the pages will be successful.

Transferability

Plans are underway to include on-line access to parcel-specific property information and eventually GIS applications, so a customer can input an address to find zoning designations, historic information, or a number of other public records. Soon, customers will also be able to print maps and data. Another great aspect of the Web pages is that staff can now refer customers directly to the pages, allowing customers to spend as much time as they need looking up information. This frees up time for staff to work on other projects or to provide a higher quality of service for those customers who need more detailed assistance.

Implementation Effectiveness

The implementation of the Web site is ongoing. After a year of development, the site went live in September 1997 and, since that time, has been updated and improved regularly. The Web team makes weekly updates to the pages to keep

the meetings and other information up to date. The team is currently in the second phase of the project to make the site more interactive. The first Webtrends analysis has been received and the team is looking to see where the results can guide them to make the pages more productive to users. Marketing of the pages has been limited to date but a major campaign will be conducted when the second phase is completed. The film site has marketed their pages separately and has had an outstanding response from the filming industry including a praising article in Location Update, the magazine for Film and Video Production.

Comprehensiveness

One of the guiding principles of Pasadena's General Plan is: Community participation will be a permanent part of achieving a greater city. The team has made every effort to ensure the Web pages serve this principle. Their goal is to present different options to customers to make dealing with the Planning and Permitting department as simple and accessible as possible. All of the pages, as well as the more interactive second and third phases (discussion groups, online comments, surveys, etc.) will expand public participation by allowing direct access from home, office or neighborhood centers. This supports Pasadena's goal of encouraging citizens to actively participate in shaping plans and policies for the City's future.

Appendix C

Survey of Internet Applications in Planning

The purpose of this survey is to gather information and feedback about the use of computers and the Internet in municipal planning organizations. The results of this survey are important to my Major Degree Project, a requirement for completing the Master of City Planning degree at the University of Manitoba. In order to focus the study, I am specifically seeking participation from those individuals working for municipal planning agencies. Individual responses will be kept confidential and no individuals or agencies will be identified without prior consent.

If you are unable to answer any of the following questions, please enter a statement such as "unable to comment" in the boxes provided.

Thank you for your assistance,

Ann Kjerulf, BES, Dipl.T.(GIS)

Background Information:

Name

Job Title

Organization/Department

City/Province

Email Address

Web Address

Phone

1. What percentage of time is spent by your organization on the following planning activities?
Please provide an approximate breakdown of a typical work-week.

Responding to Public Inquiries [ ]%   Development Review [ ]%

Permit Processing [   ]% Report Preparation [   ]%

Plan Preparation [   ]% Research [   ]%

Map Production [   ]% GIS Analysis [   ]%

Site Inspection [   ]% Meetings [   ]%

Please indicate any other significant activities and the percentage of time spent on those activities:

[   ]

2. What is the population of the community that you serve? [   ]

3a. Does your organization utilize computers for municipal planning activities?

[   ]yes [   ]no

3b. If yes, please indicate the computer applications and the software used for each application.

[   ]Word Processing [   ]

[   ]Database Management [   ]

[   ]GIS [   ]

[   ]Map Production [   ]

[   ]Computer-aided Design [   ]

[   ]Internet [   ]

[   ]Permit Processing [   ]

Please indicate any other applications and associated software below:

3c. If no, does your organization plan to utilize computers in the future?

yes   no   I don't know

4a. Does your organization utilize GIS?

yes   no

4b. If yes, please identify the uses of GIS in your organization:

4c. If no, does your organization have plans to implement GIS?

yes   no   I don't know

5. Does your organization have the necessary resources to implement Internet-based planning applications?

yes   no   I don't know

6a. Does your organization currently utilize the Internet?

yes   no

6b. If yes, indicate the uses of the Internet in your organization:

- Providing Community Information On-line
- Providing Plans and Documents On-line
- Providing On-line Zoning Information
- Providing On-line Permit Information
- On-Line Permit Application Processing
- Providing Meeting Minutes On-line
- Providing Economic Development Information On-line
- Web-based GIS
- Conducting Research

☐ Conducting On-line Surveys

☐ Conducting Discussion Groups

☐ Transferring Files (ftp)

☐ Email

Please indicate any other applications below:

[text box]

6c. Please comment briefly on the success and usefulness of the Internet applications being used in your organization:

[text box]

6d. If your organization does not currently use the Internet, is there a possibility that Internet-based planning applications may be established in the future?

☐ yes ☐ no ☐ I don't know

7a. Identify the limitations experienced by your organization with respect to the implementation of Internet-based planning applications:
Please answer this question regardless of whether or not your organization is utilizing Internet applications.

☐ Financial Costs

☐ Lack of Technical Expertise

☐ Lack of Motivation or Interest

☐ Lack of Time

☐ Lack of Awareness

Please indicate any other limitations below:

[text box]

7b. Please elaborate on the specific limitations experienced by your organization and, if possible, indicate solutions to these limitations:

8a. Do you feel that the Internet can be a viable tool for planning applications?

yes no

8b. Please explain your answer to 8a. Also, provide your opinions regarding the strengths and weaknesses of Internet applications in planning:

9a. What are the potential applications of the Internet in your organization?

9b. What is required in order for these types of applications to be established?

10. Please provide any supplementary information that you feel may be relevant:

To submit this survey, click here:

Please send questions or comments regarding this survey to ann_kjerulf@yahoo.com.

Ann Kjerulf
University of Manitoba
Department of City Planning

APPENDIX D

HTML SOURCE CODE FOR INTERNET SURVEY

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<BODY>
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Survey of Internet Applications in Planning</FONT></FONT></H1></CENTER>

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to gather information and feedback about the use of computers and the
Internet in municipal planning organizations. The results of this
survey are important to my Major Degree Project, a requirement for
completing the Master of City Planning degree at the University of
Manitoba. In order to focus the study, I am specifically seeking
participation from those individuals working for municipal planning
agencies. Individual responses will be kept confidential and no
individuals or agencies will be identified without prior consent.
</FONT></FONT>

<P><FONT FACE="Arial"><FONT COLOR="#000000">If you are unable to answer
any of the following questions, please enter a statement such as
"unable to comment" in the boxes provided.</FONT></FONT>

<P><FONT FACE="Arial"><FONT COLOR="#000000">Thank you for your
assistance,</FONT></FONT>

<P><FONT FACE="Arial"><FONT COLOR="#000000">Ann Kjerulf, BES,
Dipl.Tech.(GIS)</FONT></FONT><BR>
<HR WIDTH="100%">

<P><B><FONT FACE="Arial"><FONT COLOR="#000000">Background
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1. What percentage of time is spent by your organization on the
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3c. If no, does your organization plan to utilize computers in the
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4b. If yes, please identify the uses of GIS in your organization:
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4c. If no, does your organization have plans to implement GIS?
</FONT></FONT></B>

<P><INPUT TYPE="radio" NAME="4C_GIS_IMPLEMENTATION" VALUE="yes">
<FONT FACE="Arial"><FONT COLOR="#000000">yes 
<INPUT TYPE="radio" NAME="4C_GIS_IMPLEMENTATION" VALUE="no">no
<INPUT TYPE="radio" NAME="4C_GIS_IMPLEMENTATION" VALUE="dont_know">I
don't know</FONT></FONT>

<P><B><FONT FACE="Arial"><FONT COLOR="#000000">
5. Does your organization have the necessary resources to implement
Internet-based planning applications?</FONT></FONT></B>

<P><INPUT TYPE="radio" NAME="5_RESOURCES" VALUE="yes">
<FONT FACE="Arial"><FONT COLOR="#000000">yes 
<INPUT TYPE="radio" NAME="5_RESOUCES" VALUE="no">no
<INPUT TYPE="radio" NAME="5_RESOURCES" VALUE="dont_know">I don't
know</FONT></FONT>

<P><B><FONT FACE="Arial"><FONT COLOR="#000000">
6a. Does your organization currently utilize the Internet?
</FONT></FONT></B>

<P><INPUT TYPE="radio" NAME="6A_CURRENT_INTERNET_USE" VALUE="yes">
<FONT FACE="Arial"><FONT COLOR="#000000">yes 
<INPUT TYPE="radio" NAME="6A_CURRENT_INTERNET_USE"
VALUE="no">no</FONT></FONT>

<P><B><FONT FACE="Arial"><FONT COLOR="#000000">
6b. If yes, indicate the uses of the Internet in your organization:
</FONT></FONT></B>

<P><INPUT TYPE="checkbox" NAME="6B_INTERNET_APPLICATIONS"
VALUE="Community_Information">
<FONT FACE="Arial"><FONT COLOR="#000000">Providing Community
Information On-line</FONT></FONT>
```

```
<BR><INPUT TYPE="checkbox" NAME="6B_INTERNET_APPLICATIONS"
VALUE="Plans_and_Documents">
<FONT FACE="Arial"><FONT COLOR="#000000">Providing Plans and Documents
On-line</FONT></FONT>
<BR><INPUT TYPE="checkbox" NAME="6B_INTERNET_APPLICATIONS"
VALUE="Zoning_Information">
<FONT FACE="Arial"><FONT COLOR="#000000">Providing On-line Zoning
Information</FONT></FONT>
<BR><INPUT TYPE="checkbox" NAME="6B_INTERNET_APPLICATIONS"
VALUE="Permit_Information">
<FONT FACE="Arial"><FONT COLOR="#000000">Providing On-line Permit
Information</FONT></FONT>
<BR><INPUT TYPE="checkbox" NAME="6B_INTERNET_APPLICATIONS"
VALUE="Permit_Applications">
<FONT FACE="Arial"><FONT COLOR="#000000">On-Line Permit Application
Processing</FONT></FONT>
<BR><INPUT TYPE="checkbox" NAME="6B_INTERNET_APPLICATIONS"
VALUE="Minutes">
<FONT FACE="Arial"><FONT COLOR="#000000">Providing Meeting Minutes On-
line</FONT></FONT>
<BR><INPUT TYPE="checkbox" NAME="6B_INTERNET_APPLICATIONS"
VALUE="Economic_Development">
<FONT FACE="Arial"><FONT COLOR="#000000">Providing Economic Development
Information On-line</FONT></FONT>
<BR><INPUT TYPE="checkbox" NAME="6B_INTERNET_APPLICATIONS"
VALUE="Internet_GIS">
<FONT FACE="Arial"><FONT COLOR="#000000">Web-based GIS</FONT></FONT>
<BR><INPUT TYPE="checkbox" NAME="6B_INTERNET_APPLICATIONS"
VALUE="Research">
<FONT FACE="Arial"><FONT COLOR="#000000">Conducting
Research</FONT></FONT>
<BR><INPUT TYPE="checkbox" NAME="6B_INTERNET_APPLICATIONS"
VALUE="Surveys">
<FONT FACE="Arial"><FONT COLOR="#000000">Conducting On-line
Surveys</FONT></FONT>
<BR><INPUT TYPE="checkbox" NAME="6B_INTERNET_APPLICATIONS"
VALUE="Discussion_Groups">
<FONT FACE="Arial"><FONT COLOR="#000000">Conducting Discussion
Groups</FONT></FONT>
<BR><INPUT TYPE="checkbox" NAME="6B_INTERNET_APPLICATIONS" VALUE="FTP">
<FONT FACE="Arial"><FONT COLOR="#000000">Transferring Files
(ftp)</FONT></FONT>
<BR><INPUT TYPE="checkbox" NAME="6B_INTERNET_APPLICATIONS"
VALUE="Email">
<FONT FACE="Arial"><FONT COLOR="#000000">Email</FONT></FONT>

<P><FONT FACE="Arial"><FONT COLOR="#000000">
Please indicate any other applications below:</FONT></FONT>

<P><TEXTAREA NAME="6B_OTHER_INTERNET_APPLICATIONS" ROWS="3"
COLS="70"></TEXTAREA>

<P><B><FONT FACE="Arial"><FONT COLOR="#000000">
6c. Please comment briefly on the success and usefulness of the
Internet applications being used in your organization:
</FONT></FONT></B>
```

```
<P><TEXTAREA NAME="6C_SUCCESS" ROWS="3" COLS="70"></TEXTAREA>

<P><B><FONT FACE="Arial"><FONT COLOR="#000000">
6d. If your organization does not currently use the Internet, is there
a possibility that Internet-based planning applications may be
established in the future?</FONT></FONT></B>

<P><INPUT TYPE="radio" NAME="6D_INTERNET_IN_FUTURE" VALUE="yes">
<FONT FACE="Arial"><FONT COLOR="#000000">yes 
<INPUT TYPE="radio" NAME="6D_INTERNET_IN_FUTURE" VALUE="no">no
<INPUT TYPE="radio" NAME="6D_INTERNET_IN_FUTURE" VALUE="dont_know">I
don't know</FONT></FONT>

<P><B><FONT FACE="Arial"><FONT COLOR="#000000">
7a. Identify the limitations experienced by your organization with
respect to the implementation of Internet-based planning applications:
</FONT></FONT></B>
<BR><I>Please answer this question regardless of whether or not your
organization is utilizing Internet applications.</I>

<P><INPUT TYPE="checkbox" NAME="7A_LIMITATION" VALUE="Financial_Costs">
<FONT FACE="Arial"><FONT COLOR="#000000">Financial Costs</FONT></FONT>
<BR><INPUT TYPE="checkbox" NAME="7A_LIMITATION"
VALUE="Lack_of_Expertise">
<FONT FACE="Arial"><FONT COLOR="#000000">Lack of Technical
Expertise</FONT></FONT>
<BR><INPUT TYPE="checkbox" NAME="7A_LIMITATION"
VALUE="Lack_of_Motivation">
<FONT FACE="Arial"><FONT COLOR="#000000">Lack of Motivation or
Interest</FONT></FONT>
<BR><INPUT TYPE="checkbox" NAME="7A_LIMITATION" VALUE="Lack_of_Time">
<FONT FACE="Arial"><FONT COLOR="#000000">Lack of Time</FONT></FONT>
<BR><INPUT TYPE="checkbox" NAME="7A_LIMITATION"
VALUE="Lack_of_Awareness">
<FONT FACE="Arial"><FONT COLOR="#000000">Lack of
Awareness</FONT></FONT>

<P><FONT FACE="Arial,Helvetica">Please indicate any other limitations
below:</FONT>

<P><TEXTAREA NAME="7A_OTHER_LIMITATIONS" ROWS="3" COLS="70"></TEXTAREA>

<P><B><FONT FACE="Arial"><FONT COLOR="#000000">
7b. Please elaborate on the specific limitations experienced by your
organization and, if possible, indicate solutions to these
limitations:</FONT></FONT></B>

<P><TEXTAREA NAME="7B_SPECIFIC_LIMITATIONS" ROWS="3"
COLS="70"></TEXTAREA>

<P><B><FONT FACE="Arial"><FONT COLOR="#000000">
8a. Do you feel that the Internet can be a viable tool for planning
applications?
</FONT></FONT></B>

<P><INPUT TYPE="radio" NAME="8A_INTERNET_VIABLE" VALUE="yes">
<FONT FACE="Arial"><FONT COLOR="#000000">yes 
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<INPUT TYPE="radio" NAME="8A_INTERNET_VIABLE"
VALUE="no">no</FONT></FONT>

<P><B><FONT FACE="Arial"><FONT COLOR="#000000">
8b. Please explain your answer to 8a.  Also, provide your opinions
regarding the strengths and weaknesses of Internet applications in
planning:</FONT></FONT></B>

<P><TEXTAREA NAME="8B_OPINIONS" ROWS="3" COLS="70"></TEXTAREA>

<P><B><FONT FACE="Arial"><FONT COLOR="#000000">
9a. What are the potential applications of the Internet in your
organization?
</FONT></FONT></B>

<P><TEXTAREA NAME="9A_POTENTIAL_USES" ROWS="3" COLS="70"></TEXTAREA>

<P><B><FONT FACE="Arial"><FONT COLOR="#000000">
9b. What is required in order for these types of applications to be
established?
</FONT></FONT></B>

<P><TEXTAREA NAME="9B_REQUIREMENTS" ROWS="3" COLS="70"></TEXTAREA>

<P><B><FONT FACE="Arial"><FONT COLOR="#000000">
10. Please provide any supplementary information that you feel may be
relevant:
</FONT></FONT></B>

<P><TEXTAREA NAME="10_SUPPLEMENTARY_INFORMATION" ROWS="3"
COLS="70"></TEXTAREA>

<P><B><FONT FACE="Arial">To submit this survey, click
here:</B></FONT><INPUT NAME="SEND_BUTTON" TYPE="submit" VALUE="SUBMIT
SURVEY">
<BR></FORM>

<HR WIDTH="100%">
<BR><FONT FACE="Arial,Helvetica">Please send questions or comments
regarding this survey to <A
HREF="mailto:ann_kjerulf@yahoo.com">ann_kjerulf@yahoo.com</A>.</FONT>
<DIV ALIGN=right><FONT FACE="Arial,Helvetica"> Ann Kjerulf
</FONT></DIV>

<DIV ALIGN=right><FONT FACE="Arial,Helvetica">University of Manitoba
</FONT></DIV>

<DIV ALIGN=right><FONT FACE="Arial,Helvetica">Department of City
Planning</FONT></DIV>

<DIV ALIGN=right><FONT FACE="Arial,Helvetica"></FONT> </DIV>

</BODY>
</HTML>
```

GLOSSARY

Adobe pdf
PDF (Portable Document Format) is a file format that captures elements of a printed document as an electronic image that you can view, navigate, print, or forward to another person. PDF files are created using Adobe Acrobat, Acrobat Capture, or similar products. To view and use the files, the free Acrobat Reader is required, which can be easily downloaded from the Adobe Web Site.

Banner
A banner is either a graphic image that announces the name or identity of a site (and often is spread across the width of a Web page) or an advertising image.

Bookmark
Bookmarks are features of most Web browsers. Frequently accessed links can be saved as bookmarks rather than having to enter a URL each time a site is accessed.

Broken link
A broken link is a hyperlink that no longer directs a user to his or her intended destination. Broken links can occur for several reasons: the server hosting the Web site has shut down temporarily or has been restarted, the Web site has moved to an entirely new server, the file or files have been moved or deleted, or the HTML code for the hyperlink is incorrect.

Browser
A browser is an application program that provides users with a way to look at and interact with information on the World Wide Web. Netscape Navigator and Microsoft Explorer are both examples of browsers.

CGI
The common gateway interface (CGI) is a standard way for a Web server to pass a Web user's request to an application program and to receive data back to forward to the user.

Chat Room
A chat room is a site on the World Wide Web where any number of computer users can type in messages to each other (i.e. chat) in real time, creating an online conversation.

Check box
A check box is a component of an HTML form that allows a Web user to interact with the material on a Web page. For example, the user can click on a box to make a checkmark appear.

Cyberspace

Cyberspace is a term coined by author William Gibson in his novel "Neuromancer". It is currently used to refer to the digital world constructed by computer networks, in particular the Internet

Discussion Group (Board)

This is a general term for any online "bulletin board" where a user can leave and expect to see responses to messages that have been left.

Download

This is a method of transferring files from one computer to another. The most common way of doing this on the Internet is by FTP.

Edit box

This is a component of an HTML form where a user can enter information into a box.

Email

Electronic mail or email is the exchange of computer-stored messages by telecommunication. Email is transferred by SMTP (simple mail transfer protocol).

FTP

File transfer protocol (FTP) is a standard Internet protocol and the simplest way to exchange files between computers on the Internet. Like the Hypertext Transfer Protocol (HTTP), which transfers displayable Web pages and related files, FTP is an application protocol that uses the Internet's TCP/IP protocols. FTP is commonly used to download programs and other files to a home (client) computer from a server.

Form

A form is a section of a Web Page that accepts user input. Forms can be used to solicit user comments and are accompanied by a "submit" button so that the information entered by the user can be sent.

Frames

Frames are multiple HTML files that are presented to a user as a single Web page. When a user requests a Web page that uses frames, the address requested is actually that of the main file that defines the frames; the result of the request is that multiple HTML files are returned, one for each visual section. A typical use of frames is to have one frame containing a selection menu in one frame and another frame that contains the space where the selected (linked to) files will appear.

GIS

A GIS (geographic information system) enables a user to query or analyze a relational database and receive the results in the form of a map.

GIF

Graphic interchange format (GIF) is a common file format for graphic images on the World Wide Web.

Home page

This is the first page on a Web site that acts as the starting point for navigation.

Hyperlink

A hyperlink is a link in an HTML document that contains a URL that allows a user to easily locate other Web resources.

HTML

Hypertext Markup Language (HTML) is the set of "markup" symbols or codes inserted in a file intended for display on a World Wide Web browser. The markup tells the Web browser how to display a Web page's words and images for a user.

Icon

On a Web page, an icon is often a graphical image that represents the topic or information category of another Web page. Frequently, the icon is a hypertext link to that page.

Image Map

In Web page development, an image map is a graphic image defined so that a user can click on different areas of the image and be linked to different destinations.

Internet

The Internet is a worldwide system of computer networks - a network of networks in which a user at any one computer can, if he or she has permission, get information from any other computer (and sometimes talk directly to users at other computers). The Internet was conceived by the Advanced Research Projects Agency (ARPA) of the U.S. government in 1969 and was first known as the ARPANet. The Internet is based on the TCP/IP protocols.

Internet Service Provider

An Internet Service Provider (ISP) is a company that provides various kinds of Internet accounts to organizations and individuals.

Java applet

An applet is a mini-program that can be downloaded quickly and used by any computer equipped with a Java capable browser.

JavaScript

JavaScript is an interpreted programming or script language from Netscape which is used to create short programs such as applets. An example of

JavaScript usage is when a mouse is passed over some text or an image and this causes the text or image to be highlighted or changed in some way.

Link
See hyperlink

List-serve discussion group
A list server (mailing list server) is a program that handles subscription requests for a mailing list and distributes new messages, newsletters, or other postings from the list's members to the entire list of subscribers as they occur or are scheduled. A discussion group may occur via a list server.

Mailing list
A mailing list is a discussion forum where participants subscribe to a list and receive messages by e-mail. See List-Serve discussion group above.

Navigate
Navigation is the act of moving around on the World Wide Web by following hypertext paths or links from one Web page to another.

Network
In information technology, a network is a series of points or nodes interconnected by communication paths. Networks can interconnect with other networks and contain subnetworks.

Newsgroup
A newsgroup is a discussion about a particular subject consisting of notes written to a central Internet site and redistributed through Usenet, a worldwide network of news discussion groups. Usenet uses the Network News Transfer Protocol (NNTP).

Online
When a user is connected to a network, he or she is described as being online.

Protocol
A protocol is a specification that describes how computers will talk to each other on a network.

Pull-down menu
This is another element of a form where a user can click on an arrow a select from a list of choices. Pull-down menus are also vital components of graphical user interfaces such as browsers, for example, where pull-down menus are generally located along the top of of the browser window.

Radio button

Radio buttons are used in forms to indicate a list of items. Only one button can be selected at a time. For example, a user may have a choice to select a radio button to indicate yes, no, or maybe while completing a form.

Search engine

A search engine is a program on the Internet that allows a user to search through massive databases of information. The search engine takes a request for information from a user, compares this request to an index of searchable sites, and returns the results to the user.

Software

Software is a general term for the various kinds of programs used to operate computers and related devices. (The term hardware describes the physical aspects of computers and related devices.)

TCP/IP

The Transmission Control Protocol (TCP) and the Internet Protocol(IP) are protocols that let different types of computers communicate with each other. The Internet is based on this suite of protocols.

Transaction

In computer programming, a transaction usually means a sequence of information exchange and related work (such as database updating) that is treated as a unit for the purposes of satisfying a request and for ensuring database integrity. For a transaction to be completed and database changes to be made permanent, a transaction has to be completed in its entirety. A typical transaction is a catalog merchandise order phoned in by a customer and entered into a computer by a customer representative. The order transaction involves checking an inventory database, confirming that the item is available, placing the order, and confirming that the order has been placed and the expected time of shipment. If this is viewed as a single transaction, then all of the steps must be completed before the transaction is successful and the database is actually changed to reflect the new order.

URL

A Uniform Resource Locator (URL) is the address of a file that is accessible on the Internet. The type of resource depends on the Internet application protocol. Using the World Wide Web's protocol, the Hypertext Transfer Protocol (HTTP) , the resource can be an HTML page, an image file, a program such as a CGI application or Java applet, or any other file supported by HTTP. The URL contains the name of the protocol required to access the resource, a domain name that identifies a specific computer on the Internet, and a hierarchical description of a file location on the computer.

VBScript

VBScript is an interpreted script language from Microsoft that is a subset of the Visual Basic programming language. It is used to create short programs for Web Sites.

Virtual community

A virtual community is a community of people sharing common interests, ideas, and feelings over the Internet or other collaborative networks. A possible inventor of this term and one of its first proponents was Howard Rheingold, who created one of the first major Internet communities, called "The Well." In his book, The Virtual Community, Rheingold defines virtual communities as social aggregations that emerge from the Internet when enough people carry on public discussions long enough and with sufficient human feeling to form webs of personal relationships in cyberspace.

Web GIS

Web GIS allows a remote user to access a relational database of information from a Web server and have the information returned to that user's browser in the form of a map. With Web GIS, the user does not have to have actual GIS software on his or her computer. The user only needs a browser to view the geographic data.

Web site

A Web site is a related collection of Web files that includes a beginning file called a home page. From the home page, the user should be able to access all of the other pages on the site.

World Wide Web

A technical definition of the World Wide Web is: all the resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP).

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PERSONAL COMMUNICATIONS

Dwight Mercer, City of Regina / Scenario Plus Editor (September, 1999)

Chris Ryder, City of Pasadena Planning and Permitting Department (January 27, 2000)

WORLD WIDE WEB SITES

Altavista (Search Site)
<http://www.altavista.com>

Blacksburg Electronic Village
<http://www.bev.net>

CERES
<http://www.ceres.ca.gov>

City of Calgary
<http://www.city.calgary.ab.ca>

City of Edmonton
<http://www.city.edmonton.ab.ca>

City of Freemont
<http://www.ci.fremont.ca.us/>

City of Grande Prairie Cyber City Initiative
<http://www.city.grande-prairie.ab.ca/homepage.htm#CyberCity_Initiative>

City of Houston (Online Permits)
<http://houston.onlinepermits.com>

City of Milpitas
<http://www.ci.milpitas.ca.us>

City of Mountain View
<http://www.ci.mtnview.ca.us/mtnviewhp.html>

City of Palo Alto
<http://www.city.palo-alto.ca.us/splash.html>

City of Pasadena
<http://ci.pasadena.ca.us>

City of Philadelphia Planning Commission
<http://www.libertynet.org/philiplan>

City of San Carlos
<http://www.ci.san-carlos.ca.us>

City of Santa Clara
<http://www.ci.santa-clara.ca.us/>

City of Santa Rosa (Online Permits)
<http://santarosa.onlinepermits.com>

City of Sunnyvale
<http://www.ci.sunnyvale.ca.us>

City of Vancouver, British Columbia
<http://www.city.vancouver.bc.ca>

Cyburbia
<http://cyburbia.ap.buffalo.edu/pairc/>

King County, Washington
<http://www.metrokc.gov>

LUPIN
<http://ceres.ca.gov/planning/index.html>

Lycos (Search Site)
<http://www.lycos.com>

Metacrawler (Search Site)
<http://www.metacrawler.com>

Montgomery County Planning and Inspections Office
<http://www.bev.net/community/montgomery/planning>

Planning Commissioners Journal: PlannersWeb
<http://www.plannersweb.com>

PlanWeb U.K.
<http://www.planweb.co.uk>

Pierce County, Washington
<http://www.triton.co.pierce.wa.us>

Smart Permits Project
<http://www.jointventure.org/initiatives/smartpermit/>