RESEARCH REPORT

An Assessment of Municipal Infrastructure Information Needs

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AN ASSESSMENT OF

Municipal Infrastructure Information Needs

FINAL PROJECT REPORT

prepared for

Canada Mortgage and Housing Corporation
Research Division

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CONSULTING LTD.

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An Assessment of Municipal Infrastructure Information Needs

Executive Summary

Purpose of the Study

The purpose of the study was to investigate the needs of key municipal stakeholders for information on urban infrastructure and identify any impediments pertaining to the dissemination of information on the management, financing, community planning and technological aspects of municipal infrastructure.

In particular, the study was to attempt to identify information gaps and examine issues and problems related to the quality and accessibility of information. The study was also to identify possible information dissemination techniques which may be able to address the gaps in information transfer identified in the survey.

Scope of the Work

The project was composed of three tasks:

1) a survey of municipal infrastructure professionals to identify issues and concerns in the area of information dissemination;
2) a review of possible mechanisms for disseminating information on municipal infrastructure; and,
3) a stakeholder strategic planning meeting to review the preliminary results of the survey and develop a series of recommendations for CMHC and related infrastructure stakeholders.

Survey Methodology

The approach taken was to administer an eight-page questionnaire targeted at 50 municipalities across Canada covering large (over 100,000 inhabitants), medium (50,000 to 100,000 inhabitants) and small municipalities (less than 50,000 inhabitants).

CMHC was interested in obtaining answers to the following questions:

- what types of information are used?
- what sources do respondents rely upon for information?
- are there information gaps and, if so, what are they?
- is the quality of the information acceptable?
- is the information readily accessible?

Survey Results

The project team was able to obtain 51 responses from 39 municipalities. In terms of total respondents who received the faxed survey, this represents a 51 percent response rate. In terms of the total number of municipalities targeted by the survey, it represents a 78 percent participation rate.

Based on the survey results obtained and analyzed in this report, a profile of the "typical" municipal infrastructure professional and their information habits suggests the following. This profile reflects the predominantly technical focus and areas of responsibility of the respondents to the survey.

This individual looks for information on costing issues, technology options, operating and maintenance items and planning and design issues. This individual is often frustrated in obtaining better information in these areas.

In terms of sources of information, this individual relies most often on professional journals, conferences, municipal colleagues and consultants. The most useful information for this individual comes from the same sources, plus training programs. The best medium for information transfer for this individual is judged to be conferences, followed by professional journals and municipal colleagues.

This individual attends between 1 to 3 conferences per year and spends less than 3 hours per week reviewing publications. This person contacts other municipal colleagues at least several times a month and attaches a high value to the opinions, experience and advice of these colleagues.

Information clearinghouses and computerized bulletin boards and information retrieval systems are used only infrequently by this individual. And, finally, this individual is motivated first by quality of information and only secondarily by accessibility and cost.

Information Dissemination Techniques

As part of this study the project team examined types of information dissemination mechanisms and developed a short profile of several examples for each type. The study focused on those types of mechanisms which might be appropriate for a new national initiative in information dissemination.

An Appendix discusses a wide range of mechanisms and the report summarizes five generic types: codes and standards, education and training, publications, information clearinghouses and computer networks and databases. Some of the types examined, such as publications or codes and standards, are tried and true methods of technology transfer. Others, such as clearinghouses and computer networks are emerging approaches to information dissemination.

Focus Group Recommendations

The results of the survey and the brief examination of potential new initiatives in information dissemination raise several issues. These formed the basis of discussion at a focus group session with key stakeholders in the municipal infrastructure field, held on April 7, 1995.

The information gathering and dissemination habits of the focus group attendees tended to reflect the results of the survey as a whole. The principal information sources they rely on are publications, conferences, and other municipal colleagues, which corresponds well with the findings of the survey. However, in one key area — the use of computers and computerized information networks — the focus group participants indicated a willingness to accelerate the use of this information dissemination technique.

It was agreed that the *Internet* computerized information network is likely to be the best long-term vehicle for the dissemination of topical, current information on all municipal issues, including infrastructure. The discussion then centered on identifying who should be responsible for accelerating the use of the Internet by municipal infrastructure professionals and what the next steps should be to accomplish this.

The following groups or organizations were suggested: CMHC, Association of Municipalities of Ontario (AMO), Federation of Canadian Municipalities (FCM), Intergovernmental Committee on Urban and Regional Research (ICURR), the American Water Works Association (AWWA), the Transportation Association of Canada (TAC) and the Canadian Public Works Association (CPWA). Some thought that FCM would be the best umbrella organization to provide his consolidated information dissemination service Canada-wide. Others thought ICURR was better positioned, because it already is in the information collection, storage and dissemination business.

It was suggested that ICURR might be able to provide a web site on the Internet which could act as a one-window gateway or main index to all municipal services, starting from the generic and subdividing down to the specific. In this way, ICURR could then offer its web site to all the other municipal information providers (FCM, AMO, CWWA, TAC, CPWA etc.) as a kind of on-line Internet clearinghouse.

An alternative option that was suggested would see discussion groups attached to specific issues on an Internet web site bulletin board where interested parties could quickly access the information they are trying to find or, alternatively, state their problem and see if there are any "hits" offering solutions. This discussion group could act as a kind of gateway itself, plugging browsers into other sources of information, such as references to other municipalities (case studies), other networks, or publications and reports.

To test the feasibility of whether this service would work, it was recommended that CMHC, which provides 50 percent of ICURR's funding, invite the major municipal information suppliers to a similar roundtable discussion to explore the idea in more detail. The focus group recommended that the information suppliers listed on the following page be invited to the roundtable:

- Intergovernmental Committee on Urban and Regional Research (ICURR);
- American Water Works Association (AWWA);
- Transportation Association of Canada (TAC);
- Canadian Public Works Association (CPWA);
- Association of Municipalities of Ontario (AMO);
- Federation of Canadian Municipalities (FCM);

CMHC, possibly through the auspices of ICURR, could play a lead facilitation role in bringing all the key municipal information providers to the table for a discussion about municipal information dissemination in general and Internet options specifically. The list of players should include those identified by the April 7 information users focus group. To that list should be added the following organizations or agencies.

- Centre for Expertise and Research on Infrastructure in Urban Areas (CERIU);
- Canadian Urban Transit Association (CUTA);
- The Road Information Program (TRIP) of Canada;
- Urban Development Institute (UDI);
- Canadian Water and Wastewater Association (CWWA);
- Canadian Association of Municipal Administrators (CAMA); and,
- Canadian Institute of Planners (CIP).

It might also be appropriate to invite representatives from the provincial ministries of municipal affairs who, collectively, provide the other 50 percent of ICURR's funding.

Évaluation des besoins d'information sur les infrastructures municipales

Résumé

Objet de l'étude

L'objet de cette étude était d'évaluer les besoins des principaux intervenants municipaux en information sur l'infrastructure urbaine et de cerner tous les obstacles relatifs à la diffusion de cette information sur la gestion, le financement, la planification communautaire et les aspects technologiques de l'infrastructure municipale.

L'étude devait, en particulier, repérer les carences et évaluer les questions et problèmes liés à la qualité et à l'accessibilité de l'information. Elle devait également évaluer d'éventuelles techniques de diffusion de l'information susceptibles de combler les lacunes en matière de transmission relevées lors de l'enquête.

Portée de l'étude

Le projet comportait trois objectifs :

1) un enquête auprès des professionnels de l'infrastructure municipale afin de déterminer les questions et les problèmes relatifs à la diffusion de l'information;
2) une étude des mécanismes disponibles pour diffuser l'information sur l'infrastructure municipale;
3) une réunion de planification stratégique des intervenants afin d'examiner les résultats préliminaires de l'enquête et de proposer une série de recommandations à la SCHL ainsi qu'aux intervenants intéressés.

Méthodologie de l'enquête

On a distribué un questionnaire de huit pages, d'un bout à l'autre du Canada, à 50 municipalités de grande taille (plus de 100 000 habitants), de taille moyenne (de 50 000 à 100 000 habitants) et de petite taille (moins de 50 000 habitants).

La SCHL désirait obtenir des réponses aux questions suivantes :

- Quels types d'information sont utilisés?
- À quelles sources d'information les répondants se fient-ils?
- Existe-t-il des carences en matière d'information et, si tel est le cas, quelles sont-elles?
- La qualité de l'information est-elle acceptable?
- L'information est-elle facilement accessible?

Résultats de l'enquête

L'équipe de projet a reçu 51 réponses de 39 municipalités avant la date limite. Par rapport au total des répondants qui ont reçu le questionnaire par télécopieur, cela représente un taux de réponse de 51 %. Du point de vue du total des municipalités ciblées par l'enquête, on arrive à un taux de participation de 78 %.

Les résultats de l'enquête analysés dans le présent rapport permettent de dresser un profil du professionnel type travaillant dans le domaine de l'infrastructure municipale, de connaître ses habitudes dans l'utilisation de l'information et de tirer des conclusions, lesquelles sont présentées ci-dessous. Ce profil fait ressortir le caractère technique des intérêts et des sphères de responsabilité des répondants.

Cette personne, donc, recherche de l'information sur l'établissement des coûts, les possibilités technologiques, l'exploitation et l'entretien ainsi que sur les questions de planification et de conception. Elle est souvent frustrée de ne pas pouvoir obtenir une meilleure information dans ces secteurs.

En ce qui concerne les sources d'information, cette personne utilise souvent les journaux professionnels, les congrès, les collègues dans les autres municipalités et les experts-conseils. L'information la plus utile pour cette personne provient de ces mêmes sources ainsi que des programmes de formation. Les meilleures façons de transmettre de l'information à cette personne sont les congrès, suivis des journaux professionnels et des collègues.

Cette personne assiste à 1 à 3 congrès par année et consacre moins de 3 heures par semaine à lire des publications. Elle communique avec des collègues municipaux au moins plusieurs fois par mois et accorde une grande valeur à leurs opinions, leur expérience et leurs conseils.

Les centres d'information, les babillards électroniques et les systèmes informatisés de recherche documentaire sont peu utilisés par cette personne. Enfin, cette personne est d'abord motivée par la qualité de l'information et, ensuite, par son accessibilité et son coût.

Techniques de diffusion de l'information

Dans le cadre de cette étude, l'équipe de projet a examiné divers mécanismes de diffusion de l'information et élaboré plusieurs courts exemples de chaque type. L'étude a mis l'accent sur les mécanismes qui pourraient être utilisés dans le contexte d'une nouvelle initiative de diffusion de l'information à l'échelle nationale.

On trouvera en annexe une discussion portant sur un large éventail de mécanismes, répartis en cinq groupes types : codes et normes, éducation et programmes de formation, publications, centres d'information, réseaux informatiques et bases de données. Certains des types examinés, comme les publications, les codes et les normes, constituent déjà de vraies méthodes de transfert de technologie bien implantées. D'autres, comme les centres d'information et les réseaux informatiques, sont nouvelles en matière de diffusion de l'information.

Recommandations du groupe de travail

Les résultats de l'enquête et un bref aperçu des nouvelles initiatives dans le domaine de la diffusion de l'information ont soulevé plusieurs questions qui ont été au centre des discussions d'un groupe de travail composé d'intervenants du domaine de l'infrastructure municipale, lequel s'est réuni le 7 avril 1995.

Les habitudes de cueillette et de diffusion de l'information des participants au groupe de travail tendaient à confirmer les résultats généraux de l'enquête. Les principales sources d'information auxquelles ils ont recours sont les publications, les congrès et les collègues des autres municipalités, ce qui reflète bien les conclusions de l'enquête. Cela dit, pour un secteur clé, c'est-à-dire l'emploi des ordinateurs et des réseaux informatiques, les membres du groupe de travail se sont dit prêts à accélérer l'usage de cette technique de diffusion de l'information.

Les participants se sont entendus pour dire que, à longue échéance, le réseau d'information électronique «Internet» sera vraisemblablement le meilleur véhicule de diffusion d'information d'actualité sur toutes les questions municipales, y compris les infrastructures. Les participants se sont alors demandés à qui il incomberait d'accélérer l'utilisation d'Internet par les professionnels de l'infrastructure municipale et quelles mesures devraient être prises prochainement pour y parvenir.

Les groupes ou organisations suivants ont été mentionnés à cet égard : la SCHL, l'Association des municipalités de l'Ontario (AMO), la Fédération canadienne des municipalités (FCM), le Comité intergouvernemental de recherches urbaines et régionales (CIRUR), l'American Water Works Association (AWWA), l'Association des transports du Canada (ATC) et l'Association canadienne des travaux publics (ACTP). Certains estimaient que la FCM serait le meilleur organisme parapluie susceptible de fournir, à la grandeur du Canada, ce genre de service complet de diffusion d'information. D'autres étaient d'avis que le CIRUR était le mieux placé parce que ses activités consistent déjà à recueillir, à emmagasiner et à diffuser de l'information.

On propose que le CIRUR établisse un site Web sur Internet, de manière à servir de noeud ou d'index principal pointant sur tous les services municipaux, du générique jusqu'au spécifique. Ainsi, le CIRUR pourrait offrir son site Web à tous les autres fournisseurs d'information dans le monde municipal (FCM, AMO, ACEPU, ATC, ACTP, etc.) qui deviendrait une sorte de centre d'information en direct sur Internet.

Une autre possibilité consisterait à rattacher des groupes de discussion sur des sujets précis à un babillard installé sur un site Web d'Internet où les personnes intéressées auraient rapidement accès à l'information qu'elles recherchent ou pourraient signaler leur problème dans l'espoir qu'un autre «internaute» leur fournisse la réponse. Ce groupe de discussion pourrait servir de porte d'accès en soi, puisque les «surfeurs» pourraient s'y voir aiguillés vers d'autres sources d'information comme des références concernant d'autres municipalités (études de cas), d'autres réseaux, des publications ou des rapports.

Pour mettre à l'essai la faisabilité de ce service, on a recommandé que la SCHL, d'où provient la moitié des subventions du CIRUR, invite les principaux fournisseurs d'information dans le secteur municipal à une table ronde similaire visant à explorer à fond cette idée. Le groupe de travail a suggéré que les fournisseurs d'information énumérés ci-dessous soient invités à cette table ronde :

- o Comité intergouvernemental de recherches urbaines et régionales (CIRUR)
- o American Water Works Association (AWWA)
- o Association des transports du Canada (ATC)
- o Association canadienne des travaux publics (ACTP)
- o Association des municipalités de l'Ontario (AMO)
- o Fédération canadienne des municipalités (FCM)

La SCHL, possiblement sous les auspices du CIRUR, pourrait contribuer à réunir tous les fournisseurs d'information clés du monde municipal autour d'une même table afin de discuter de la diffusion d'information en général et, plus particulièrement, des possibilités qu'offre le réseau Internet. La liste des intervenants devrait inclure ceux qui ont été proposés lors de la réunion du 7 avril du groupe de travail. À cette liste pourrait s'ajouter les agences ou organismes suivants :

- o Centre d'expertise et de recherche en infrastructures urbaines (CERIU)
- o Association canadienne du transport urbain (ACTU)
- o Programme d'information sur l'état des routes du Canada (PIERC)
- o Institut canadien d'aménagement urbain (ICAU)
- o Association canadienne des eaux potables et usées (ACEPU)
- o Association canadienne des administrateurs municipaux (ACAM)
- o Institut canadien des urbanistes (ICU)

Il pourrait aussi être approprié d'inviter des représentants des ministères provinciaux responsables des affaires municipales qui, ensemble, procurent l'autre moitié du financement du CIRUR.

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Table of Contents

Section 1 — Introduction 1

1.1 Overview 1
1.2 Purpose of the Study 1
1.3 Scope of the Work 1

Section 2 — Survey Methodology 2

2.1 Overview 2
2.2 What Questions Were Asked 3
2.3 How the Questions Were Posed 3

Section 3 — Survey Results 4

3.1 Who Responded to the Survey 4
3.2 Information Needs 4
3.3 Information Sources 6
3.4 Information Quality 13
3.5 Accessibility of Information 15
3.6 Summary 16

Section 4 — Dissemination Mechanisms 19

4.1 Mechanisms 19
4.2 Discussion 21

Section 5 — Results of Focus Group 23

5.1 Introduction 23
5.2 Discussion 23
5.3 Recommendations 26

Appendices

A.1 Participating Municipalities
A.2 Questionnaire
A.3 Sources Relied Upon for Different Types of Information
A.4 Profiles of Information Dissemination Techniques
A.5 Focus Group Attendees
A.6 Preliminary Internet Municipal Index Page

An Assessment of Municipal Infrastructure Information Needs

Section 1
Introduction

1.1 Overview

At a 1992 workshop on urban infrastructure, sponsored by the Canada Mortgage and Housing Corporation (CMHC) and the Canadian Home Builders' Association (CHBA), attendees pointed out that the information which municipalities and others need on urban infrastructure is not always available or accessible. Information required ranges from ways to upgrade and repair, to the costing, planning and financing of infrastructure services.

Responding to these concerns, the Research Division of Canada Mortgage and Housing Corporation released a request for proposal in October of 1994 to retain the services of a consultant to survey the information needs of municipal employees in the broad area of urban infrastructure design, planning, operation and financing.

Infrastructure, in the context of this project, includes **linear types** (roads, sewers and water mains), as well as **treatment facilities** (water plants and sewage treatment plants) and such **community facilities** as parks, arenas, libraries and other municipally-owned buildings.

1.2 Purpose of the Study

The purpose of the study was to investigate the needs of key municipal stakeholders for information on urban infrastructure and identify any impediments pertaining to the dissemination of information on the management, financing, community planning and technological aspects of municipal infrastructure. In particular, the study was to attempt to identify information gaps and examine issues and problems related to the quality and accessibility of information. The study is also to identify possible information dissemination techniques which may be able to address the gaps in information transfer identified in the survey.

1.3 Scope of the Work

The project was composed of three tasks:

1) a survey of municipal infrastructure professionals to identify issues and concerns in the area of information dissemination (Sections 1 through 3 of this report);
2) a review of possible mechanisms for disseminating information on municipal infrastructure (Section 4); and,
3) a stakeholder strategic planning meeting to review the preliminary results of the survey and develop a series of recommendations for CMHC and related infrastructure stakeholders (Section 5).

Section 2
Survey Methodology

2.1 Overview

The approach taken was to survey a representative sample of municipal respondents from one end of Canada to the other. CMHC postulated that information needs might vary with the size of the municipality. Therefore, representatives from large (over 100,000 inhabitants), medium (50,000 to 100,000 inhabitants) and small municipalities (less than 50,000 inhabitants) were surveyed.

The sample had to be large enough to allow a comparison between small and medium/large municipalities. The sample size was determined based on this criteria. Eventually, the project team and CMHC agreed on a sample size of 50 municipalities and to target an average of two respondents per municipality, for a total of 100 respondents. The survey instrument selected consisted of an eight-page questionnaire, developed by the consultant with input from the CMHC project manager.

Two types of respondents, representing two functional groups — technical and non-technical — were targeted in each municipality, pre-selected on the basis of an initial screening conducted by telephone. An initial list of potential respondents was derived from a list of participants who attended the series of National Research Council infrastructure workshops, held in 1992 and 1993.

The intent was to solicit responses from both technical and non-technical respondents. Non-technical respondents included those at a corporate planning level, such as a commissioner of finance or a chief administrative officer, who were responsible for the broader financial planning and debt servicing involving urban infrastructure. One non-technical respondent was chosen from each municipality.

Given the limitations of budget and time, a straightforward method was used to select the type of technical respondent in each municipality. Technical respondents included those with a design or operation and maintenance responsibility in one of three infrastructure areas:

- Linear Facilities (roads, water and sewer distribution systems);
- Treatment Facilities (water supply and wastewater treatment); and,
- Community Facilities (parks, arenas, libraries and other municipally-owned buildings).

Municipalities were grouped according to size: less than 50,000 in population, 50,000 to 100,000 in population and over 100,000 in population.

The objective was to obtain an evenly distributed sample of experts from the three specialty fields across a given group of municipalities within the same size range. This was achieved by simply moving down the list of municipalities within one size range and assigning a technical respondent from one of the three categories in turn.

The project team felt confident that this approach would generate sufficient diversity of responses to meet the broader information gathering and related objectives of the client.

After identifying the respondents, a total of 100 questionnaires were sent by facsimile transmittal to 50 municipal addresses. The list of municipalities is included in Appendix 1. In order to ensure a high response rate, the survey protocol involved extensive use of telephone interviews. The telephone was used at the preliminary stages of the survey to pre-select the most appropriate individuals to respond to the questionnaire.

During this introductory conversation, the purpose of the survey was explained and the respondent was asked to nominate a corresponding technical or non-technical respondent from his or her municipality to respond to the questionnaire.

Then, the questionnaire was faxed to respondents with the understanding that a follow-up phone interview would occur in a few days to record their answers. In the majority of cases, respondents took advantage of the phone interview to complete the questionnaire. However, several of the respondents simply completed the questionnaire and faxed it back to the consultant.

2.2 What Questions Were Asked

CMHC was interested in obtaining answers to the following questions:

- what types of information are used?
- what sources do respondents rely upon for information?
- are there information gaps and, if so, what are they?
- is the quality of the information acceptable?
- is the information readily accessible?

Based on these generic kinds of questions, the project team developed an eight-page questionnaire organized around four broad subject categories: 1) information needs; 2) information sources; 3) quality of the information from all sources; and 4) accessibility of information. A copy of the questionnaire is included in Appendix 2.

2.3 How the Questions Were Posed

In answering these and other questions, participants were able to respond to as many categories as they wished. For example, respondents were free to check off as many information categories as they wished, in indicating which types of information they looked for on a regular basis (see Section 3.2.1 and Chart 1). In addition, the percentages given in most charts reflect the number of respondents who responded to the survey as a whole, not just those who responded to a particular question or category, unless otherwise noted.

Section 3
Survey Results

3.1 Who Responded to the Survey

The survey was sent by fax to 100 potential respondents in 50 municipalities. The project team was able to obtain 51 responses from 39 municipalities before the cut-off date. In terms of total respondents who received the faxed survey, this represents a 51 percent response rate. In terms of the total number of municipalities targeted by the survey, it represents a 78 percent participation rate, which can be considered quite good.

In terms of size of municipality responding to the survey, 10 municipalities (25.5%) were in the < 50,000 population range; 8 municipalities (20.5%) were between 50,000 and 100,000 population; and, 21 municipalities (54%) were in the > 100,000 population range.

Not surprisingly, due to the perception that this was a technical survey, many of the non-technical recipients delegated responding to the survey to a technical subordinate. About 80% of the respondents were classified as technical people. The technical focus of the majority of the respondents should be kept in mind as the reader interprets the results.

3.2 Information Needs

Section 1 of the questionnaire prompted information from respondents about their information needs: a) the types of information looked for in daily decision-making; b) in what areas respondents felt they needed better information; and, c) in what areas respondents felt information was either unavailable or not available in a usable form.

3.2.1 Types of Information Looked For

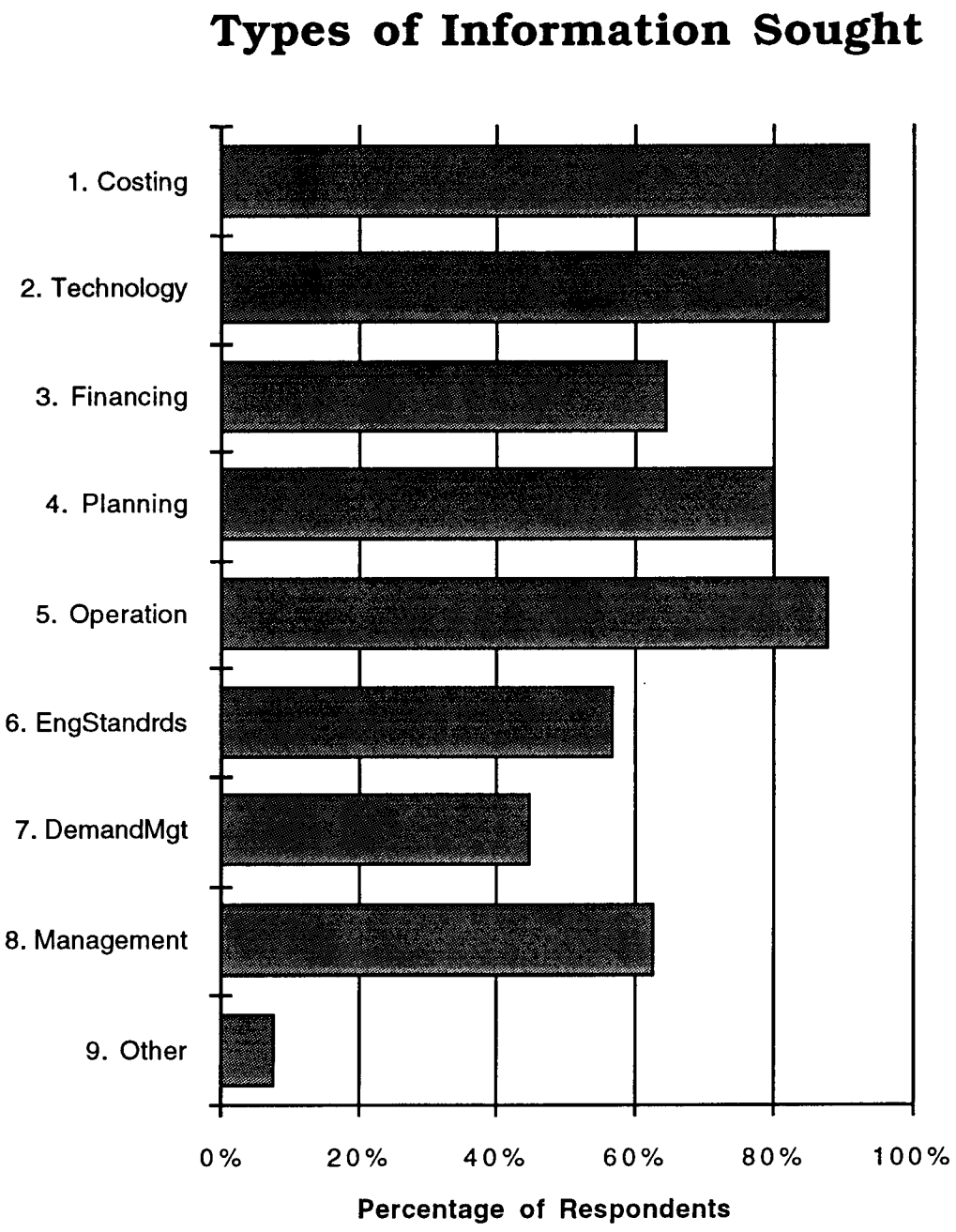
Nine information categories were listed in the questionnaire:

1) costing information
2) technology options (alternative products, materials or designs)
3) financing options (public/private partnerships, special bonds etc.)
4) planning/design issues
5) operation and maintenance information
6) alternative engineering standards
7) demand management options and strategies
8) management systems (GIS, SIMS etc.)
9) other

The top four categories in which information was looked for on a regular basis were: costing information (among 94% of respondents); technology options and O&M information (both with 88%); and planning/design issues (80%) - refer to **Chart 1.**

Financing options, management systems and alternative engineering standards rounded out a middle category of information sources looked for on a regular basis (at 65%, 62% and 58% of respondents, respectively). Demand management information was looked for on a regular basis by 45% of respondents.

Chart 1


Types of Information Sought
1. Costing
2. Technology
3. Financing
4. Planning
5. Operation
6. EngStandrds
7. DemandMgt
8. Management
9. Other
0%
20%
40%
60%
80%
100%
Percentage of Respondents

3.2.2 Areas Where Better Information Is Needed

Respondents were asked to indicate in which categories they needed better information, ranked as to whether the category was: most important; important; or not important. The top three information categories in which respondents indicated it was important or very important to obtain better information were: technology options (73%); costing information (53%); and O&M information (51%). The next three rankings were planning/design issues (45%); management issues (43%) and alternative engineering standards (41%) - **Chart 2.**

3.2.3 Areas Where Information is Not Available

Interestingly enough, while 45% of respondents indicated demand management options and strategies were looked for (and only 34% indicated it as a category needing better information), this category was the highest ranked (at 24%) in terms of those who felt that information was either not available or not available in a usable form to assist them in fulfilling their mandate.

The next highest ranking of information categories where information was not available were financing options, alternative engineering standards and management systems (at, 14%, 12% and 12%, respectively).

3.3 Information Sources

Section 2 of the questionnaire asked respondents about: a) the information sources they currently use; b) the sources they find most useful; and, c) the sources they think are the best medium or method for conveying information.

3.3.1 Information Sources Currently Used

Sixteen information sources were listed in the questionnaire:

1) professional journals
2) trade magazines
3) newsletters
4) professional associations
5) conferences, seminars and workshops
6) training programs
7) technical reports
8) consultants
9) other municipalities
10) federal/provincial governments
11) guidelines and standards
12) universities and research centres
13) municipal reference libraries
14) information clearinghouses
15) computerized networks and data bases
16) other

The sources of information used by most respondents were: professional journals (used by 96% of respondents); conferences, seminars and workshops (96%); other municipalities (92%); consultants (88%); technical reports (80%); codes & standards (80%); trade magazines (78%); professional associations (78%); and training progs. (76%) - **Chart 3.**

Chart 2

Where Better Information is Needed

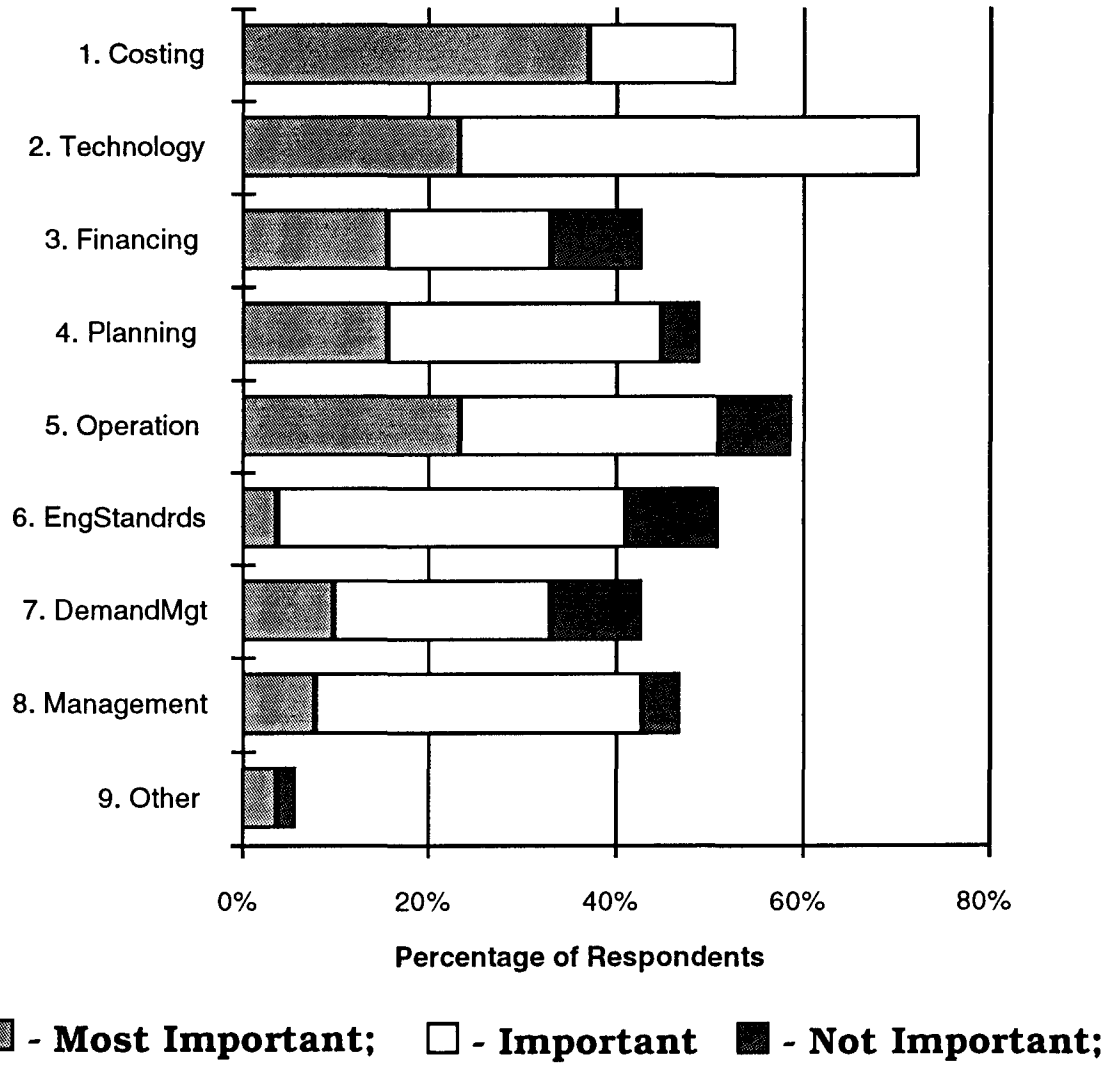
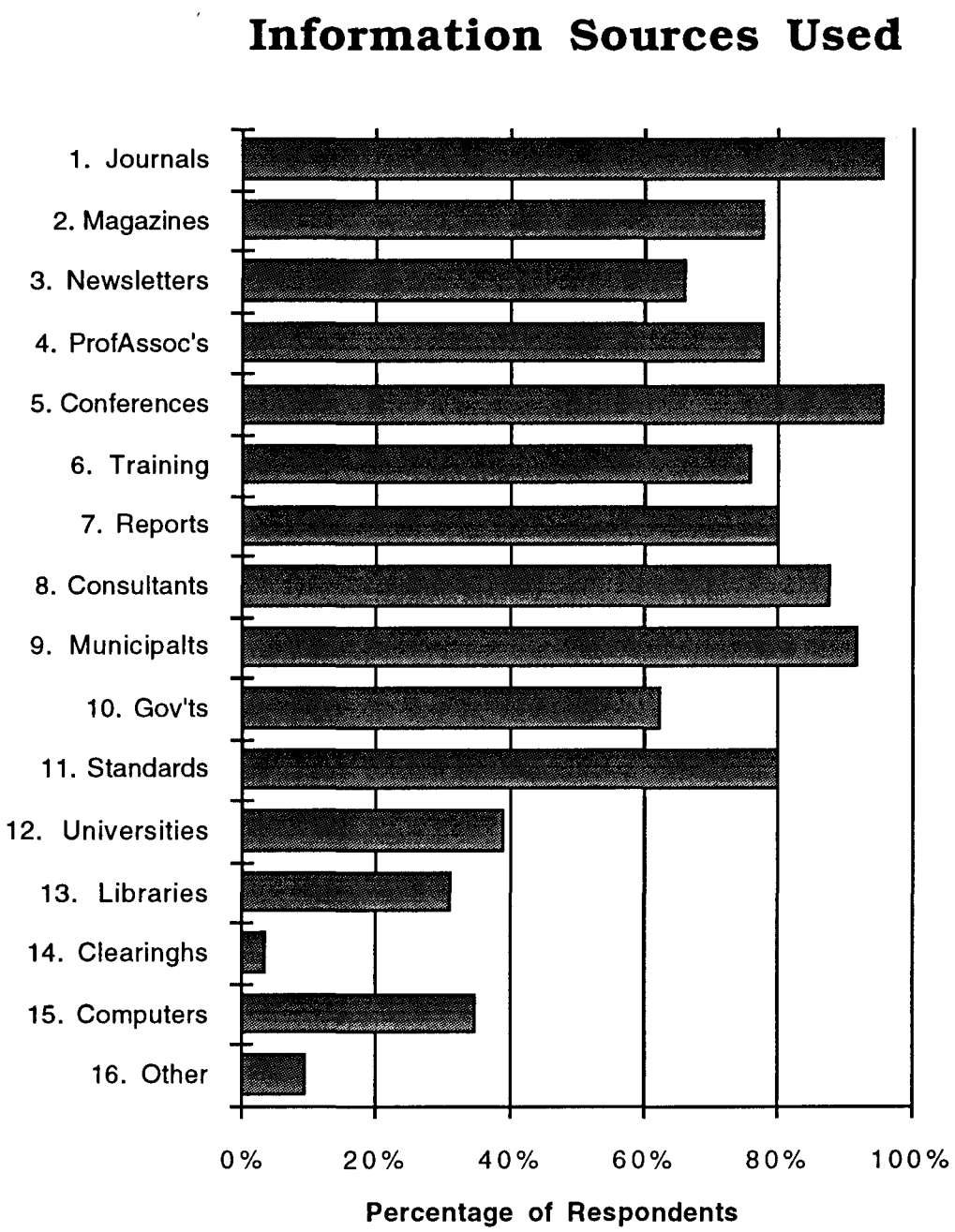


Chart 3


Information Sources Used
1. Journals
2. Magazines
3. Newsletters
4. ProfAssoc's
5. Conferences
6. Training
7. Reports
8. Consultants
9. Municipalts
10. Gov'ts
11. Standards
12. Universities
13. Libraries
14. Clearinghs
15. Computers
16. Other
0%
20%
40%
60%
80%
100%
Percentage of Respondents

In the middle range of information sources used by respondents were: newsletters (used by 67% of respondents) and the federal and provincial governments (63%) - **Chart 3.**

At the low end of the use scale were: university research centres (used by 39% of respondents); computerized networks and data bases (35%) and information clearinghouses (4%) - **Chart 3.** Other categories mentioned included manufacturers and suppliers (4% of respondents), own surveys (4%), word of mouth (2%) and centres for specific expertise (2%).

3.3.2 Information Sources Ranked in Order of Usefulness

Respondents were asked to indicate the usefulness of information sources, ranked on the basis of: most useful; useful; or not very useful. The top category of information sources in which respondents indicated a most useful or useful rank were: conferences, seminars and workshops (indicated by 90% of respondents); professional journals (86%); and, other municipalities, consultants and technical reports (each at 80% of respondents) - **Chart 4.**

In the middle range of information sources ranked useful were: training programs (indicated by 64% of respondents); professional associations (63%); guidelines and standards (61%); trade magazines (59%); and, newsletters (49%) - **Chart 4.**

At the low end of the usefulness scale were: federal and provincial governments (indicated by 41% of respondents); universities and research centres (35%); computerized networks and data bases (32%); municipal reference libraries (20%); and information clearinghouses (6%) - **Chart 4.**

3.3.3 Sources Ranked as Best Medium for Conveying Information

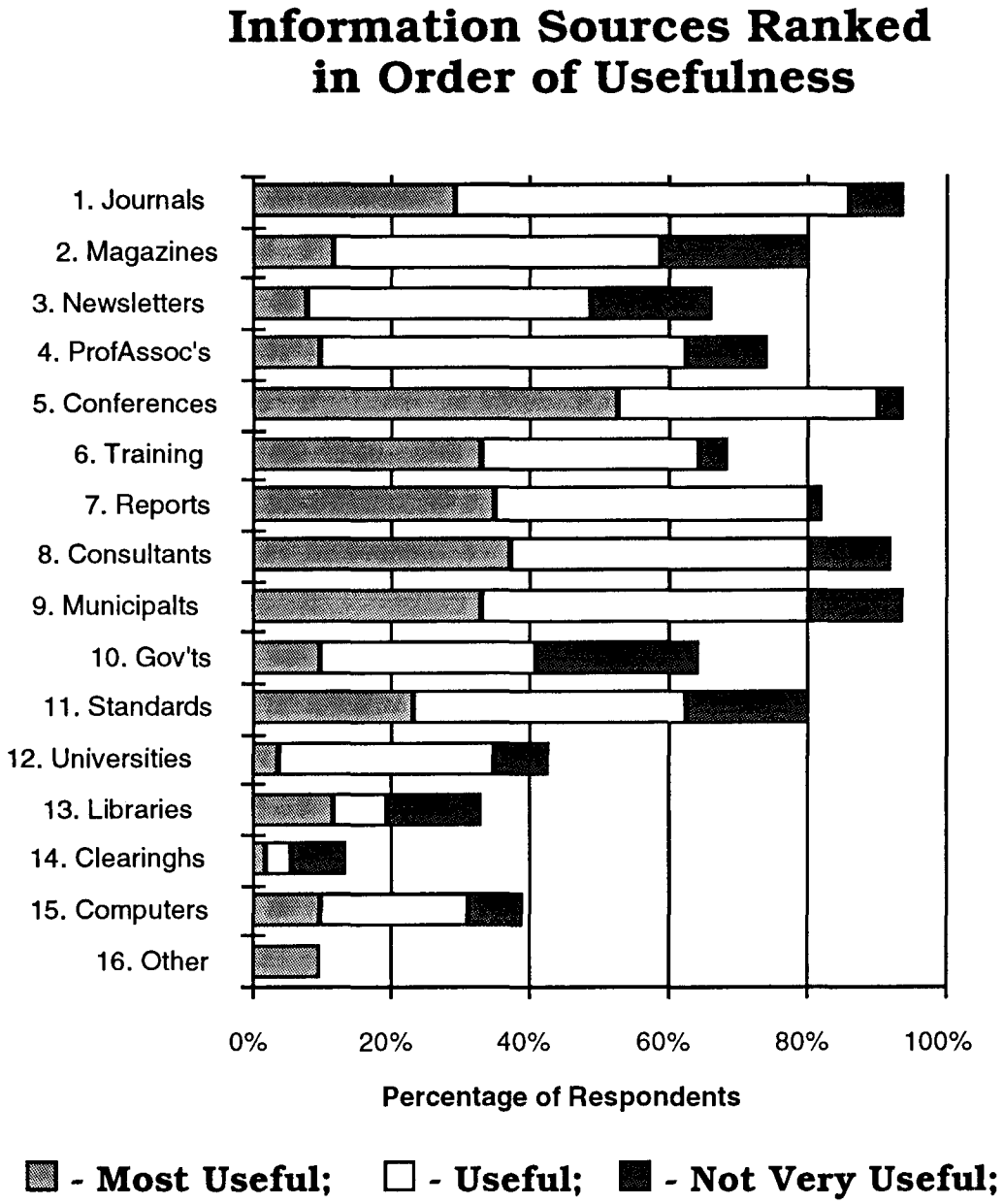
Respondents were also asked to rank which information sources they thought were the best medium for conveying information for their purposes. The top five information sources which respondents identified as either a good or best medium for disseminating information were: conferences and workshops (identified by 80% of respondents); other municipalities (58%); professional journals (56%); and training programs and consultants (both at 51%) - **Chart 5.**

In the middle ranks, such information sources as guidelines/standards, technical reports and trade magazines were identified as either a good or best medium by 49%, 47% and 45% of respondents, respectively - **Chart 5.**

The information sources with the lowest rating as either a good or best medium for information transfer were: professional associations (identified by 34% of respondents); newsletters (24%); the federal and provincial governments (24%); universities and research centres (22%); computerized networks and data bases (20%); and information clearinghouses (6%) - **Chart 5.**

It is interesting to note that the top information sources in terms of usefulness (Chart 4) are also ranked as the best medium for conveying information (Chart 5).

Chart 4


Information Sources Ranked in Order of Usefulness
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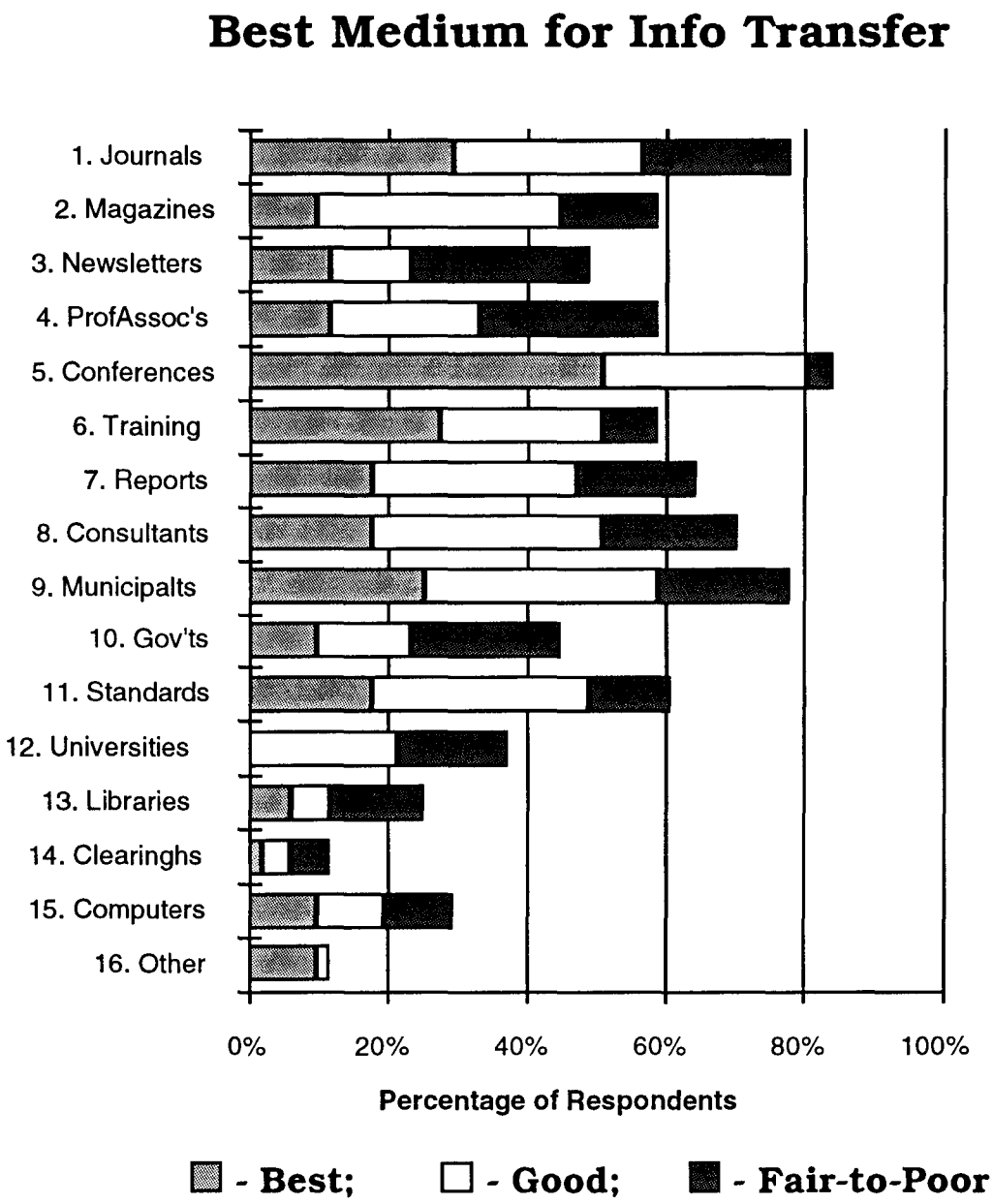
10. Gov'ts
11. Standards
12. Universities
13. Libraries
14. Clearinghs
15. Computers
16. Other
0%
20%
40%
60%
80%
100%
Percentage of Respondents
- Most Useful; - Useful; - Not Very Useful;

Chart 5


Best Medium for Info Transfer
1. Journals
2. Magazines
3. Newsletters
4. ProfAssoc's
5. Conferences
6. Training
7. Reports
8. Consultants
9. Municipalts
10. Gov'ts
11. Standards
12. Universities
13. Libraries
14. Clearinghs
15. Computers
16. Other
0%
20%
40%
60%
80%
100%
Percentage of Respondents
- Best;
- Good;
- Fair-to-Poor

3.3.4 Determining Factors in Choosing Useful Information Sources

Respondents were asked to return to the most useful sources of information previously identified (3.3.2, above) and indicate what the determining factor was in choosing these sources — cost, convenience of access, or quality of information. Quality of information was considered most important by 84% of respondents, followed by convenience of access (31%) and cost (27%).

3.3.5 What Sources Are Relied On For Different Types of Information

Respondents were asked to indicated which sources were relied on for different types of information. A review of the Charts in Appendix 3 indicates that the four main sources relied upon fairly consistently, across all information types, are conferences, seminars and workshops (1st), other municipalities (2nd), consultants (3rd) and professional journals (4th). The information sources least relied upon include information clearinghouses, computerized networks and data bases and municipal reference libraries.

Some types of information seem to be able to draw from a larger range of sources. For example, a greater percentage of respondents reported they could find information on planning/design issues and technology options from several different sources. On the other hand, information on infrastructure costing issues and financing options could only draw from a handful of sources (mostly other municipalities, consultants and conferences, seminars and workshops).

3.3.6 Time Spent at Conferences/Workshops

Conferences and workshops appear to be high on respondents' lists of sources for credible information. Thirty-one percent of respondents reported attending one conference each year, while 55% reported attending between 2 to 3 conferences each year. Eight percent of respondents attended more than 3 conferences or workshops per year.

3.3.7 Time Spent Reviewing Job-Related Publications

Respondents were asked to record how much time in a typical week was devoted to reviewing job-related magazines and publications. Thirty-seven percent of respondents reported spending less than one hour per week reviewing job-related publications. Forty-three percent spent between one to three hours per week reviewing publications, while 16% reported spending between three to five hours per week reviewing publications. One respondent reported spending between five to ten hours per week on this activity.

3.3.8 Time Spent Consulting With Municipal Colleagues

Respondents were asked to indicate how often they consulted with municipal colleagues about infrastructure-related issues. The survey found that 43% of respondents consult with municipal colleagues several times a month. Eighteen percent of respondents consult with municipal colleagues either daily or several times a week. Interestingly enough, only 2% of respondents indicated they never consult with municipal colleagues.

3.3.9 Influence Municipal Colleagues Have on Decision-Making

Based on the responses to 3.3.8 above, respondents were asked to comment on how much influence the information obtained from municipal colleagues has on their decision-making. The survey found that 25% of respondents indicated this information had considerable influence on their decision-making while 65% indicated it had some influence.

3.3.10 The Role of Clearinghouses in Information Dissemination

The survey devoted a series of questions to determining the role of clearinghouses in the dissemination of information on municipal infrastructure. The project team had assumed clearinghouses were a more popular information source among municipal infrastructure professionals. However, as indicated in section 3.3.1 and in Chart 3, information clearinghouses were used by only 4% of respondents.

Further, as revealed in section 3.3.2 (Chart 4), only 6% of respondents considered clearinghouses useful and only 6% ranked them as the best medium for conveying information.

3.4 Information Quality

The survey also asked a series of questions about the quality of the information obtained by infrastructure professionals from all sources and the areas of weakness, if any, in the sources utilized.

3.4.1 Quality of Information From All Sources

Respondents were asked to rank the quality of information obtained from the 16 information sources listed in 3.3.1 as either very good, acceptable or poor - **Chart 6**.

Professional journals were rated very good by 60% of respondents and acceptable by 37%. The major areas of weakness for this information source related to obtaining information that was relevant (noted by 18% of respondents) and in a usable format (18%).

Conferences, seminars and workshops were rated very good by 61% of respondents and acceptable by 29%. The major areas of weakness for this information source related to availability (27% of respondents) and accessibility (31%).

Other municipalities were rated very good by 20% of respondents and acceptable by 67%. The major area of weakness for this information source related to accessibility of information (27% of respondents).

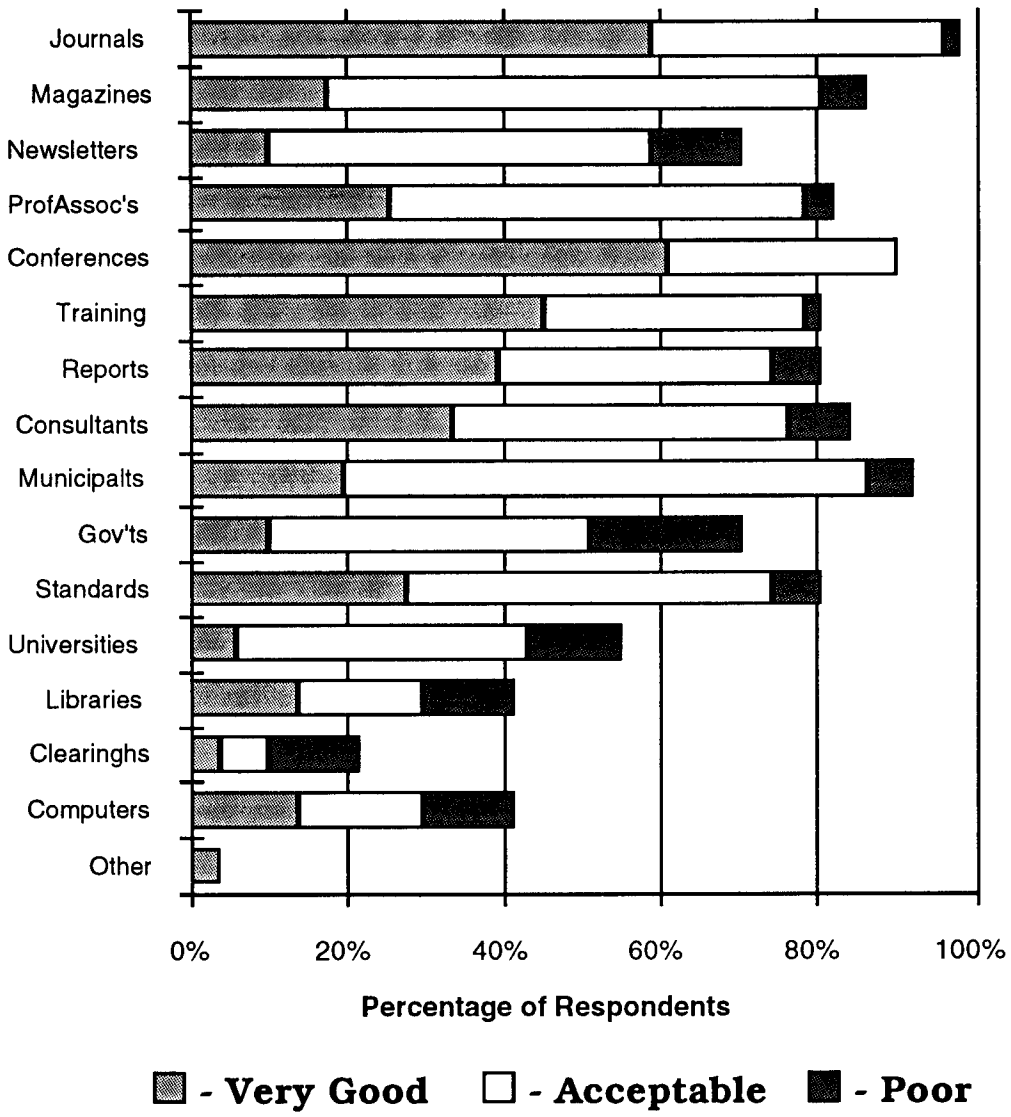
Magazines were rated very good by 18% of respondents and acceptable by 63%. The major area of weakness for this information source related to relevance of the material (noted by 20% of respondents), followed by timeliness (18%) and impartiality (18%).

Consultants were rated very good by 33% of respondents and acceptable by 43%. The major area of weakness for this information source related to impartiality of information (24% of respondents).

Federal and provincial governments were rated very good by only 10% of respondents and acceptable by 41%. Twenty percent of respondents rated the quality of information from federal and provincial governments as poor. The major area of weakness for this information source related to availability of information (noted by 22% of respondents), followed by accessibility (18% of respondents) and relevance (18%).

Chart 6

Information Quality From All Sources



Training programs were rated very good by 45% of respondents and acceptable by 33%. The major area of weakness for this information source related to availability of information (24% of respondents).

Professional associations were rated very good by 25% of respondents and acceptable by 53%. The major areas of weakness for this information source were split between timeliness of the information (noted by 20% of respondents) and the relevance of the information (20% of respondents).

Newsletters were rated very good by 10% of respondents and acceptable by 49%. This information source had one of the best scores, in terms of areas of weakness, with only 14% of respondents reporting that newsletters did not always generate information in a usable format.

Technical reports were rated very good by 39% of respondents and acceptable by 35%. The major area of weakness for this information source related to accessibility of information (18% of respondents).

Guidelines and standards were rated very good by 27% of respondents and acceptable by 47%. This information source also had one of the best scores, in terms of areas of weakness, with only 14% of respondents reporting that guidelines and standards did not always generate information in a usable format. Availability was also a problem for 14% of respondents.

Universities and research centres were rated very good by only 6% of respondents and acceptable by 37%. The major areas of weakness for this information source related to accessibility of information (24% of respondents) and relevance of the information (24%).

Information clearinghouses were rated very good by only 4% of respondents and acceptable by only 6%. The major areas of weakness for this information source related to accessibility of information (12% of respondents).

And, finally, computerized networks and data bases were rated very good by 14% of respondents and acceptable by 16%. The only major area of weakness for this information source related to accessibility of information (22% of respondents).

3.5 Accessibility of Information

A final series of questions asked respondents to identify how accessible information was and what the key limiting factors were in obtaining access to information.

3.5.1 How Accessible is Information on Infrastructure

Respondents were asked if they could readily access information on municipal infrastructure as it relates to their areas of responsibility and mandate. Fifty five percent answered in the affirmative to this question, while 35% answered in the negative.

3.5.2 Key Factors Limiting Accessibility

In an effort to discover what the key barriers are to more effective information dissemination, respondents were asked to comment on the key limiting factors affecting accessibility for each of the 16 information sources listed in 3.3.1. Four limiting factors were identified:

1) Cost of the information;
2) Not knowing what information is available;
3) Not knowing where to find information; and,
4) Not having enough time to find the information.

The top four information sources ranked as most useful (see Chart 4), are discussed below.

With regard to professional journals, the key limiting factor was finding enough time to go through the relevant literature (identified by 43% of respondents). Not knowing what information is available was also noted as a barrier by 37% of respondents, followed by not knowing where to find journals which cover information needed (27% of respondents). The cost of professional journals was seen to be a limiting factor by only 12% of the respondents.

In terms of conferences, seminars and workshops, the key limiting factor is cost (identified by 63% of respondents). In addition, 24% indicated lack of time as a limiting factor.

Consultants are a key source of information for municipal infrastructure professionals, however, 59% of respondents indicated that the cost of consultants was a key limiting factor to utilizing them more often.

With regard to municipal colleagues as a source of information, there was no one limiting factor that stood out. Thirty-seven percent of respondents did indicate that not knowing where to find information on what other municipal colleagues are doing was a limiting factor, followed by time limitations to hunt down the municipal contact (29% of respondents), and not knowing what information on municipal experience in infrastructure is available (27% of respondents).

3.6 Summary

What does this survey tell us about what types of information are used, by whom and from what sources? What is the quality of the information infrastructure professionals are relying upon, how accessible is it and, more importantly, where are the information gaps?

3.6.1 What Types of Information Are Used

Table 1 lists the top three information types sought by infrastructure professionals and correlates them against the most used sources for that type of information.

Table 1	
Types of Information	**Most Used Sources for That Type of Information**
Costing	Municipalities and Consultants
Technology	Journals and Conferences
O & M	Journals and Conferences

3.6.2 From What Sources

Table 2 ranks information sources in terms of: frequency of use; which are regarded as having the best quality of information; which ones are regarded as most useful; and, which are regarded as the best medium for information transfer.

Table 2				
Ranking	**Freq. of Use**	**Quality Info**	**Usefulness**	**Best Medium**
1	Journals	Journals	Conferences	Conferences
2	Conferences	Conferences	Journals	Journals
3	Municipalities	Municipalities	Municipalities	Municipalities
4	Consultants	Training Progs	Consultants	Consultants

3.6.3 Are There Information Gaps

Table 3 summarizes where better information is needed and where information is simply not available.

Table 3	
Better Info Needed	**Information Not Available**
Technology	Demand Management
Costing	Financing
O & M	Management Systems
	Alternative Engineering Standards

3.6.4 Is Information Quality Acceptable

Table 4 summarizes the main areas of weakness in the most popular information sources.

Table 4	
Source	**Areas of Weakness**
Journals	Relevance and Usable Format
Conferences	Availability and Accessibility
Municipalities	Accessibility
Consultants	Impartiality

3.6.5 Is Information Accessible

Table 5 summarizes the main limiting factors for the four top sources of information listed in Chart 3, in terms of information accessibility. Percentages reflect the number of respondents to the survey as a whole. Respondents were free to check off as many limiting factors as they wished.

Table 5				
Source	Cost	What's Available	Where to Find Info	Lack of Time
Conferences	63%	14%	12%	24%
Journals	12%	37%	27%	43%
Municipalities	4%	27%	37%	29%
Consultants	59%	10%	12%	12%

3.6.6 A Profile of the Typical Information User

Based on the survey results obtained and analyzed above, a profile of the "typical" municipal infrastructure professional and their information habits suggests the following. This profile reflects the predominantly technical focus and areas of responsibility of the respondents to the survey.

This individual looks for information on costing issues, technology options, operating and maintenance items and planning and design issues. This individual is often frustrated in obtaining better information in these areas.

In terms of sources of information, this individual relies most often on professional journals, conferences, municipal colleagues and consultants. The most useful information for this individual comes from the same sources, plus training programs. The best medium for information transfer for this individual is judged to be conferences, followed by professional journals and municipal colleagues.

This individual attends between 1 to 3 conferences per year and spends less than 3 hours per week reviewing publications. This person contacts other municipal colleagues at least several times a month and attaches a high value to the opinions, experience and advice of these colleagues.

And, finally, this individual is motivated first by quality of information and only secondarily by accessibility and cost.

Section 4
A Discussion of Information Dissemination Mechanisms

4.1 Mechanisms

As part of this study the project team examined several types of information dissemination mechanisms and developed a short profile of several examples for each type. These profiles are included in Appendix 4. The study focused on those types of mechanisms which might be appropriate for a new national initiative in information dissemination. Some of the types examined, such as publications or codes and standards, are tried and true methods of technology transfer. Others, such as clearinghouses and computer networks are emerging approaches to information dissemination.

4.1.1 Codes and Standards

Canada has considerable experience with using codes and standards as reference points for minimum performance levels. Federal government and other national agencies play an important role in developing standards such as the National Building Code, which may be adopted by provincial and local regulatory agencies.

Increasingly, government agencies and professional organizations are developing guidelines which go well beyond minimum code requirements and which represent current "best practice". Examples relating to infrastructure are Ontario's Guidelines for Alternative Development Standards, Stormwater Management, and Transit Supportive Development.

National examples include the building performance standards developed under the R2000, Advanced Houses and Healthy Housing programs. These initiatives serve to synthesize and "codify" recent developments in technology and applications and make them available to a wider audience through a usable reference document.

The advantages of the codes and standards approach are:

- information is accessible to the end user regardless of their location
- cost is low for the end user
- information is synthesized in one reference document
- from a life/cycle costing perspective, their costs are more than offset by longer term benefits (avoided costs) to society

On the negative side, a considerable investment is required on the part of the sponsoring body to develop an initial set of guidelines or codes and standards, and to provide regular updating as technology and practices evolve. As well, whether the document is a mandatory code or a voluntary guideline, considerable effort is required to get the document into the hands of users and to help them become familiar with it.

4.1.2 Education and Training Programs

In this area, the study focused on special education or training programs which would be undertaken as a professional development activity, rather than full-time academic studies. Special education and training programs may be local or national in scope and may be offered by a research agency, professional association, university or community college.

Some programs, such as the National Research Council's seminar series, are developed as required, to address a specific problem which is occurring in the field, such as durability of parking garages. Others, such as the Building Energy Management Program offered through Energy Training Ontario, support ongoing professional development in the field of building management and operation.

Often education and training programs may be used to support wider application of "best practice" guidelines. The R2000 program is a successful example of this integrated approach, providing initial training leading to certification as well as regular updates.

A major advantage of education and training programs is that information is transferred on a person to person basis. Depending on the design of the program, there may be opportunity for the participant to practice applying new information in an interactive setting.

Cost may be a barrier for some participants, especially considering travel expenses. As well, for education and training programs to be effective, the sponsoring agency needs to carefully identify the intended audience, develop a good understanding of the participants' learning needs and design the curriculum accordingly. This requires good liaison with the appropriate professional organization and considerable development expense.

4.1.3 Publications

Publications, whether journals, magazines or informal newsletters are the standard currency of information transfer. However, the number of publications in a given field is often staggering. For example, there are over twenty titles dealing with water and wastewater issues in North America.

A major advantage of publications is the low purchase price for the end user. Another is that users can access current information regardless of their location.

However, users seldom factor in the time it takes them to review publications as a cost of this method. Regular review as new issues become available is one task, but for periodicals to be a useful source of reference information the user must be able to retrieve information from them. This requires that publications be catalogued and stored appropriately, an activity which requires additional staff time. Some publications are now offering an annual index, either on hard copy or disk, to facilitate this process.

4.1.4 Clearinghouses

Clearinghouses act much like reference libraries, providing information search and retrieval services; but, they often augment this basic function with other services such as distributing publications, publishing a newsletter or operating a toll-free hotline.

Some time ago, clearinghouses were among the first agencies to put bibliographic information on computer. Users typically made an information request by phone or mail, the clearinghouse performed the search, provided hard copy print out of the results and a hard copy of specific documents as requested.

Now that computer use is widespread, clearinghouses are adding on-line access to their database as a service and augmenting this with the creation of bulletin board services (BBS's) or conferences, enabling interaction between users in areas of special interest.

Where a clearinghouse is aggressive in seeking out and obtaining the latest information, it can offer the user timely assistance with particular information requests and it can also provide a "window" into a field through publication of a regular newsletter.

Costs associated with joining a clearinghouse may be a barrier for some municipalities, although basic charges for membership and a newsletter are not prohibitive. A greater barrier to access may be the facilities and costs associated with on-line connection. From a sponsoring agency point of view, the costs of setting up and operating a clearinghouse are considerable. For example, the 1994 budget for the U.S. National Small Flows Clearinghouses is $1.35 million.

4.1.5 Computer Networks and Databases

As describe above, the boundary between clearinghouses and computer networks and databases is blurring as many clearinghouses move to put their database on-line for users. In addition to on-line access, some agencies are putting their database on CD ROM and making it available to member subscribers on an annual subscription basis. Although this option involves greater hardware costs for the user, it could save users considerable expense in access charges.

One additional service often operated by computer networks is the provision of a BBS or conference which enables users from a particular field to contact each other, engage in dialogue and download documents. The latest development in the computer network field is the linkage of various databases and networks around the world, via Internet. Access to Internet is through a computer network. In Canada, these could be commercial services such as Canada Remote Systems or Compuserve, non-profit services such as WEB or the public access network, Freenet.

The main advantage of computer networks is that users, even in remote locations, may readily access information, and perhaps more importantly, carry on a dialogue with their peers. This is an especially important development for a communications dependent country such as Canada.

The transfer to a computer network system for information transfer is likely to be as challenging for institutions as was the advent of personal computers in the workplace. Lead time required to develop skills and familiarity with this new medium will likely be a major barrier to its adoption.

4.2 Discussion

The results of the survey and the brief examination of potential new initiatives in information dissemination raise several issues. These will be the focus of discussion at a focus group session with key stakeholders in the municipal infrastructure field, planned for April 7, 1995.

The overarching question is, of course, " What should an information system for municipal infrastructure professionals look like?" Also, what can national organizations do to help ensure that needed information is getting into the hands of infrastructure designers, operators and decision-makers?

Respondents to the survey indicated that journals and conferences were the best media, but even they posed disadvantages. Journals required too much time to review and it was often not clear where to find the necessary information. Conferences, on the other hand were sometimes prohibitively expensive.

The time required to access journal articles could be reduced through a print or computer based index of articles. The cost associated with conferences also speaks to the use of a computer bulletin board or conference as a less costly way to keep in touch with colleagues.

However, clearinghouses and computer networks were only rarely used by respondents. How could they be made more accessible? What about computer conferences? Could an intermediate step to a large national clearinghouse be to first set up computer bulletin boards, relating to the annual conferences which people already attend, e.g., Canadian Water and Wastewater Association, Canadian Institute of Planners etc.? And then later, to link these through another national organization covering all types of infrastructure?

Should there be a national infrastructure hotline? Is there a role for a new national "digest" in print, to serve as an ongoing index to articles and developments in Canadian infrastructure? Such an omnibus type of publication might be especially useful to smaller municipalities where fewer staff are responsible for many different types of infrastructure.

These and other issues were explored at a stakeholder focus group session held in Toronto, April 7, 1995. The results of this discussion are presented in Section 5.

Section 5
Results of Focus Group Discussion — April 7, 1995

5.1 Introduction

As part of this study the project team invited a cross-section of stakeholders in the municipal infrastructure field to attend a discussion meeting. The purpose of the meeting was to: review the findings of the survey; discuss what needs to happen to overcome the key barriers to the dissemination of information identified in the survey; and, develop a series of recommendations for CMHC for future activity in this area.

There were nine attendees at the session — seven of the nine were representatives from municipalities and the remaining two were from the federal government. The list of attendees is attached as Appendix 5.

The session began with a brief summary of the results of the survey, in which all the municipal attendees had participated. It was pointed out that while journals, conferences and municipal colleagues were ranked highly by respondents to the survey, clearinghouses and computerized information networks and data bases generally got low rankings.

The general response from the focus group was that clearinghouses which produce a newsletter have to compete with other, more established print sources, such as the American Water Works Association's (AWWA) *Journal* or *Municipal Public Works*.

5.2 Discussion

Participants spent a considerable amount of time during the session discussing the problems associated with obtaining and processing information in carrying out their mandates. The principal information sources they rely on are publications, conferences, and other municipal colleagues, which corresponds well with the findings of the survey.

The key limiting factor in accessing information for this group, as for the respondents to the broader survey, is one of *time*. Whether they are endeavouring to solve an immediate problem or seeking broader based information or conducting research (e.g., for justifying expenditures), there was some frustration evident in the realization that municipal colleagues somewhere out there in the real world have probably already dealt with the issue. The real frustration was wasting time reinventing the wheel.

Networking with municipal colleagues was identified by session participants as a valuable way to exchange information and experience and to find out what's already been done in solving recurring problems. Case studies of municipal experiences with new practices and procedures were given high value by session attendees. This corroborates the findings of the broader survey which noted that the experiences of municipal colleagues carried a lot of weight in decision-making about infrastructure choices.

The question was then raised, what is the best way to overcome this time constraint problem while also improving on the way information is made available to practitioners. It was agreed that the sheer volume of print materials and publications generated in any given month was often inimical to the very purpose intended, namely, information transfer. No one seemed to have the time to find the information they were looking for, let alone find the time to read it.

The discussion then centred around the potential of the personal computer in general and the Internet information network in particular to solve some of these problems. While most or all attendees were using personal computers in their day-to-day business, two reported that there were disparities in technology across jurisdictions. In one case, a participant indicated that he knew of an instance where colleagues in a neighbouring municipality had no access to a fax machine, although key staff did have access to personal computers.

At the other end of the electronic data interchange spectrum, one municipality reported they were using the Internet as a basic business development and communications tool. This use extends to basic information retrieval and dissemination and teleconferencing on a wide range of municipal issues, including infrastructure. This municipality regards the Internet as both a trunk carrier of information and as an information source.

Despite the Internet's growing appeal, it was pointed out that, at the moment, journals are the most accessible information source. However, there was some discussion about the likelihood that the Internet system of information networks will improve on accessibility considerably in the next few years, or even months. For example, it was pointed out that the major telecommunications companies, such as Bell, MCI and Sprint are poised to become Internet providers. This will make Internet accessible to anyone with a computer and modem[1].

Beginning with the premise that the information an Internet user gets out of the system would only be as good as the information fed into the system, the attendees were asked what incentive there would be for them to upload files, reports or paragraph updates onto the Internet, now or in the future. The key concern is the time requirements needed to input the information into the system.

The ensuing discussion indicated that most attendees would be prepared to contribute to the Internet system because their intuition tells them that "50 to 75 percent of what you need is already out there". They would be prepared to input information onto the Internet, but only once. Updating information would have to be the responsibility of some other, coordinating agency. Other incentives mentioned included a sense of professionalism towards other colleagues, personal growth, and enlightened self-interest (notoriety, ego gratification, future job prospects and career development opportunities).

Attendees also pointed out that the credibility of the source for the information is a key determining factor. Periodicals such as the *AWWA Journal*, *Municipal Public Works*, *Liaison* (by the Intergovernmental Committee on Urban and Regional Research — ICURR), and *Landscape Architecture* got high marks for having the necessary credibility as a source for unbiased information. Colleagues and consultants were also mentioned as very creditable sources for information by the attendees (even though the impartiality of consultants was identified as an area of weakness in the quality of information by respondents to the survey — Table 4).

Not knowing what other municipal jurisdictions were doing, particularly in the development of new policies and procedures, was identified as a major information gap that attendees felt needed to be addressed. The need for a one-stop-shop compendium on municipal policies and procedures was strongly endorsed by the attendees.

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[1] In a 1993 survey by ICURR, over 90 percent of municipal respondents indicated they had ready access to a PC and 65 percent indicated they had ready access to a modem.

There was mixed response to the question: "Would you take the time to update your municipal contributions in this area on a regular basis?" It was pointed out that ICURR already does this compendium search and that ICURR was a logical municipal candidate to become an Internet provider or "on ramp" to the Internet. Such a compendium document or "web site" on the Internet "might eliminate six or eight other journals" from each person's in basket, suggested one attendee.

The discussion after lunch began with a consensus agreement around the table that the Internet is likely to be the best long-term vehicle for the dissemination of topical, current information on all municipal issues, including infrastructure. Starting from this consensus point, attendees were asked, "Who should be responsible for charting the roadmap to get us to the Internet vehicle?"

The following groups or organizations were suggested: CMHC, Association of Municipalities of Ontario (AMO), Federation of Canadian Municipalities (FCM), ICURR, and AWWA. Some thought that FCM would be the best umbrella organization to provide this consolidated information dissemination service Canada-wide. Others thought ICURR was better positioned, because it already is in the information collection, storage and dissemination business.

The Montréal-based Centre for Expertise and Research on Infrastructure in Urban Areas (CERIU) was also mentioned as a possible champion for this information dissemination service. It was pointed out that their focus, until recently, has been on research and that CERIU would need to develop a greater profile outside Quebec.

The ability of ICURR to provide a credible service on all municipal subject matter was questioned by several attendees. For example, neither ICURR nor FCM currently have credibility in water and sewer issues, whereas AWWA does have this credibility and is already offering on-line Internet service to its membership. It was suggested that this decision by AWWA to become an Internet provider was a good business decision because it would help to keep its subscribers.

However, it was felt that ICURR was a logical candidate to co-ordinate the efforts of all the other information suppliers in Canada, including AWWA and other professional associations. In fact, AWWA and other information suppliers (FCM, AMO, CWWA, TAC, CPWA etc.) may be willing to pool resources and cooperate if the results of this cooperation is seen as value-added service for their individual memberships. The main incentive for this cooperative effort would be a one-stop service which coordinates the collection, storage and dissemination of information.

The suggestion was tabled by one of the session facilitators that ICURR might be able to provide a web site on the Internet which could act as a one-window gateway or main index to all municipal services, starting from the generic and subdividing down to the specific (see sample index in Appendix 6). In this way, ICURR could then offer its web site to all the other municipal information providers (FCM, AMO, CWWA, TAC, CPWA etc.) as a kind of on-line Internet clearinghouse.

An alternative option that was suggested would see discussion groups attached to specific issues on an Internet web site bulletin board where interested parties could quickly access the information they are trying to find or, alternatively, state their problem and see if there are any "hits" offering solutions. This discussion group could act as a kind of gateway itself, plugging browsers into other sources of information, such as references to other municipalities (case studies), other networks, or publications and reports.

It was pointed out that, for an organization like AWWA, the incentive to cooperating with ICURR would be gaining access to more potential AWWA subscribers, members, customers etc. If all the municipal information providers or suppliers could be brought under the ICURR umbrella, they would each have the ability to reach a much wider audience with their information and other services. This potential for a larger customer base for each individual supplier would be reason enough for charging a nominal membership fee to cover ICURR's costs of maintaining the web site and keeping it current and topical.

Most agreed that it would not be realistic to expect this web site clearinghouse service to be provided free of charge. It would have to be a for profit or fee for service arrangement, financed through membership fees of the member information suppliers. The *users* of the service could potentially get the service for free, up to browser level. Downloading documents could be a chargeable service, similar to buying a book.

The issue of whether this service should be run in-house by the clearinghouse provider (e.g., ICURR) or contracted out wasn't resolved. Apparently AMO is considering contracting out its information dissemination services on the Internet to Bell Canada when they become an Internet provider later this year.

When asked whether the proposed integrated municipal information service should be limited just to municipal infrastructure issues or broadened to include all municipal issues, there was consensus around the table that it should be kept as broad as possible. Subscriptions to such a network would be much easier to cost justify if the information was broadly based, because there would be more potential users in the municipality.

It was further suggested that CMHC needs to ensure that ICURR becomes a more robust provider of information to a wider audience, particularly in light of the fact that CMHC funds 50 percent of ICURR's operation. To test the feasibility of whether this service would work, it was recommended that CMHC invite the major municipal information suppliers to a similar roundtable discussion to explore the idea in more detail.

The focus group identified the following information suppliers which should be invited to the roundtable:

- Intergovernmental Committee on Urban and Regional Research (ICURR);
- American Water Works Association (AWWA);
- Transportation Association of Canada (TAC);
- Canadian Public Works Association (CPWA);
- Association of Municipalities of Ontario (AMO);
- Federation of Canadian Municipalities (FCM);

5.3 Recommendations

As the broader survey and this focus group have demonstrated, there is a pressing need to improve on the way practitioners in the fields of municipal infrastructure and community services find and share information. However, because of the wide variety of information sources currently available in the urban infrastructure field, improvements can only be realized with the commitment and support of the key players in this area.

CMHC, possibly through the auspices of ICURR, could play a lead facilitation role in bringing all the key municipal information providers to the table for a discussion about municipal information dissemination in general and Internet options specifically.

The list of players should include those identified by the April 7 information users focus group. To that list should be added the following organizations or agencies.

- Centre for Expertise and Research on Infrastructure in Urban Areas (CERIU);
- Canadian Urban Transit Association (CUTA);
- The Road Information Program (TRIP) of Canada;
- Urban Development Institute (UDI);
- Canadian Water and Wastewater Association (CWWA);
- Canadian Association of Municipal Administrators (CAMA); and,
- Canadian Institute of Planners (CIP).

It might also be appropriate to invite representatives from the provincial ministries of municipal affairs who, collectively, provide the other 50 percent of ICURR's funding.

In addition, the Key Index concept, developed in preliminary format in Appendix 6, should be further developed as a possible starting point for this focus group meeting with municipal information providers/suppliers.

Appendix 1

List of Municipalities Who Responded to the Survey

Who Responded to the Survey

Province	Municipality
Newfoundland	Gander
Newfoundland	St. John's
Nova Scotia	Halifax
Nova Scotia	New Glasgow
New Brunswick	Fredericton
New Brunswick	Saint John
New Brunswick	Moncton
Québec	Montréal
Québec	Québec City
Québec	Sherbrooke
Ontario	Aurora
Ontario	Barrie
Ontario	Belleville
Ontario	Hamilton-Wentworth
Ontario	Kirkland Lake
Ontario	Markham
Ontario	North Bay
Ontario	North York
Ontario	Ottawa-Carleton
Ontario	Scarborough
Ontario	Thunder Bay
Ontario	Metro Toronto
Ontario	Waterloo
Ontario	York
Manitoba	Thompson
Manitoba	Winnipeg
Saskatchewan	Regina
Saskatchewan	Saskatoon
Alberta	Calgary
Alberta	Edmonton
Alberta	Fort McMurray
British Columbia	Burnaby
British Columbia	Gtr. Van. Reg'l. Dist.
British Columbia	Kamloops
British Columbia	Kelowna
British Columbia	North Vancouver Dist.
British Columbia	Terrace
British Columbia	Vancouver

Appendix 2

Questionnaire

Introduction

As outlined in the attached letter, CMHC is conducting a study on information relating to municipal infrastructure. In this context, municipal infrastructure includes linear types, such as sanitary sewers, storm sewers, water mains and roadways, as well as treatment facilities, and municipally owned community facilities such as libraries, parks and public buildings.

The study will help CMHC and other organizations to better understand the information needs of municipal staff and how well those needs are met by current information systems. A major part of the study is a survey of municipal staff using the attached questionnaire.

The questionnaire is organized around five (5) key issues:

1) Information needs of respondents
2) Information sources currently used
3) Quality of the information from these sources
4) Accessibility of this information
5) Other issues and concerns

Respondent Information

Please fill-in the information on this page and fax this page only to: CMHC Information Survey, 15,010 Yonge Street, Aurora, Ontario L4G 1M6. The fax number is 905-841-6744. The information on this page will be used to co-ordinate the phone interview phase of the project (refer to cover letter).

Municipal Office (please give name): _____

Municipal Address: _____

Name of Respondent: _____

Title of Respondent: _____

Phone/Fax Number: _____ Total Municipal Population _____

Please Send Copy of Study Report Yes ❒ No ❒

Type of Municipal Infrastructure in Your Area of Mandate:

- Linear Roads ❒ Water ❒ Sewer ❒ Other _____
- Treatment Facilities Water ❒ Sewage ❒ Other _____
- Community Facilities Recreation Facilities ❒ Public Bldgs. ❒ Other _____

What is Your Role with Infrastructure:

- Financing ❒
- Planning/Design ❒
- Operations and Maintenance ❒
- Other _____

1) Information Needs

This question focuses on: i) the types of information you look for in your decision-making; ii) the areas in which you need better information; and iii) areas in which information is not currently available.

i) What types of information do you look for when you have to recommend a course of action re: infrastructure? Please indicate with a check mark (√) the types of information looked for in column (a) below.

ii) In what areas do you need better information? Please rank in order of importance by checking the appropriate boxes in column (b) below, as follows: (1) most important; (2) important; and (3) not important.

iii) In terms of information which you require to fulfill your mandate, what information is simply not available or not available in a usable form? Please indicate with a check mark (√) in column (c) on the table below.

	Type of Information	(a) Looked For	(b) Need For Better Info.	(c) Info. Not Available
1.	Costing Information			
2.	Technology Options (alternative products, materials or designs)			
3.	Financing Options (e.g., public/private partnerships, special bonds)			
4.	Planning/Design Issues			
5.	Operation and Maintenance Information			
6.	Alternative Engineering Standards			
7.	Demand Management Options and Strategies			
8.	Management Systems			
9.	Other (specify)			

iv) With regard to items ticked off in column (c), above, how best do you think these information gaps could be filled?

2) Information Sources

a) General

This question focuses on: i) the information sources you currently use; ii) the sources you find most useful; and iii) the sources you think are the best medium or method for conveying information.

i) What sources of information do you rely upon? Please check the sources used in column (a) below.

ii) Please rank the sources you use in order of usefulness, by checking the appropriate boxes in column (b) below, as follows: (1) most useful; (2) useful; and (3) not very useful.

iii) Of the sources you use, which do you think is the best medium for conveying information for your purposes? Please use column (c) to rank the sources you identified in column (a) as follows: (1) best; (2) good; (3) fair; and (4) poor.

	Information Source	(a) Used	(b) Usefulness	(c) Best Medium
1.	Professional Journals			
2.	Magazines			
3.	Newsletters			
4.	Professional Associations			
5.	Conferences, Seminars and Workshops			
6.	Training Programs			
7.	Technical Reports			
8.	Consultants			
9.	Other Municipalities			
10.	Federal/Provincial Governments			
11.	Guidelines and Standards			
12.	Universities and Research Centres			
13.	Municipal Reference Libraries			
14.	Information Clearinghouses			
15.	Computerized Networks and Data Bases			
16.	Other (specify)			

iv) In terms of useful sources (identified in column (b), above), what is the determining factor in choosing these sources — cost, convenient access or quality of information?
In answering this question, please rank the three factors as follows: (1) most important; (2) less important; and (3) not important.

	Factor	Rank
1.	Cost/Affordability	
2.	Convenience of Access	
3.	Quality of Information	

v) Are there other factors affecting your choice of information sources? Please specify.

_____

_____

vi) Please indicate the sources you rely on for the types of information listed in the table below, by inserting a check mark (√) in the appropriate table cell.

Sources	Types of Information								
	Costing Information	Technology Options	Financing Options	Planning/Design Issues	Operation & Maintenance Info.	Alternative Engineering Standards	Demand Mgmt. Options & Strategies	Management Systems	Other (specify)
Professional Journals									
Magazines									
Newsletters									
Professional Associations									
Conferences, Seminars and Workshops									
Training Programs									
Technical Reports									
Consultants									
Other Municipalities									
Federal/Provincial Governments									
Guidelines and Standards									
Universities and Research Centres									
Municipal Reference Libraries									
Information Clearinghouses									
Computerized Networks and Data Bases									
Other (specify)									

2) Information Sources cont'd

b) Professional Associations

i) What professional associations do you belong to?

1) 5)
2) 6)
3) 7)
4) 8)

c) Conferences and Workshops

i) How often do you attend conferences or workshops in your area of interest or mandate?

1) Once a year ❑
2) Between 2 to 3 times per year ❑
3) Greater than 3 times per year ❑

ii) What conferences and/or association meetings do you attend on a regular basis? (Please list).

_____

_____

_____

_____

d) Print Media

i) What professional journals, magazines and newsletters do you receive?

1) 5)
2) 6)
3) 7)
4) 8)

ii) How much of your time in a week goes into reviewing the above noted job-related magazines and publications?

1) Less than 1 hour per week ❑
2) Between 1 to 3 hours per week ❑
3) Between 3 to 5 hours per week ❑
4) Between 5 to 10 hours per week ❑
5) Greater than 10 hours per week ❑

iii) Using the table below, and the codes filled in in 2 d) i) above, please indicate whether the publications you subscribe to provide the information you need on the issues listed in the table by inserting a (Y) yes; or (N) no, in the appropriate table cell.

Type of Information	Journals, Magazines and Newsletters							
	1	2	3	4	5	6	7	8
Costing Information								
Technology Options								
Financing Options								
Planning/Design Issues								
Operation and Maintenance Information								
Alternative Engineering Standards								
Demand Management Options and Strategies								
Management Systems								
Other (specify)								

e) Municipal Colleagues

i) How often do you consult with municipal colleagues in other jurisdictions?

1) Every day ❑
2) Several times a week ❑
3) Several times a month ❑
4) Seldom ❑
5) Never ❑

ii) How much influence does the information you obtain from municipal colleagues have in your decision-making?

1) Considerable influence ❑
2) Some influence ❑
3) Not very influential ❑
4) No influence ❑

f) Clearinghouses

i) Do you now subscribe to any clearinghouses or related information systems? If yes, please list them.

_____

_____

_____

Have you stopped subscribing ❑
Have you never subscribed ❑
Please indicate why.

_____

_____

ii) If you are a member of any clearinghouses or related information systems, do you provide data updates into the system? If yes, how much time does it take to do this? If no, please indicate why this activity is not done.

1) Yes ❑
2) No ❑

_____

_____

_____

iii) How useful is information obtained from the clearinghouses you use? Please list the clearinghouses you use in the column heading in the table below. Then rank the usefulness of the information by inserting a (1) most useful; (2) useful; and (3) not very useful, in each of the table cells.

Issues	Clearinghouses			
Costing Information				
Technology Options				
Financing Options				
Planning/Design Issues				
Operation and Maintenance Information				
Alternative Engineering Standards				
Demand Management Options and Strategies				
Management Systems				
Other (specify)				

g) Computer Bulletin Boards

i) Do you use computerized bulletin boards such as those available on Internet? If yes, please list them. If no, please indicate why.

1) Yes ❑
2) No ❑

_____

_____

_____

3) Quality of the Information from All Sources

a) How would you rank the quality of information for your purposes, from the following sources? Please indicate your response in the Quality of Info. cells on the table below.

b) Please indicate which areas of weakness apply to the information sources you use by inserting a check mark (√) in the applicable cell in the table below.

Sources	Quality of Info.			Areas of Weakness						
	Very Good	Acceptable	Poor	Accuracy	Timeliness	Impartiality	Relevance	Usable Format	Availability	Accessibility
Professional Journals										
Magazines										
Newsletters										
Professional Associations										
Conferences, Seminars and Workshops										
Training Programs										
Technical Reports										
Consultants										
Other Municipalities										
Federal/Provincial Governments										
Guidelines and Standards										
Universities and Research Centres										
Municipal Reference Libraries										
Information Clearinghouses										
Computerized Networks and Data Bases										
Other (specify)										

4) Accessibility of Information

a) Can you readily access information on municipal infrastructure, as it relates to your areas of responsibility and mandate?

1) Yes ❑
2) No ❑

b) What are the key limiting factors in terms of your access to information? Using the *limiting factor codes listed below*, please indicate which limiting factors apply to the various information sources by placing a check mark (√) in the appropriate cell of the table below.

1) **Cost** of the information
2) Not knowing **what information is available**
3) Not knowing **where to find information**
4) **Lack of time** to find the information

Sources	Limiting Factor			
	1	2	3	4
Professional Journals				
Magazines				
Newsletters				
Professional Associations				
Conferences, Seminars and Workshops				
Training Programs				
Technical Reports				
Consultants				
Other Municipalities				
Federal/Provincial Governments				
Guidelines and Standards				
Universities and Research Centres				
Municipal Reference Libraries				
Information Clearinghouses				
Computerized Networks and Data Bases				
Other (specify)				

5) Other Issues and Concerns

If you have any other comments or thoughts on this survey or on the subject of infrastructure information, please provide your comments in the space provided below. Please attach extra pages, if needed.

Introduction

Comme vous l'avez constaté dans la lettre d'accompagnement, la SCHL fait une étude sur les renseignements touchant les infrastructures municipales. Lorsqu'on parle d'infrastructures municipales, on songe aux infrastructures linéaires, comme les égouts sanitaires, les égouts pluviaux, les canalisations d'aqueduc, les routes, les usines de traitement ainsi que les services communautaires appartenant aux municipalités comme les bibliothèques, les parcs et les édifices publics.

Cette étude aidera la SCHL et d'autres organismes à mieux comprendre les besoins en information des fonctionnaires municipaux en plus de comprendre dans quelle mesure ces besoins sont satisfaits par les systèmes d'information actuels. Une grande partie de cette étude gravite autour de cette enquête menée auprès des fonctionnaires municipaux.

Le questionnaire est subdivisé en cinq grands sujets :

1) Les besoins en information des répondants.
2) Les sources d'information actuellement utilisées.
3) La qualité des informations fournies par ces sources.
4) L'accessibilité de l'information.
5) Les autres sujets d'intérêt et d'inquiétude.

Renseignements sur les répondants

Veuillez remplir cette page et expédier cette page uniquement par télécopieur à l'adresse suivante : Questionnaire d'information de la SCHL, 15 010 rue Yonge, Aurora (Ontario) L4G 1M6. Le numéro de télécopieur est le suivant : (905) 841-6744. Les informations apparaissant sur cette page seront utilisées pour préparer les interviews téléphoniques (voir la lettre d'accompagnement).

Bureau municipal (donner le nom) : _____

Adresse de la municipalité : _____

Nom du répondant : _____

Titre du répondant : _____

Téléphone/fax : _____ Population totale de la municipalité : _____

Prière d'envoyer une copie du rapport d'étude Oui ❒ Non ❒

Type d'infrastructure municipale dans votre secteur de responsabilité :

- Linéaire Routes ❒ Aqueduc ❒ Égouts ❒ Autres _____
- Installations de traitement Aqueduc ❒ Égouts ❒ Autres _____
- Installations communautaires Installations de récréation ❒ Édifices publics ❒ Autres _____

Quel est votre rôle au niveau des infrastructures ?

- Financement ❒
- Planification/conception ❒
- Exploitation et entretien ❒
- Autres _____

1) Besoins en information

Cette question porte sur ce qui suit : i) le genre d'informations que vous recherchez pour prendre vos décisions; ii) les secteurs où il vous faut de meilleurs renseignements; iii) les secteurs où il n'existe pas d'information actuellement.

i) Quels types d'information recherchez-vous lorsque vous devez recommander une orientation en matière d'infrastructures ? SVP, cochez les types d'information que vous recherchez dans le tableau ci-dessous.

ii) Dans quels secteurs avez-vous besoin de meilleures informations ? Établissez l'importance des besoins en cochant les cases appropriées du tableau ci-dessous en utilisant les codes suivants : (1) très important; (2) important; (3) pas important.

iii) En ce qui concerne l'information qu'il vous faut pour vous acquitter de votre mandat, quelles informations ne sont tout simplement pas disponibles ou ne sont pas disponibles sous une forme utilisable ? SVP, cochez les cases appropriées du tableau ci-dessous.

	Types d'information	**(a) Information Recherchée**	**(b) Meilleure inform. req.**	**(c) Information non disp.**
1.	Informations sur l'établissement des coûts			
2.	Les options techniques (produits, matières ou conceptions de rechange)			
3.	Options de financement (par ex., partenariat avec le secteur public/privé, obligations spéciales)			
4.	Questions de planification/conception			
5.	Informations sur l'exploitation et l'entretien			
6.	Normes alternatives d'ingénierie			
7.	Options et stratégies de gestion de la demande			
8.	Systèmes de gestion			
9.	Autre (spécifier)			

iv) En ce qui concerne les points que vous avez cochés dans la colonne (c) ci-dessus, comment, à votre avis, ce manque de renseignements peut-il être le mieux comblé ?

2) Sources d'information

a) Généralités

Cette question porte sur ce qui suit : i) les sources d'information que vous utilisez actuellement; ii) les sources que vous trouvez les plus utiles; iii) les sources qui, à votre avis, sont les meilleures ou la meilleure méthode de transmission des informations.

i) À quelles sources d'information vous fiez-vous ? Dans la colonne (a) ci-dessous, cochez les sources que vous utilisez.

ii) Indiquez l'utilité de chaque source que vous utilisez en mettant dans les cases appropriées de la colonne (b) ci-dessous un des codes suivants : (1) le plus utile; (2) utile; (3) pas très utile.

iii) Parmi les sources que vous utilisez, laquelle est, à votre avis, la meilleure façon de vous donner des informations ? Utilisez la colonne (c) pour coder les sources que vous avez indiquées à la colonne (a) en utilisant le code suivant : (1) la meilleure; (2) bonne; (3) moyenne; (4) piètre.

	Sources d'information	**(a) Utilisée**	**(b) Utilité**	**(c) Meilleure**
1.	Journaux professionnels			
2.	Revues			
3.	Bulletins			
4.	Associations professionnelles			
5.	Congrès, séminaires et ateliers			
6.	Programmes de formation			
7.	Rapports techniques			
8.	Experts-conseils			
9.	Autres municipalités			
10.	Gouvernements fédéral/provincial			
11.	Directives et normes			
12.	Universités et centres de recherche			
13.	Bibliothèques de référence municipales			
14.	Centres d'information			
15.	Réseaux informatiques et bases de données			
16.	Autres (spécifier)			

iv) En ce qui concerne les sources d'information utiles (voir la colonne (b) ci-dessus), quel est le facteur déterminant lorsque vient le moment de choisir ces sources : le coût, la facilité d'accès ou la qualité des informations ? Pour répondre à ces questions, établissez l'ordre de priorité des trois facteurs comme suit : (1) le plus important; (2) moins important; (3) pas important.

	Facteur	**Priorité**
1.	Coût/abordabilité	
2.	Facilité d'accès	
3.	Qualité de l'information	

v) Y a-t-il d'autres facteurs influant sur vos choix des sources d'information ? SVP, précisez.

_____

_____

vi) Veuillez indiquer la source à laquelle vous vous fiez pour avoir les types d'information apparaissant au tableau ci-dessous en cochant la case appropriée.

Sources	Types d'information								
	Établissement des coûts	Techniques	Financement	Planification/conception	Exploitation et entretien	Normes alternatives d'ingénierie	Gestion de la demande	Systèmes de gestion	Autres (spécifier)
Journaux professionnels									
Revues									
Bulletins									
Associations professionnelles									
Congrès, séminaires et ateliers									
Programmes de formation									
Rapports techniques									
Experts-conseils									
Autres municipalités									
Gouvernements fédéral/provincial									
Directives et normes									
Universités et centres de recherche									
Bibliothèques de référence municipales									
Centres d'information									
Réseaux informatiques et bases de données									
Autres (spécifier)									

2) Sources d'information (suite)

b) Associations professionnelles

i) Êtes-vous membre d'associations professionnelles ? Si oui, lesquelles ?

1) 5)
2) 6)
3) 7)
4) 8)

c) Congrès et ateliers

i) À quelle fréquence assistez-vous aux Congrès ou aux ateliers dans le domaine qui vous intéresse ou de votre mandat ?

1) Une fois par année ❑
2) Entre 2 et 3 fois par année ❑
3) Plus de 3 fois par année ❑

ii) À quels Congrès et (ou) rencontres d'associations participez-vous ? (SVP, donnez la liste.)

_____

_____

_____

_____

d) Documents imprimés

i) Quels journaux professionnels, revues et bulletins recevez-vous ?

1) 5)
2) 6)
3) 7)
4) 8)

ii) Combien de temps par semaine consacrez-vous à la lecture des revues et aux publications ci-dessus ayant trait à votre profession ?

1) Moins d'une heure par semaine ❑
2) Entre 1 et 3 heures par semaine ❑
3) Entre 3 et 5 heures par semaine ❑
4) Entre 5 et 10 heures par semaine ❑
5) Plus de 10 heures par semaine ❑

iii) En utilisant le tableau ci-dessous et les codes utilisés en 2 d) i) ci-dessus, indiquez si les publications que vous recevez vous fournissent les informations qu'il vous faut sur les questions apparaissant au tableau en inscrivant (O) oui ou (N) non dans la case appropriée.

Types d'information	**Journaux, revues et bulletins**							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Informations sur l'établissement des coûts								
Options techniques								
Options de financement								
Questions de planification/conception								
Informations sur l'exploitation et l'entretien								
Normes alternatives d'ingénierie								
Options et stratégies de gestion de la demande								
Systèmes de gestion								
Autre (spécifier)								

e) Collègues municipaux

i) À quelle fréquence consultez-vous vos collègues municipaux d'autres juridictions ?

1) Chaque jour ❑
2) Plusieurs fois par semaine ❑
3) Plusieurs fois par mois ❑
4) Rarement ❑
5) Jamais ❑

ii) Lorsque vous devez prendre des décisions, quelle influence ont les informations que vous obtenez de vos collègues municipaux ?

1) Considérable ❑
2) Une certaine influence ❑
3) Pas beaucoup ❑
4) Aucune influence ❑

e) Centres d'information

i) Êtes-vous actuellement abonné à un centre d'information ou à des systèmes d'information semblables ? Si oui, indiquez-en le nom.

_____

_____

_____

Abonnement arrêté ❑
Jamais abonné ❑
Indiquez pourquoi.

_____

_____

ii) Si vous êtes membre d'un centre d'information ou de systèmes d'information semblables, fournissez-vous au système des mises à jour de données ? Si oui, combien de temps vous faut-il pour cela ? Si non, indiquez pourquoi vous ne le faites pas.

1) Oui ❑
2) Non ❑

_____

_____

_____

iii) À quel point l'information que vous obtenez du centre d'information est-elle utile ? Énumérez les centres d'information que vous utilisez dans l'en-tête du tableau ci-dessous. Indiquez ensuite la priorité que vous accordez aux informations en indiquant (1) le plus utile; (2) utile; (3) pas très utile dans chacune des cases du tableau.

Sujets	**Centres d'information**			
Informations sur l'établissement des coûts				
Options techniques				
Options de financement				
Questions de planification/conception				
Informations sur l'exploitation et l'entretien				
Normes alternatives d'ingénierie				
Options et stratégies de gestion de la demande				
Systèmes de gestion				
Autre (spécifier)				

g) Bulletins d'information informatisés

1) Oui ❑
2) Non ❑

i) Utilisez-vous des bulletins d'information informatisés comme ceux de Internet ? Si oui, énumérez-les. Si non, indiquez pourquoi.

_____

_____

_____

3) Qualité de l'information provenant de toutes sources

a) Comment qualifiez-vous la qualité de l'information convenant à vos besoins d'après les sources suivantes ? Indiquez votre réponse dans les cases relatives à la qualité de l'information dans le tableau ci-dessous.

b) Indiquez les genres de faiblesses des sources d'information que vous utilisez en cochant la case pertinente dans le tableau ci-dessous.

	Qualité de l'inform.			Points faibles						
Sources	Très bon	Acceptable	Mauvais	Exactitude	À temps	Impartialité	Pertinence	Format utilisable	Disponibilité	Accessibilité
Journaux professionnels										
Revues										
Bulletins										
Associations professionnelles										
Congrès, séminaires et ateliers										
Programmes de formation										
Rapports techniques										
Experts-conseils										
Autres municipalités										
Gouvernements fédéral/provincial										
Directives et normes										
Universités et centres de recherche										
Bibliothèques de référence municipales										
Centres d'information										
Réseaux informatiques et bases de données										
Autre (spécifier)										

4) Accessibilité à l'information

a) Avez-vous facilement accès à l'information sur les infrastructures municipales dans les domaines sous votre responsabilité ou votre mandat ?

1) Oui ❑
2) Non ❑

b) Quels sont les grands facteurs limitatifs en ce qui a trait à l'accès que vous avez à l'information ? En utilisant les *codes de facteurs limitatifs ci-dessous*, indiquez quels facteurs limitatifs s'appliquent aux différentes sources d'information en cochant la case appropriée dans le tableau ci-dessous.

1) **Coût** de l'information
2) Ne sait pas **que l'information est disponible**
3) Ne sait pas **où trouver l'information**
4) **Manque de temps** pour trouver l'information

Sources	Facteur limitatif			
	1	2	3	4
Journaux professionnels				
Revues				
Bulletins				
Associations professionnelles				
Congrès, séminaires et ateliers				
Programmes de formation				
Rapports techniques				
Experts-conseils				
Autres municipalités				
Gouvernements fédéral/provincial				
Directives et normes				
Universités et centres de recherche				
Bibliothèques de référence municipales				
Centres d'information				
Réseaux informatiques et bases de données				
Autre (spécifier)				

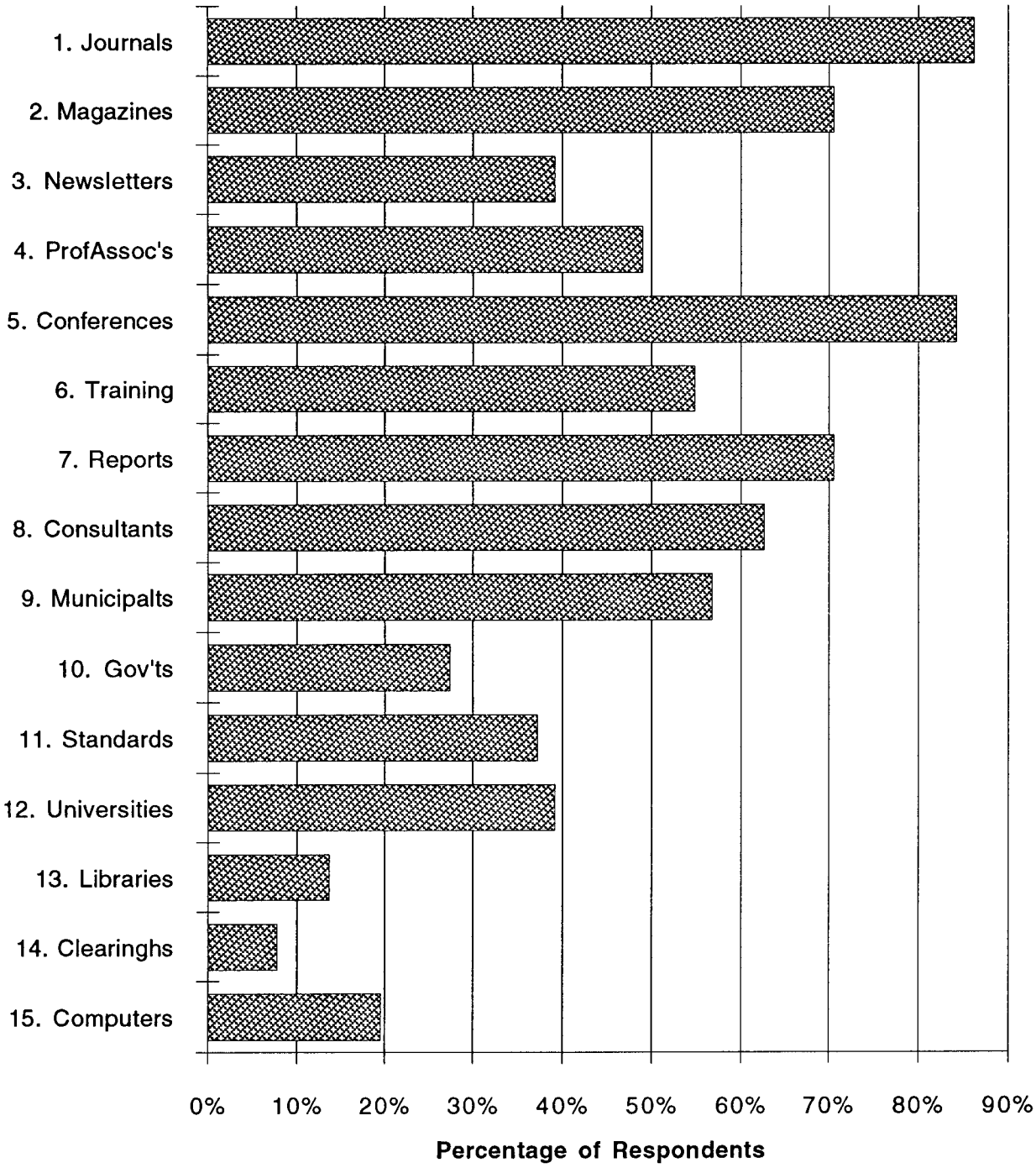
5) Autres sujets d'intérêt et d'inquiétude

Si vous avez d'autres commentaires ou réflexions à propos de cette enquête ou sur le sujet de l'information sur les infrastructures, inscrivez vos commentaires dans l'espace ci-dessous. Au besoin, annexez d'autres pages.

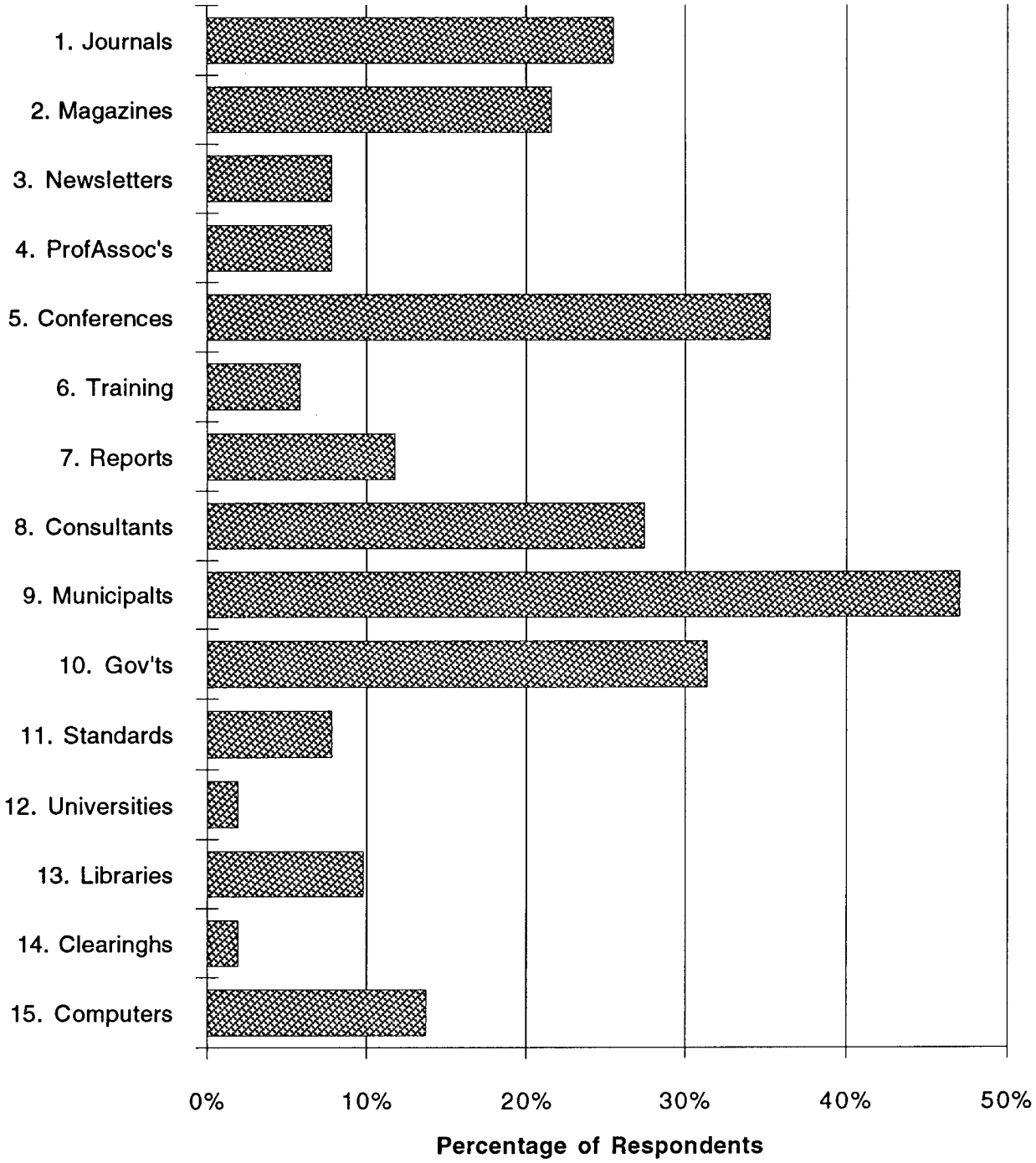
Appendix 3

Sources Relied Upon for Each Information Type

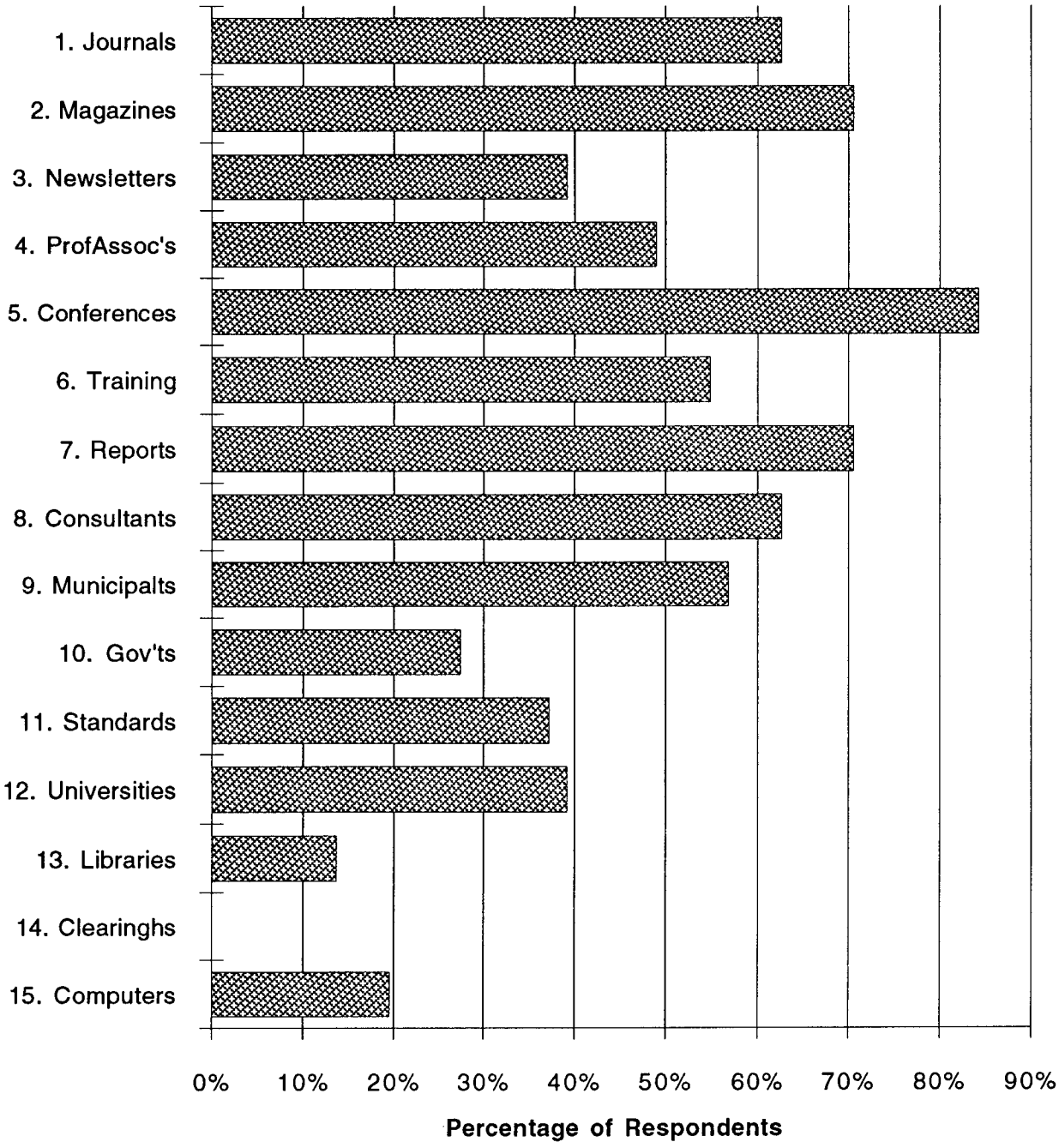
Sources for Technology Options



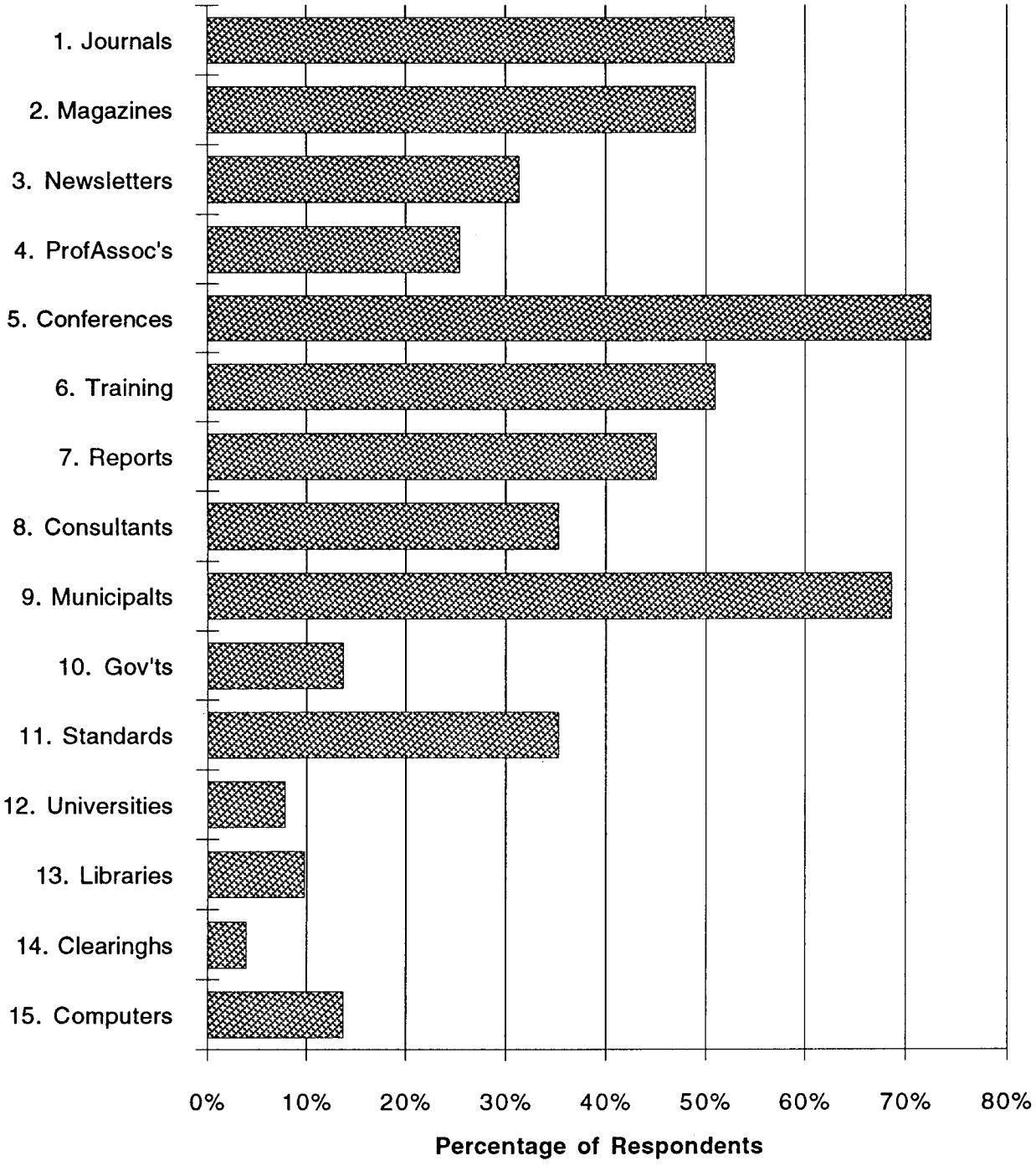
Sources for Financing Information



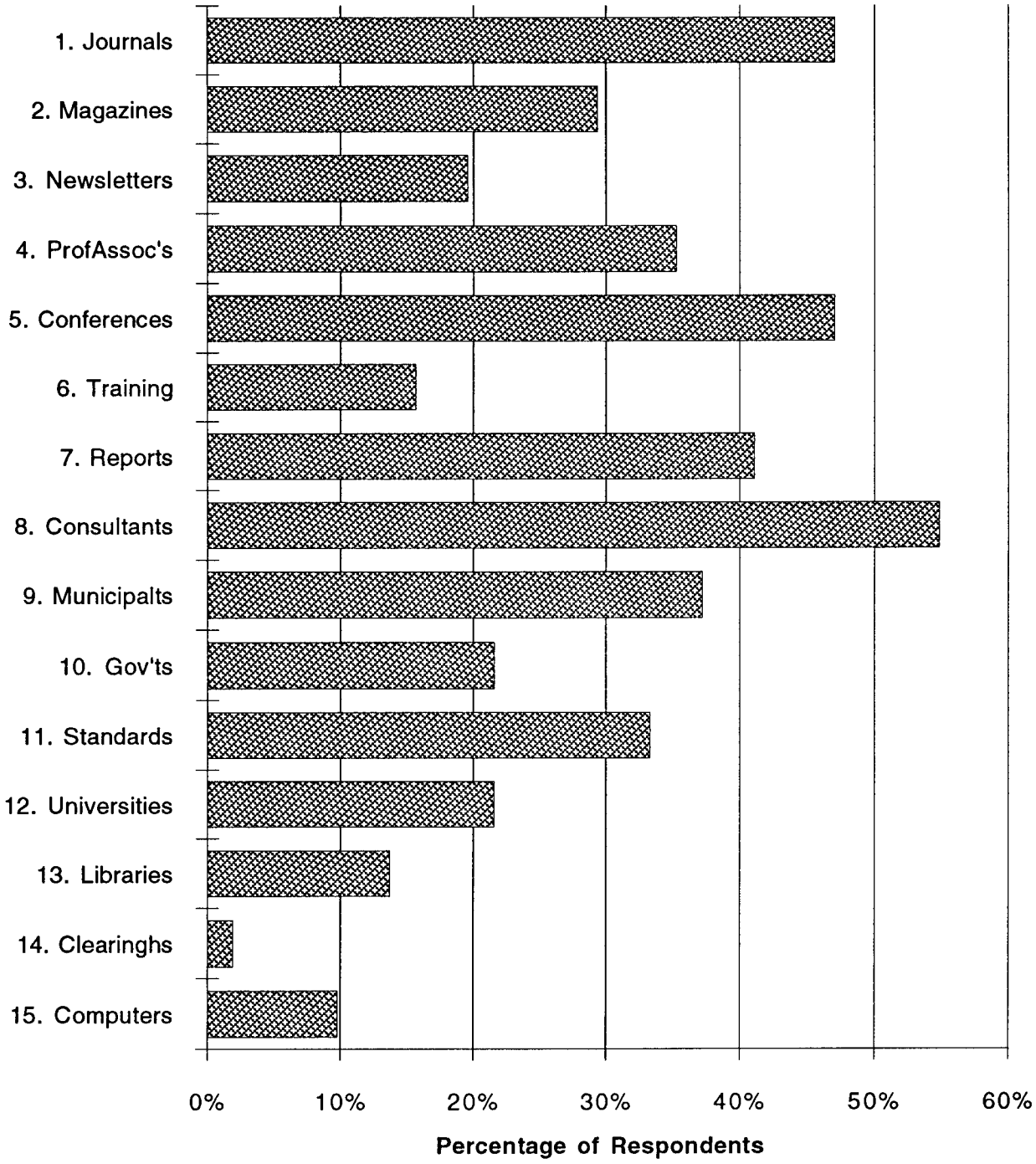
Sources for Planning/Design Information



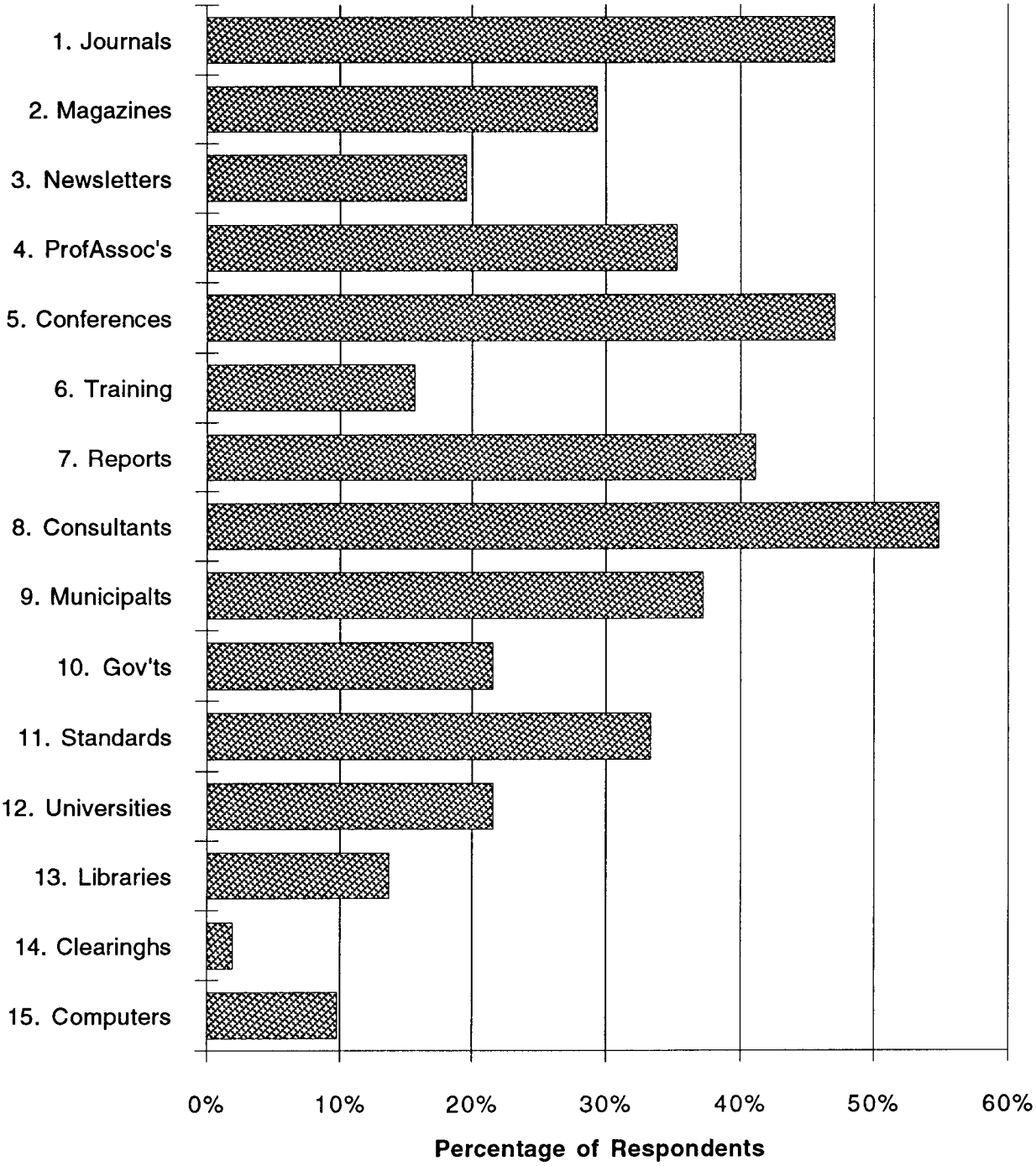
Sources for O & M Information



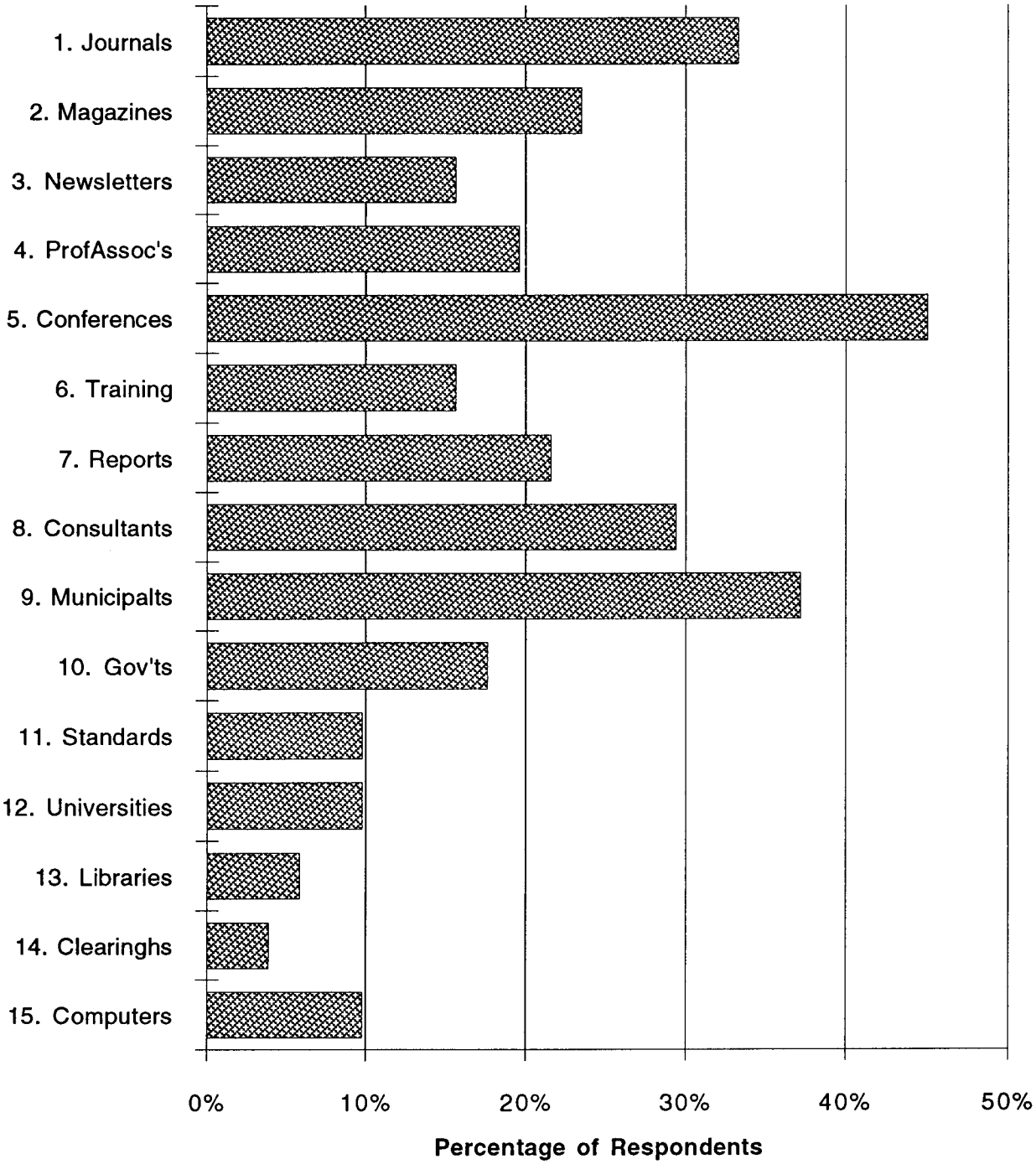
Sources for Alt. Eng. Stds. Information



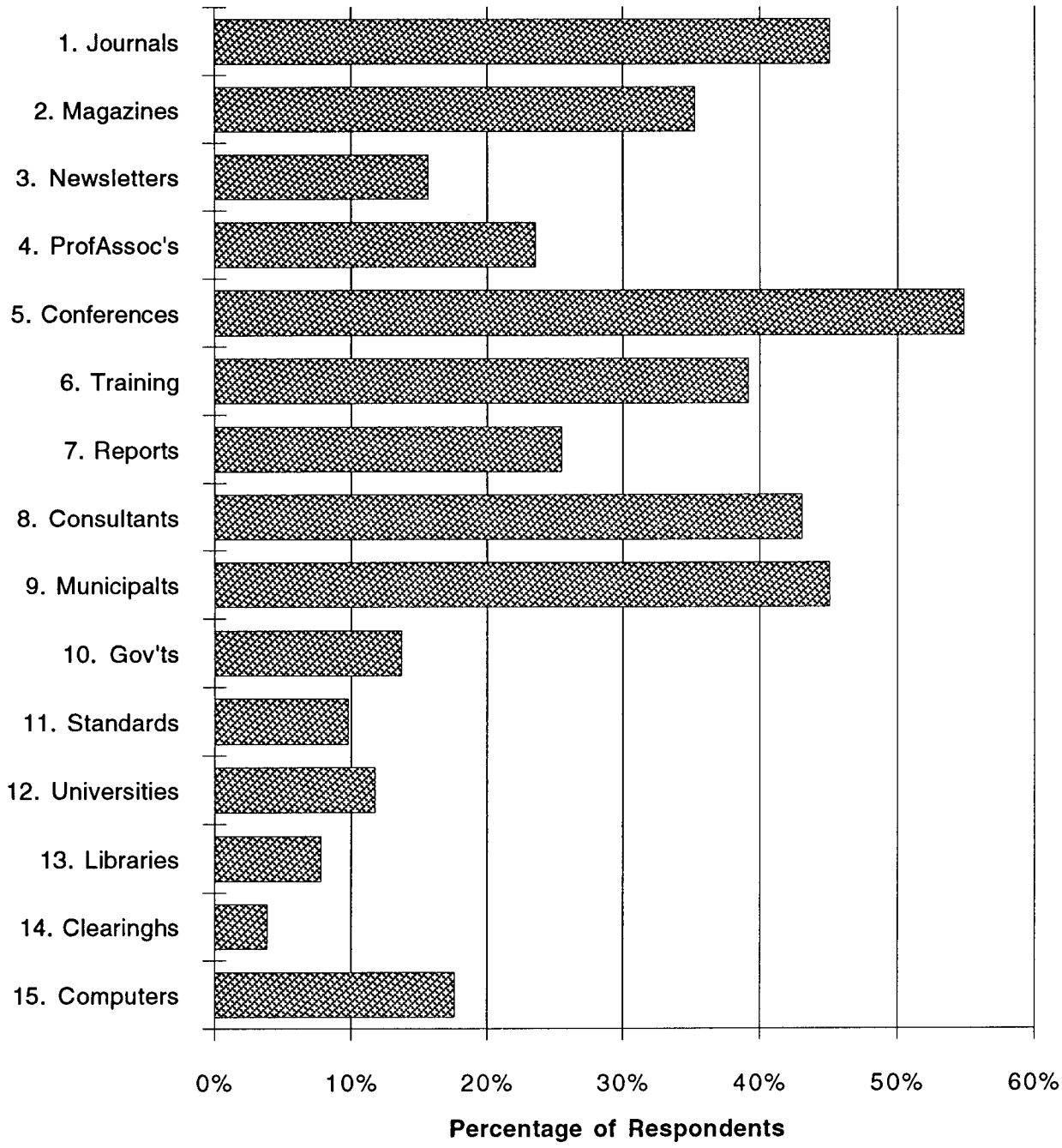
Sources for Alt. Eng. Stds. Information



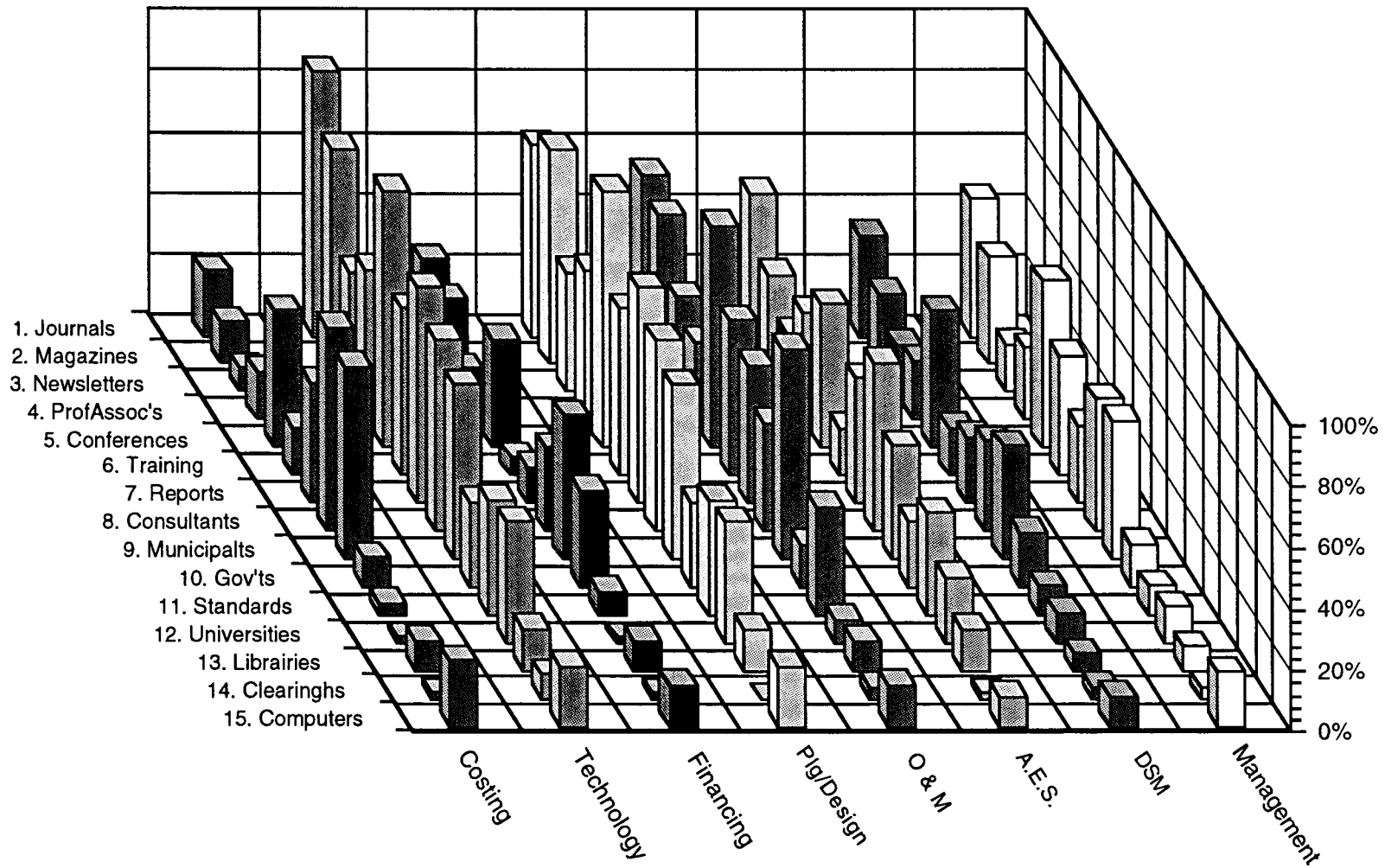
Sources for DSM Information



Sources for Management Systems Information



Source Relied Upon For Different Types of Information



Appendix 4

Profiles of Selected Information Dissemination Mechanisms

COMPUTERIZED NETWORKS AND DATABASES

Name

Canadian Environmental Solutions

Type of Infrastructure Covered

Air, water and waste water and solid and hazardous waste.

Jurisdictions Where in Use

Canada

Agency or Organization Responsible

Industry Canada's Environmental Affairs Branch

Contact

Environmental Solutions
Industry Canada (EAB)
235 Queen Street, Rm 724A
Ottawa, Ontario
K1A 0H5
Telephone: (613) 954-3080
Fax: (613) 952-9564

DESCRIPTION

Canadian Environmental Solutions is a portable information tool designed to familiarize both domestic and international companies and partners with Canadian products and services which are available to address environmental problems. The solutions package consists of a cross-referenced database of 277 environmental problems, 324 solutions and 143 Canadian companies. At present, the database is available on CD-ROM or diskette. Industry Canada plans to make it available through Internet.

COSTS

The diskette or CD-ROM version are available free of charge.

Prerequisite Requirements

A PC or Mac.

▲ ADVANTAGES

The ability to access complete information about Canadian companies in the environmental industry, their products, technologies and services.

▼ DISADVANTAGES

This system is just in Pilot form and the database is limited. It is not yet available on-line through Internet.

Name

Canadian Municipal Environmental Database (CURE)

Type of Infrastructure Covered

The database includes municipal environmental initiatives, contacts and documents, categorized in the following sectors:

- air quality and atmospheric change
- community education and involvement
- community goals and objectives
- contaminated sites
- energy management and efficiency
- environmental management
- environmental monitoring and reporting
- environmental policy
- housing and environment
- human health and environment
- natural areas and greenspace
- nature conservation and biodiversity
- planning and environment
- solid waste management
- toxic and hazardous materials
- transportation and environment
- wastewater management
- water provision and efficiency

Jurisdictions Where in Use

The database covers environmental activities of municipalities in every province and region of Canada.

DESCRIPTION

The Canadian Urban Research on the Environment (CURE) project of the Federation of Canadian Municipalities has developed an electronic database of municipal actions to improve the environment and promote long term sustainability. The database includes more than 1,350 municipal environmental initiatives and almost 4,000 environmental contacts from 850 municipalities across Canada.

Agency or Organization Responsible

Federation of Canadian Municipalities

Contact

Dan Friesen
CURE Project
Federation of Canadian Municipalities
24 Rue Clarence Street
Ottawa, Ontario
K1N 5P3
Telephone: (613) 241-8484
Fax: (613) 241-7117

The database is suitable for publication and dissemination in printed and electronic formats. It is currently available in printed form as the *Canadian Municipal Environmental Directory*. FCM is studying opportunities to publish the database in CD ROM format and to make it available on-line.

COSTS

The Directory may be purchased for $80.00 from FCM.

▲ ADVANTAGES

This is the only database which focuses on environmental initiatives of municipalities, covering all aspects of infrastructure. With a membership of 570 municipalities representing more than 70 percent of Canada's population, FCM is well placed to develop and maintain the database.

▼ DISADVANTAGES

Only available in print form at present.

COMPUTERIZED NETWORKS AND DATABASES

Name

Canadian Online Enquiry Service (CAN/OLE)

Type of Infrastructure Covered

Linear, Treatment, Buildings

Jurisdiction Where in Use

This mechanism is used worldwide, but is based in Canada.

Agency or Organization Responsible

National Research Council Canada

Contact

Patrice Dupont
Electronic Products and Services, CAN/OLE
CISTI, National Research Council Canada
Ottawa, Ontario
K1A 0S2
Telephone: (613) 993-1210
Fax: (613) 952-8244

DESCRIPTION

An automated information retrieval system containing databases produced in Canada and worldwide regarding scientific and technical publications, research projects, new technologies and Canadian associations.

Some databases contained are:

- Canadian Standards
- CISTI catalogue of serials
- Environment Canada Library Catalogue
- NRC Publications
- Transport Canada online catalogue
- Enviroline
- ICONDA — International construction database

COSTS

There is no cost to set-up an account. There is an annual administration fee of $25 (Canadian funds). The user pays for the time spent on the system and the amount of information retrieved and printed. This will vary depending on the database being searched.

Prerequisite Requirements

A modem and IBM PC (or compatible) as searches can be done through Datapac Telecommunications Network throughout Canada or via the Internet.

▲ ADVANTAGES

Access to Canadian international databases regarding various subjects at a reasonable cost.

From discussion with an actual user, the system was found to be easy to use.

▼ DISADVANTAGES

The number of databases is currently below fifty and therefore a great amount of information out in the medium will be missed. Some larger networks contain thousands of databases.

COMPUTERIZED NETWORKS AND DATABASES

Name

ENV-I-NET

Type of Infrastructure Covered

Air, water and wastewater and solid and hazardous waste.

Jurisdictions Where in Use

Canada

Agency or Organization Responsible

Industry Canada's Environmental Affairs Branch

Contact

ENV-I-NET
Industry Canada (EAB)
235 Queen Street, Rm 724A
Ottawa, Ontario
K1A 0H5
Telephone: (613) 952-5437
Fax: (613) 952-9564

DESCRIPTION

ENV-I-NET is a full text environmental industry information system which is part of Industry Canada's On-line system. Its purpose is to provide an easy to access broad source of information on the business of the environment for the Canadian business community. The database includes information from public, private, national and international sources. It provides easy access to reports, directories and studies including Environment Canada's State of the Environment Reporting.

COSTS

Access to ENV-I-NET is free of charge through a 1-800 number. On-line time is limited to one hour a day for each user.

Prerequisite Requirements

A PC or Mac, modem and applicable software. Free software is available on diskette or may be downloaded directly from ENV-I-NET.

▲ ADVANTAGES

ENV-I-NET provides a free, nationally available source of information on environmental issues as well as products and services. Software allows users to search for items using one or more keywords.

▼ DISADVANTAGES

ENV-I-NET is not specifically designed for users in the infrastructure field, however, many relevant subject areas such as water treatment, wastewater and waste management will be included.

Name

GREAT LAKES INFORMATION NETWORK

Type of Infrastructure Covered

This systems database and information network covers environmental quality, resource management, transportation and demographic and economic data on the Great Lakes Region in Canada and the United States.

Jurisdictions Where in Use

In the Great Lakes Region of Canada and the United States.

DESCRIPTION

GLIN is a computerized network that links data, information and individuals in the Great Lakes region using the Internet, a worldwide research network. GLIN offers quick access to current data as well as to leading researchers and policy makers.

COSTS

One can access GLIN through a GLIN account or via other means such as a gopher or ftp. If you have a GLIN account, you are able with a modem and the appropriate communications software, to dial in directly. Long distance charges will apply.

Agency or Organization Responsible

The Great Lakes Commission and CICNet

Contact

Carol Ratza
Communications Program Manager
Great Lakes Commission
Argus II Building, 400 Fourth Street
Ann Arbor, MI
48103-4816
Telephone: (313) 665-9135

Prerequisite Requirements

The necessary equipment needed to access GLIN is a PC computer and a modem that can function at speeds up to 14.4K bps, as well as the applicable software.

▲ ADVANTAGES

If you have a personal computer and a modem, or other access to the Internet, GLIN can connect you with people around the Great Lakes region, or around the world.

▼ DISADVANTAGES

Long distance billing can be costly when attempting to download files, however, one must look at the system and do an individual cost/benefit analysis to see whether or not the system is beneficial for their needs.

COMPUTERIZED NETWORKS AND DATABASES

Name

(Transportation Research Information Services (TRIS)

Type of Infrastructure Covered

Linear — TRIS contains information on various modes and aspects of transportation including planning, design, finance, construction, maintenance, equipment, traffic, operations, management, marketing and other topics.

Jurisdictions Where in Use

TRIS is based in the United States but is used world-wide.

Agency or Organization Responsible

Transportation Research Board, U.S. National Research Council

Contact

Stephanie Wahl
Information Services
2001 Wisconsin Avenue, N.W.
Washington, D.C.
20007
Telephone: (202) 334-3250

DESCRIPTION

TRIS contains about 350,000 records covering transportation research information gathered from many American and international sources including journal articles, technical reports, conference papers and other scientific and technical literature concerning transportation.

A search maybe obtained through TRIS staff or directly through DIALOG Information Services Inc., on the Internet.

Ready access to documents included in the TRIS database can be done through CISTI (described elsewhere in this document).

COSTS

- Free to sponsors;
- $37.50 US for TRB members and affiliates;
- $50.00 US for all others;
- To access DIALOG via the Internet, there is a charge of US$0.07 per contact minute (US$4.40 per contact hour).

Prerequisite Requirements

A modem and IBM PC (or compatible) if searches are to be done through DIALOG.

▲ ADVANTAGES

TRIS contains a varied and plentiful collection of information concerning transportation from sources all over the world.

Searches can be conducted directly through DIALOG and therefore the user controls their search budget.

▼ DISADVANTAGES

Many sources are international and therefore some would not be applicable to Canadian standards and conditions.

COMPUTERIZED NETWORKS AND DATABASES

Name

WATERNET

Type of Infrastructure Covered

Linear — Waste Water Treatment, Operations and Maintenance, Lead and Copper Corrosion, etc. The Waternet covers over twenty-five topics concerning water.

Jurisdiction Where in Use

This mechanism is used worldwide, but is based in the United States.

Agency or Organization Responsible

American Water Works Association

Contact

WATERNET
American Water Works Association
6666 West Quincey Avenue
Denver, CO
80235

DESCRIPTION

A comprehensive database on many aspects of water, available to anyone who subscribes, through an accessible CD-ROM subscription service.

COSTS

For subscription to WATERNET on CD-ROM, a fee is billed annually for CD service. At the moment there is an introductory offer to first year subscribers:

1 Year CD-ROM Service (first disk, an updated disk, and a user manual)

	Single-User	Multi-User (LANS)
AWWA Members	$350.00	$525.00
Non-members	$450.00	$675.00

Prerequisite Requirements

The minimum requirements for installing and running WATERNET are:

- IBM PC (or compatible) with MS-DOS or PC-DOS, version 3.0 or higher.
- 640 K of RAM with 500 K of conventional RAM free.
- MS-DOS CD-ROM Extensions (MSCDEX) version 3.1, 3.3, or higher.
- CD-ROM driver with ISO 9660 compatibility.
- Monochrome or colour monitor.

▲ ADVANTAGES

- One advantage is unlimited access to over 33,000 references of journal articles, books, conference proceedings, government reports, and technical papers from major water publishers throughout the world without time changes.
- WATERNET covers other national and international related publications.

▼ DISADVANTAGES

- At the present time this system may be costly to operate if the database is used infrequently.

INFORMATION CLEARINGHOUSES

Name

Canadian Institute of Science and Technology Information (CISTI)

Type of Infrastructure Covered

Linear, Treatment and Community Buildings

Jurisdiction Where in Use

This mechanism is based in Canada and used worldwide.

Agency or Organization Responsible

National Research Council Canada

Contact

Faye Borden
Reference and Referral Service
CISTI, National Research Council Canada
Building M-55, Montreal Road
Ottawa, Ontario
K1A 0S2
Telephone: (613) 993-2013
Fax: (613) 952-8239

DESCRIPTION

CISTI personnel will carry out literature searches on any topic in science and technology. Also CISTI can provide references to experts in industry, academia or government research organizations.

The following search services are provided:

- Information Search Service: Examples include searches for a particular organization's address.
- Literature Search Service: Searches for such materials as recent articles or research papers.
- Patent Search Service: Patents are searched on a wide range of patent databases with world-wide or country specific coverage. CISTI does not include the patent documents themselves but does provide information as to sources of supply.
- Reference Plus Service: Integrates information and document delivery services by providing not just the references on a particular subject but also copies of the relevant articles.
- Urgent Service: Guarantees results within two working days.

COSTS

User guidance is provided at no charge.

Information, literature and patent search service fees are full online costs (in Canadian funds) plus $65/hour service fee (1/2 hour minimum). No fee will be charged if the enquiry involves less than 30 minutes of staff time and minimal online costs are incurred. In all cases the user is entitled to maintain a single copy of the results for personal use. Results may not be duplicated or further distributed without written permission from the information producer.

Urgent service costs a premium of $100 in addition to the above fees.

Prerequisite Requirements

A modem and IBM PC (or compatible) if results of searches are desired by e-mail.

▲ ADVANTAGES

Professionals doing the research work. No personnel required to be trained on an information search system.

▼ DISADVANTAGES

Costs for searches must be farmed out to another firm. Control of searches is done by providing an upset limit for search budget. Unless the budget is increased, some referenced may be missed.

INFORMATION CLEARINGHOUSES

Name

National Drinking Water Clearinghouse

Type of Infrastructure Covered

The purpose of this clearinghouse is to assist small communities in collection, development and disseminating timely information relevant to drinking water issues.

Jurisdiction Where in Use

Any small community that needs assistance in solving drinking water problems can benefit from this mechanism.

Agency or Organization Responsible

National Drinking Water Clearinghouse
West Virginia University, Morgantown, WV.

Contact

National Drinking Water Clearinghouse
West Virginia University
P. O. Box 6064
Morgantown, WV
26506-6064
Telephone: 1-800-624-8301
Bulletin Board System: 1-800-932-7459

DESCRIPTION

- The NDWC's services can help small communities find answers to save money, protect the public health, and improve their quality of life.
- Services include: A toll-free hotline to reach engineers, technical assistants, and customer service representatives eager to help small communities with drinking water problems.
- Educational Materials: NDWC offers more than 100 low-cost informational resources i.e. books, brochures and videos.
- Computer Bulletin Boards: Allows users to communicate with others around the country and to access toll-free information on drinking water.
- Computer Databases: Users can access articles from professional journals and obtain lists of manufacturers and consultants, innovative and alternative facilities and regulations.
- Newsletters: Over 10,000 readers receive this publication free, four times a year, called "On Tap". This newsletter provides readers with resource information, easy-to-understand regulatory updates and ideas for reducing treatment costs.

COSTS

National Drinking Water Clearinghouse is federally funded, and has received $1.165 million in federal funding since 1991.

- There is no cost for the quarterly newsletter entitled "On Tap".

▲ ADVANTAGES

This is a non-profit organization that is an affordable alternative to other costly information resources.

▼ DISADVANTAGES

Again the information being reported is American. It would be useful for Canadian Municipalities to be able to access a similar clearinghouse with reports on Canadian information.

INFORMATION CLEARINGHOUSES

Name

National Small Flows Clearinghouse

Type of Infrastructure Covered

The purpose of this clearinghouse is to help small communities find affordable wastewater treatment alternatives.

Jurisdiction Where in Use

Small communities that need help in solving wastewater treatment problems can benefit from this mechanism.

Agency or Organization Responsible

West Virginia University in Morgantown, WV

Contact

National Small Flows Clearinghouse
West Virginia University
P.O. Box 6064
Morgantown, WV
26506-6064
Telephone: 1-800-624-8301

DESCRIPTION

- Provides affordable alternatives to costly centralized sewers.
- Contributes to a cleaner environment.
- Improves the quality of life in small communities.

National Small Flows offers many services to smaller communities such as:

- Toll-Free Hotline: This line reaches engineers, technical assistants and customer service representatives.
- Educational Materials: Low-cost books, brochures and videos.
- Computer Bulletin Board: Wastewater treatment professionals have instant access to the latest information in the field through this service.
- Computer Databases: Databases with information from professional journals, listings of manufacturers and consultants, innovative and alternative facilities and regulations.
- Newsletters: Over 35,000 readers receive this publication, there are two newsletters published, Small Flows and Pipeline.

COSTS

National Small Flows is federally funded, and in 1994 was funded $1.35 million.

There is no cost for the quarterly newsletter entitled "Pipeline".

▲ ADVANTAGES

This is a non-profit organization, that is an affordable alternative to other costly information dissemination mechanisms.

▼ DISADVANTAGES

The information reported, is mainly American, very little Canadian information if any, is reported.

PUBLICATIONS

Name

AWWA Journal

Type of Infrastructure Covered

Linear, Water Treatment

Jurisdiction Where in Use

A United States based organization but standards are quoted internationally and magazine subscriptions are also available internationally.

Agency or Organization Responsible

American Water Works Association

Contact

American Water Works Association
6666 West Quincy Avenue
Denver, Colorado
80235
Telephone: (303) 794-7711

DESCRIPTION

AWWA Journal has articles relating to water works.

COSTS

Subscription cost is taken from AWWA membership dues.

If not AWWA member, subscription cost is US$85.00 for 12 issues.

Name

CIVIC Public Works

Type of Infrastructure Covered

Linear, Water and Wastewater Treatment

Jurisdiction Where in Use

A Canadian based publication.

Agency or Organization Responsible

Maclean Hunter Canadian Publishing

Contact

Subscription Department
CIVIC Public Works
P. O. Box 708, Station Main
Markham, Ontario
L6B 9Z9

DESCRIPTION

CIVIC Public Works has articles covering water supply, sewage treatment, roads and streets, solid waste management, grounds maintenance, parks, public utilities. traffic engineering, products and equipment

COSTS

Subscription cost is $36 per year for 12 issues.

PUBLICATIONS

Name

Environmental Science & Engineering

Type of Infrastructure Covered

Linear, Water and Wastewater Treatment

Jurisdiction Where in Use

A Canadian based publication.

Agency or Organization Responsible

Environmental Science & Engineering

Contact

Penny Davey
Environmental Science & Engineering
220 Industrial Parkway South, Unit 30
Aurora, Ontario
L4G 3V6
Telephone: (905) 727-4666

DESCRIPTION

ES & E has articles relating to the nature, collection and treatment of domestic and industrial water and wastewater.

COSTS

Subscription cost is $45 per year for 12 issues.

Name

ITE Journal

Type of Infrastructure Covered

Linear

Jurisdiction Where in Use

A United States based publication.

Agency or Organization Responsible

Institute of Transportation Engineers

Contact

Institute of Transportation Engineers
525 School Street SW
Suite 410
Washington, DC
20024-2797

DESCRIPTION

ITE Journal has articles covering transportation engineering and planning.

COSTS

Subscription cost is US$50 per year for 12 issues.

PUBLICATIONS

Name

WEF Water Environmental & Technology

Type of Infrastructure Covered

Linear, Water and Wastewater Treatment

Jurisdiction Where in Use

A United States based organization but magazine subscriptions are available internationally.

DESCRIPTION

WEF Water Environmental & Technology has articles relating to the nature, collection and treatment of domestic and industrial water.

Agency or Organization Responsible

Water Environment Federation

Contact

Water Environment Federation
601 Wythe Street
Alexandria, Virginia
22314
Telephone: 1-800-666-0206

DESCRIPTION

Subscription cost is taken from WEF membership dues.

Name

Centre for Expertise and Research on Infrastructures in Urban Areas (CERIU)

Type of Infrastructure Covered

Rehabilitation of all aspects of urban infrastructures.

Jurisdiction Where in Use

Canada

Agency or Organization Responsible

Centre for Expertise and Research on Infrastructures in Urban Areas

Contact

CERIU
321, de la Commune Street West
Suite 300
Montréal, Québec
H2Y 2E1
Telephone: (514) 848-9885
Fax: (514) 848-9992

DESCRIPTION

CERIU is an independent technology transfer centre, established to provide services to the many groups of stakeholders involved in urban instrastructure, including:

- contracting agents responsible for infrastructure such as municipalities, provincial and federal departments and non-governmental organizations;
- industry groups serving the needs of infrastructure; consulting engineers, contractors, manufacturers, and testing laboratories;
- professional associations;
- universities, schools and colleges which include courses related to infrastructure; and
- research centres.

Services provided include:

- a Technological Reference Centre;
- technical advice on individual projects;
- conferences and lectures;
- development and specifications and evaluation tools;
- development of demonstration and pilot projects.

COSTS

Individual services are provided on a fee for service basis.

▲ ADVANTAGES

Involvement of many infrastructure players and stakeholders as members of CERIU helps to ensure that programs are keyed to the needs and interests of infrastructure owners, designers and builders.

▼ DISADVANTAGES

The range of information is somewhat limited.

EDUCATION AND TECHNOLOGY TRANSFER

Name

Educational Program Innovations Centre (EPIC)

Type of Infrastructure Covered

Linear, Treatment and Community.

Jurisdiction Where in Use

Ontario

DESCRIPTION

- An educational training program that offers information on all aspects of infrastructure and more.
- By attending these seminars, one can increase their knowledge of recent advances in their field, and learn how to benefit by applying this knowledge to current projects.

COSTS

For a one-day seminar on any topic, the fee in 1994 was $454.75.

Agency or Organization Responsible

The University of Toronto and the University of Waterloo

Contact

Dr. Hira Ahuja
Professor at the University of Toronto
President of EPIC
Telephone: (416) 978-3907

▲ ADVANTAGES

- Maximum value for minimum time away from work.
- Opportunity to share ideas and solutions with like-minded peers.
- Instruction by people who make new ideas work on their projects.
- Selective topics explained in detail with the objective of showing you how to put the knowledge to use.
- Networking opportunities.

▼ DISADVANTAGES

Cost tends to be the largest limiting factor for many interest groups, and this training program, no matter how beneficial, is not the least expensive way to obtain information.

EDUCATION AND TECHNOLOGY TRANSFER

Name

Technical University of Nova Scotia (TUNS)
Centre for Water Resources Studies

Type of Infrastructure Covered

Linear and Treatment

Jurisdiction Where in Use

Small municipalities with small system needs.

Agency or Organization Responsible

Technical University of Nova Scotia

Contact

Dr. Don Waller
P. O. Box 1000
1360 Barrington Street
Halifax, Nova Scotia
B3J 2X4
Telephone: (902) 429-8300

DESCRIPTION

- A research centre for water and waste water information.
- Useful for rural municipalities with water and waste water problems.
- The Centre also generates many technical reports on various water and waste water issues.

▲ ADVANTAGES

A good source for smaller rural municipalities across Canada.

▼ DISADVANTAGES

The focus of this Centre for Water Resource Studies is limited to specific research on alternative water supply and waste water treatment. Someone looking for information regarding larger systems could be attracted to many of the reports published by TUNS, however, the reports are specific to smaller rural systems.

Name

Geometric Design Guide for Canadian Roads and Urban Development

Type of Infrastructure Covered

The original Design Guide, published in 1986, provides extensive national guidelines for the design of typical rural roadways. The supplement provides the same guidance related to urban roads.

Jurisdiction Where in Use

Canada

DESCRIPTION

Both the original Guideline and the Urban Supplement are in the form of an extensive looseleaf manual and include a Glossary and Index. They treat design considerations such as Street Classification Elements, Alignment Elements, Cross Section Elements, and Intersections. The Urban Supplement also includes material on Access, Streetscaping and Bikeway Design.

COSTS

Price for the Urban Supplement is $92.50 for non-members and $65.00 for TAC members.

Agency or Organization Responsible

Transportation Association of Canada

Contact

Transportation Association of Canada
2323 St. Laurent Boulevard
Ottawa, Ontario
K1G 4K6
Telephone: (613) 736-1350
Fax: (613) 736-1395

▲ ADVANTAGES

The Guideline and Supplement provide designers with a handy reference to guidelines and practices in roadway design.

▼ DISADVANTAGES

Some provinces may have their own guidelines and standards for road design. Since the Guideline is in print format, updates are not immediately available as they would be with an on-line service.

Name

Making Choices: Guidelines for Alternative Development Standards in Ontario

Type of Infrastructure Covered

All linear infrastructure related to new development.

Jurisdiction Where in Use

The guidelines were developed in Ontario but are applicable in other jurisdictions.

Agency or Organization Responsible

Ontario Ministry of Housing and
Ministry of Municipal Affairs

Contact

Alternative Development Standards
Ministries of Housing and Municipal Affairs
777 Bay Street, 2nd Floor
Toronto, Ontario
M5G 2E5
Telephone: (416) 585-6515
Fax: (416) 585-7607

DESCRIPTION

The guideline document presents a range of alternative planning and engineering standards for consideration in the design and development of residential subdivisions. It is intended to serve as a "tool kit of ideas for streets and neighbourhoods that are more liveable, affordable and adaptable and that allow more of the natural environment to be preserved".

The Guideline is available in print format from the Ontario government.

▲ ADVANTAGES

The format of a guideline, rather than a formal code or standard, allows the document to be widely used as a reference by those municipalities wishing to develop new approaches.

▼ DISADVANTAGES

The document is based on Ontario conditions and practices only.

Name

National Infrastructure Code

Type of Infrastructure Covered

Linear — Surface and buried infrastructure for water and sewer lines, roads and streets. Also, buried systems for electricity and gas.

Jurisdiction Where in Use

N/A

DESCRIPTION

NRC is proposing to develop and implement a National Infrastructure Code to "(facilitate) the evaluation, adoption and implementation of the best, most cost effective technologies". The planned Code would contain the following:

- Manuals of good practice for construction, rehabilitation and management;
- Model specifications and performance criteria;
- Tendering and contracting documents;
- Evaluation reports on new technologies;
- Operations and maintenance guidelines; and
- Provincial or regional supplements for local climatic and sub-surface conditions.

Development of the Code would involve a five year process in partnership with industry and other stakeholders.

COSTS

Development costs are estimated at $24 million for activities such as analyses, policy and technical committees, required research studies and costs of publication, dissemination and related training seminars. They would be raised through contributions from NRC ($13 M), clients ($4 M) and others ($7 M).

Clients' contributions to the project would vary depending on the size of the municipality or province and range from $1,000. to $100,000.

Information on operation costs and requirements re: ongoing contributions is not available.

Agency or Organization Responsible

The National Research Council's Institute for Research in Construction

Contact

Guy Felio
National Research Council
Infrastructure Laboratory
Ottawa, Canada
K1A 0R6
Telephone: (613) 991-5354

▲ ADVANTAGES

Proponents suggest that the development of a national infrastructure code would:

- Eliminate interprovincial/municipal trade barriers through harmonization of technical standards;
- Enhance industrial and national competitiveness through wider application of cost-effective technologies;
- Provide higher payback on infrastructure investments by facilitating the purchase of cost-effective technologies;
- Provide effective technology transfer for new technologies; and
- Position Canada within the North American market by providing for national evaluation and testing of new Canadian technologies.

▼ DISADVANTAGES

- Various infrastructure solutions are appropriate to different types of communities and climatic situations. Some have implications for levels of service in a national code. It may be difficult to allow for regional and community specific circumstances. This could lead to "gold plating" in some circumstances and to less than optimal solutions in others.
- Development of a national infrastructure code will involve considerable expense. Expenses will also be incurred to maintain the code and provide updates.
- Expansion of the code into areas such as water and wastewater treatment and waste management will involve additional development expense.

Appendix 5

Attendees at the April 7, 1995 Toronto Focus Group Session

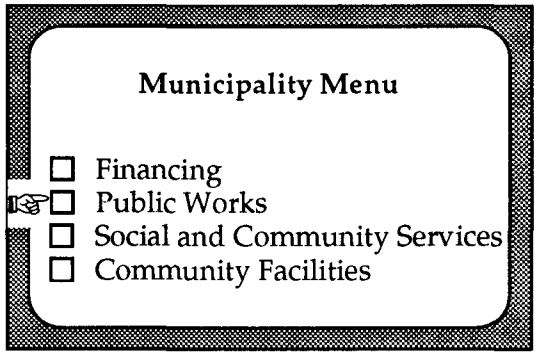
Attendees at the April 7, 1995 Toronto Focus Group Session

Name	Affiliation
Baird, William Town Engineer	Gander, Nfld
Bednar, Teresa Water Works Operations Engineer	Scarborough, Ont.
Corbett, Laurence Water and Sewer Engineer	Fredericton, N.B.
Félio, Guy Director, Infrastructure Lab	NRC (Ottawa)
Gohier, Leo Director of Infrastructure	Hamilton-Wentworth, Ont.
Melman, Neil Manager of Planning and Development	City of York, Ont.
Pastor, Marie-Hélène Economic Researcher	CMHC (Ottawa)
Rosenberg, John Engineer Technician	Terrace, B.C.
Sajatovic, Steve Director of Planning and Economics	North Bay, Ont.
Gates, Chris Marshall, Brian	REIC facilitator REIC facilitator

Appendix 6

Preliminary Internet Municipal Index Page

Main Menu



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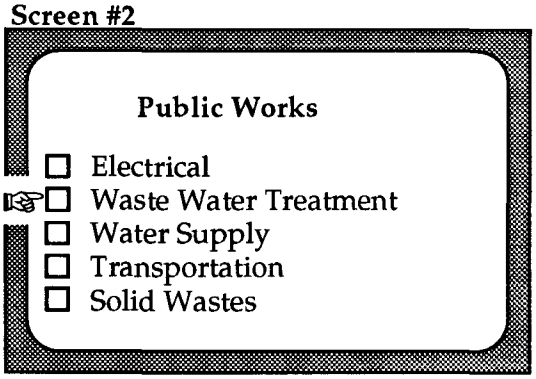

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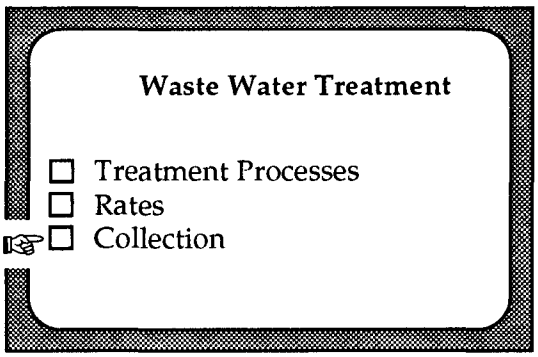

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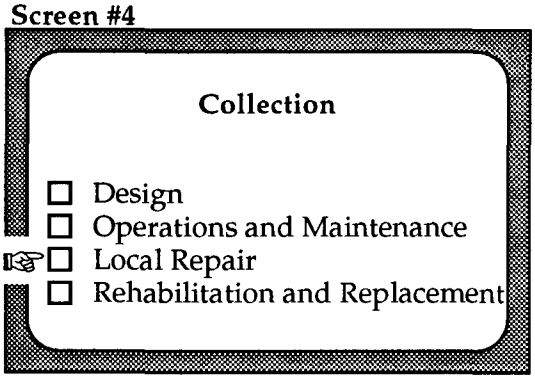

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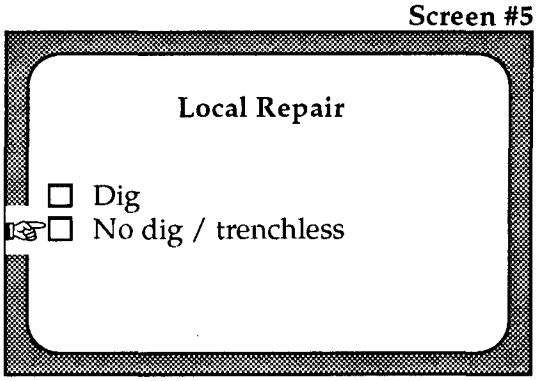

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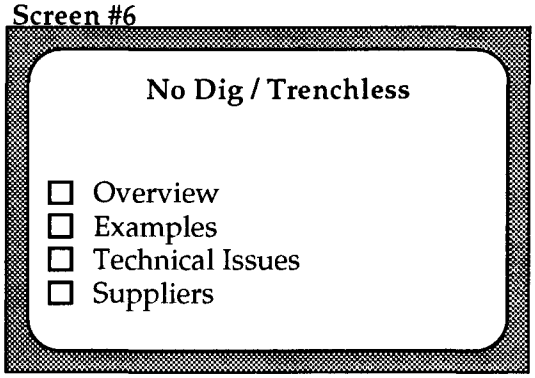

Final Screens

Overview

- brief system overview
- advantages
- limitations
- market uptake/ potential

Suppliers

- equipment suppliers
- product suppliers

Examples

- location / issues
- different applications costs and results
- contacts
- lessons learned

Technical Issues

- research reports
- contacts
- future developments
- publications

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