

A FRAMEWORK FOR IMPROVING WATER SERVICES
IN MANITOBA'S REMOTE COMMUNITIES

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ABSTRACT

Remote communities in northern Manitoba are characterized by low levels of water supply and sewage management service. Residents of remote communities, community organizations, and actors in the political and bureaucratic systems have identified the improvement of water and sewer services as an objective. Although there is agreement at all levels on the objective there is no consensus on the magnitude of the financial and physical commitment of resources that should be directed toward achieving the objective.

This practicum defines the water services problem in remote communities, provides the framework of a program that could aid in the improvement of water services and examines criteria important to the implementation of the program. The framework for the improvement program is adapted from a similar framework developed by the Manitoba Department of Northern Affairs. Most of the data used to explain the criteria and to illustrate implications of the program is from the Department of Northern Affairs.

The aim of the practicum is to present a reasonable

program for improving water services along with information that will aid in the rational implementation of the program. The data is presented so as to be operationally useful to decision makers and program planners. Illustrations of the use of the data contained in the appendices reflect the author's own perceptions of the problem.

The practicum does not provide an orderly set of steps leading to water service improvement in remote communities. For instance, the suggested method of prioritizing communities in order to phase-in the program results in a guide to allocation of resources, not in a prescription for development. The program framework and criteria presented in the practicum provide a system within which difficult decisions regarding allocation can be made under conditions of reduced uncertainty as to implication.

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Chapter 1

INTRODUCTION

Residents and local leaders in remote communities, elected representatives at all levels and departments in the provincial and federal governments have identified the improvement of water services in remote communities as an objective.¹ Upgrading the level of water services elicits the prime management problem; the allocation of limited resources among competing uses and users over time. This management problem takes on a different aspect in remote northern communities because the financial mechanisms to allocate resources are not yet well developed. At the same time there are political and social objectives that must be achieved in spite of the absence of conventional linkages that normally operate to co-ordinate those objectives.

It is the intent of the practicum to provide those involved in making allocation decisions in the area of water service with information that may aid in the

¹For the purpose of this practicum "remote communities" are comprised of communities under Department of Northern Affairs jurisdiction and Indian reserves located in the same jurisdictional zone. A list of the communities appears on page 46.

making of efficient and equitable decisions. The following chapters define the problem, propose a program designed to correct the problem and relate the program to criteria that are important for implementation. The application of the criteria to the problem of allocating water service improvements between communities is not meant to define the only set of options. The aid to decision making lies in making the rationale for choice more explicit.

THE PROBLEM IN PERSPECTIVE

The term "community water services" refers to the methods by which residents of a particular community get water for their various purposes and manage sewage wastes. The schematic diagram, Figure 1, page 3, clearly outlines the components of a community water services system.

A detailed inventory of water and sewer systems in remote communities revealed that although sophisticated systems were operating in many communities very few homes were served by those systems. Of all communities under Northern Affairs jurisdiction only Waboden has comprehensive water services serving a majority of homes in the community. Cranberry Portage will soon have a system in operation. Of all the 55 communities

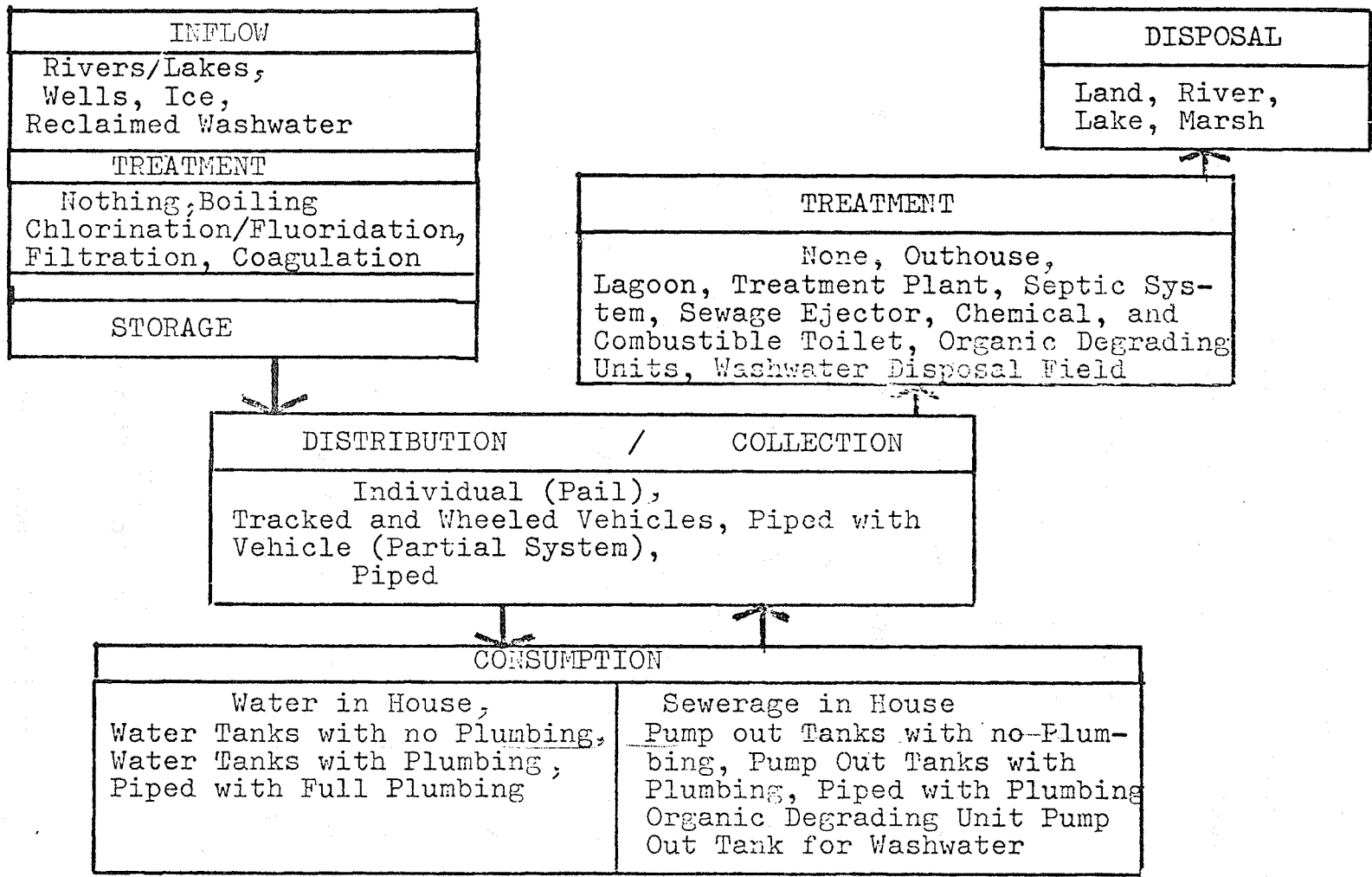


Figure 1*
Water and Sanitation System Schematic

*Adapted from "Evaluating Alternate Levels of Water and Sanitation Services for Communities in the Northwest Territories," by J. Gamble, T.L. Jansson, Conference Paper.

surveyed for the systems inventory none had comprehensive water services.³ Many residents of remote communities rely on unsophisticated methods of procuring water and disposing of wastes (i.e., pail from the source, waste disposal by pit privy).

In any particular community the school and nursing station or hospital generally have a supply of treated water and a theoretically dependable method of sewage treatment. These users sometimes share the same system. Nurses' residences, teacherages, and a few homes near the facility may also be serviced on the system. The missions usually have some form of water and sewage treatment. Band halls and community buildings sometimes have treated water with some form of sewage treatment. The only other user that consistently has a treated water source is the local store. In a few communities individual homes have piped water and individual septic systems.

Not surprisingly, the standard of service revealed by the inventory compares unfavourably with service standards in southern Manitoba. While not all communities

²The inventory formed a part of an internal report done for the Department of Northern Affairs by the present author.

³The inventory included both Northern Affairs and reserve communities throughout the north. A more in-depth inventory of systems in reserve communities has since been completed by the Department of Indian Affairs and Northern Development, Manitoba region.

of comparable population in southern Manitoba have running water in the home, most of them do have a safe source of drinking water publically available.^{4,5}

Local service performance standards derived for communities in southern Manitoba recommend 1.0 miles of water main and 3.0 miles of sewer main per 1,000 population.⁶ The recommended performance standard is determined as the average units of service and utility requirements per thousand population. The difference between the recommended performance standard and the actual performance standard is called the preferred performance increment. Since the actual performance standard is almost zero in Manitoba's remote communities the preferred performance increment and the recommended performance standard are essentially equal. Actually, the recommended performance standard for southern communities cannot be applied indiscriminately in the northern

⁴"Waterworks and Sewage Systems in Manitoba as of December 31, 1973." Department of Mines Resources and Environmental Management, Province of Manitoba.

⁵Working Paper No. 3, Analysis of Community Services and Facilities. Regional Analysis Program Southern Manitoba. Program advisors: Carvalito Page Group, 1974, pp. 18-23.

⁶Simulation of Local Government Performance, Revenue and Expenditure Alternatives. H.A. Blase, J.A. MacMillan, F. Tung, Research Bulletin No. 73-1, Faculty of Agriculture, University of Manitoba. May, 1973, p. 3.

context. Differences in surficial conditions and settlement patterns suggest that more miles of water main and sewer pipe per 1,000 population may be necessary to achieve equal performance standards in the north and the south.

The situation in northern Manitoba is no different from that in other remote areas in Canada. Remote communities in the provinces and the territories all have relatively low levels of water services. The authors of the Proposed Water and Sanitation Policy for the North West Territories observed that:⁷

The general level of service is substantially inferior to that existing in communities of comparable size elsewhere in Canada... There is rarely any community wide organization of services even at the most basic level. The result is that each community has a number of different systems for water and sanitation few, if any of which are designed to operate for the betterment of the community as a whole.

WATER QUALITY

Remote communities in northern Manitoba fall into two geologic zones; pre-cambrian and paleozoic. Communities in the pre-cambrian zone usually have relatively high quality sources of raw surface water. Those

⁷A Review of the Proposed Water and Sanitation Policy with Recommendations on Implementation, (Government of the Northwest Territories, August, 1973), pp. 3 and 8.

communities located in the paleozoic, or limestone-dolomite region have raw water sources of variable quality. Aquifers in many locations are saline and surface sources are often turbid. More intensive treatment of raw water in these communities is required to achieve drinking water objectives outlined in Canadian Drinking Water Standards and Objectives.⁸ All surface water sources require treatment in order to meet drinking water quality objectives. In fact, it is not always feasible to meet drinking water objectives completely. The objectives should be viewed as standards for evaluation.⁹

⁸Canadian Drinking Water Standards and Objectives, (1968), Health and Welfare Canada.

⁹Water quality observations from Materials for a Sewer and Water Policy for Manitoba's Remote Communities, an internal working report done for the Department of Northern Affairs by the present author.

WATER SUPPLY IMPROVEMENTS

On the basis of the material presented so far a case could be made for upgrading the standard of water service in remote communities to the level of southern Manitoba. Guidelines for the Seventies, a document which outlines provincial planning objectives, proposes policies directed at eliminating the duality of the north; the gap between the comparatively high standards of living in the urban industrial centres and the poverty and lack of opportunity that characterizes remote communities.¹⁰ In part these policies are directed at creating linkages between the dual structure of the north, in part they are directed at the improvement of infrastructure and services within the communities to contribute to their viability. The four principles which form the core of "Guidelines" are all relevant to improvements in water services standards. The principles are:¹¹

(a) maximization of the general well-being of Manitobans.

(b) greater equality of the human conditions through a more equitable distribution of the benefits of development.

¹⁰Guidelines for the Seventies, Vol. 3, Regional Perspectives, (Province of Manitoba, 1973) p. 57.

¹¹Ibid., Vol. 1, Introduction and Economic Analysis, p. 13.

(c) implementation of a stay option which will prevent Manitobans from being coerced by economic forces to leave their province or to leave the region within the province in which they prefer to live.

(d) promotion of public participation in the process of government and in the development decisions which will affect all Manitobans in the years ahead.

The need for improved services in remote communities can be outlined in two ways. Objective measures such as health statistics have the advantage of being succinct. The incidence of gastroenteric infections in a given population is the most common measure of problems in a community water system. Although gastroenteric infections are commonly attributed to contaminated drinking water, it is difficult to establish causality in many instances because other factors such as eating habits and general sanitary conditions are closely related to intestinal disorders.¹²

The Norman region of Manitoba,¹³ although it has only 7% of the provincial population, accounted, in 1973, for about 25% of all reported cases of gastroenteric

¹²See for example, Control of Communicable Diseases in Man. Abram S. Beneson, (ed.), American Public Health Association, pp. 71-76.

¹³The Norman Region includes all Territory in the Province above the 53rd Parallel.

disease.¹⁴ In 1972 the rates of hospital discharges for intestinal infections (per 1,000 population) in Northern Manitoba were:¹⁵

Group	Treaty Indians	Residents of Unorganized Territories	Other Northern Manitobans
Rate/1000 popula- tion	18.3	20.8	7.5

For all Manitobans, the rate of hospital discharges for enteric infections was 3.9/1,000 population (1972). Provincial and federal health statistics and studies on the health status of residents of remote communities indicate that enteric infections are a problem. A high incidence of skin infection is also related; in part, to low levels of water services.¹⁶

¹⁴Summary of Communicable Diseases. Department of Health and Social Development, (1973).

¹⁵Source: Northern Health Liason Committee, 1974. Note: by one estimation the actual incidence rate may be as much as 10 times higher than indicated here due to the number of unrecorded cases in remote communities. "Unorganized Territories" correspond closely with remote communities.

¹⁶Control of Communicable Diseases in Man. op. cit., pp. 216-218.

The other way to demonstrate the need for improved services is to examine "felt need". Spokesmen for residents of remote communities frequently cite the lack of sanitary facilities as a major community problem. Awareness of the importance of dependable water supply and waste management systems is growing as a result of government programs and as contact with all sectors of society increases. There is recognition of the role of basic infrastructure in community development. Organizations such as the Northern Association of Community Councils, The Manitoba Indian Brotherhood and the Manitoba Metis Federation have all expressed concern about water supply problems in remote communities. Northern M.L.A.'s have identified the development of safe water supplies as a major priority within their region. Several government departments have actively focused on water problems in remote communities.¹⁷

Examination of "felt need" in regard to water services shows that objectives at different levels are consistent. That is, at individual, community, regional and governmental/bureaucratic levels the objective of

¹⁷Departments include Provincial Northern Affairs; Health and Social Development; Mines, Resources and Environmental Management; Federal Departments of Health and Welfare; Indian Affairs and Northern Development; Environment Canada; Regional and Economic Expansion.

improved levels of water services meshes. This is an important condition since success in fulfilling an objective depends not only on decisions and desires in a particular community but also on objectives of entities such as the province and the nation.¹⁸

The objective is clear; what remains to be determined is how much priority the different parties are willing to assign to achieving the objective. Assigning priorities can be looked at in terms of the costs and benefits involved in making any decision.

COSTS AND BENEFITS

In fact, formal cost/benefit studies are not usually done in the evaluation of improvement of water services. Human health cannot easily be reduced to economic terms. True, shadow prices for the cost of illness in terms of reduced productivity and increased health costs can be derived. However, communities usually improve their water service without formally considering the payoffs involved. In a sense improved water services are perceived as good in themselves.

¹⁸C.F. Framingham, J.A. MacMillan, and P.E. Nickel, Guidelines for Community Planning, Extension Bulletin No. 73-1, (Faculty of Agriculture, University of Manitoba, February, 1973), p. 34.

The costs of improving water services in Manitoba's remote communities will be relatively high. Costs for any particular community will vary with the level of service chosen but generally the alternative chosen will be more expensive in the North than in southern Manitoba. The reasons for the increased costs in the North are many and they do not, obviously, apply with equal force to each community.

Isolation increases costs since additional transportation expenses are necessary. Depending on the modes available and distances involved, transportation costs add substantially to the price of materials shipped from the South. Isolation also makes repair of equipment involved in water and waste systems more difficult and expensive.

Surficial conditions in many remote communities preclude or raise the cost of some alternative systems. Bedrock outcrops are common in pre-cambrian regions. The cost of trenching through bedrock for any significant distance is prohibitive. Surficial conditions such as thin overburden, permafrost and muskeg also affect the operation of septic fields, the siting of lagoons, and laying out pipe.

Climatic factors contribute to the cost differential between north and south. For pipe systems engineers recommend burying pipe 13-15 feet to avoid freezing.

Often, especially in zones of bedrock outcrop this is not feasible. Heat taped, insulated, pipe or utilidor systems are alternatives, but costs are significantly higher than with the conventional systems common to the south. Climatic factors also limit the length of the working season for some tasks. Lagoon treatment is less efficient in the north, compared to southern Manitoba and lagoons must be built correspondingly larger due to the longer retention time. Freezing of water outlets and water service technology is a constant problem in the winter and operations and maintenance costs reflect this problem.

The final reason for the high cost of improved water services is the settlement pattern characteristic of remote communities. For the purpose of water services two factors are noteworthy. First, the density of homes within the community is generally low. Second, homes and buildings are not organized on a grid planning framework.¹⁹ Most remote northern communities have grown in response to local environmental features such as lake shore or river course. The implication of different types of settlement patterns in terms of the cost of providing sewer and water services and for selection among alternative systems is obvious. Servicing a linear,

¹⁹Kennedy/Smith Associates, Housing Study, Isolated Communities and Indian Reserves, Prairie Provinces, Vol., I, (1967), p. 14.

dispersed, community of four miles with piped water is not a reasonable option. The rationalized sewer and water systems provided to new southern sub-divisions are inconsistent with the realities in remote communities.

Further aggravating the improvement of water services in the remote north is the chronic shortage of contractors available and high costs during the construction phase. Government policy has been directed at involving the local labour force in northern construction. The result of this development policy is that immediate construction costs may be higher due to lack of job experience and a fluctuating work force. When combined with the fact that breakdown of equipment is more frequent in the north these factors result in costs of construction in the north which are roughly 150 to 300% of the costs in southern locations.²⁰

Consideration of "who pays" and "who benefits" is critical to discussion of costs and benefits involved in any public project. In the case of improved water service in remote communities it is clear that the communities themselves will usually be in a position to pay only a small portion of the costs. The population of most of the remote communities is relatively small, the

²⁰Personal Communication. John Reader, Engineering Services, Department of Northern Affairs. This is a very rough estimate.

average population of all communities discussed in this practicum is 477. A large portion of the population is under 15 (50% in some communities) so that the proportion of potential wage earners is relatively small. Most communities do not have a municipal assessment; where an assessment has been done tax collection has been limited. For the most part it is expected that funding for improved water service will come primarily from provincial and federal sources.

From one perspective, the funding structure could be viewed as a mechanism for income re-distribution. Projects that tend to benefit the poorer and disadvantaged members of our society are often given priority over projects that benefit the well to do. However the question of income re-distribution is peripheral to the objective of improved water services.

On the benefits side, improved water services ought to raise the health status of residents of remote communities. To some extent high health costs in Northern areas may be offset by developing safe drinking water and waste management systems in northern communities. In one documented case health costs were reduced by 30% after installation of a water and sewage system on an Indian reserve in British Columbia.²¹

²¹Interdepartmental Memo - Dr. T. Tulchinsky, Manitoba Department of Health and Welfare, (Northern Affairs Files).

Other benefits may include a more attractive context for economic development, creation of jobs within the communities, increased cash flow and in the provision of a stimulus for community self-development. Investment in water services improvement could be considered an investment in "social overhead capital" which can act as a catalytic agent for other development.²² The convenience of a sophisticated level of water services and increased resident satisfaction could also be viewed as benefits.

CAVEATS

The main objective in improving water services in remote communities is to raise the health status of the residents. Nevertheless, improving water services, while probably only a necessary condition in achieving the objective, will not be sufficient in isolation. The measure of success likely to be used, the incidence of gastroenteric infection, may not show the expected response to upgrading of services. There are many factors related to gastroenteric disease; water supply is only one. Improved housing, improved nutrition and educational programs would all contribute to improved

²²Proposed Water and Sanitation Policy,
op. cit., p. 4.

health for residents of remote communities. Sufficiency in programming for health improvement will likely occur only through an integrated set of policies. Any single policy may only satisfy one of many necessary conditions.²³

The case for upgrading water services in remote communities is a compelling one. The critical questions are to what level should water services be upgraded and how many public dollars should be directed toward the objective.

The concept of opportunity cost is always useful in consideration of any program of public expenditure. Looking just at remote communities and forgetting for the moment public expenditures outside the communities, there are many programs to which public funds could be allocated. Some of these programs reinforce one another, some conflict. Expenditure of a great deal of money on one program -- upgrading water services -- may mean that other programs and other alternatives are foregone. The challenge here is for a thoughtful ordering of community priorities by the community.

From the provincial and national point of view consideration of opportunity cost is equally valid. The general objective of all public programs is to maximize social welfare. Expenditure of large amounts of public

²³Personal Communication - Brian Katz. Public Policy, (University of Manitoba).

funds on water service improvement in remote communities may be a less efficient and equitable use of funds than other alternatives.

There is uncertainty concerning the role and future of remote communities. Population projections over the long term, even for the next twenty years, are difficult to make since the communities are presently involved or will become involved in a process of rapid social and economic change. Questions as to the strategies of local development, the balance between investment in social overhead capital and directly productive activities, for example, have to be considered in light of overall development guidelines.

As guidelines for development in remote communities, the principles stated in the government of Manitoba's Guidelines for the Seventies are philosophically interesting but operationally vague. In the interlocking system of social change, various objectives and decision making at local, regional, provincial and national levels there are no clear policies on infrastructure development and linkages with other components of development.

For this reason there is a need for a thoughtful prioritization and evaluation of water service improvement objectives to ensure efficient allocation of

scarce resources. The programming and evaluation of water service objectives should be directed so as to obtain maximum benefits in terms of health, equity and social justice in the north.

Chapter 2

OUTLINE OF PROPOSED FRAMEWORK FOR UPGRADING WATER SERVICES IN REMOTE NORTHERN COMMUNITIES

Introduction

In response to the need for improved water service a working group was established in September, 1974 within the Department of Northern Affairs. The working group was directed to produce a feasible program to upgrade water supply and sewage management services. Any proposed program had to meet two tests. First, it should assist communities in obtaining the service they require. Second, the program had to provide implementing agencies with operation guidelines in the area of sewer and water system improvement. The framework outlined here borrows heavily from the program devised by the working groups, especially in the structure of the approach.

The approach chosen to satisfy the requirements of the improvement program consists of a two level framework. In the short term, many remote communities require a public source of safe drinking water. The first priority in the improvement process is the development of a basic water supply source in each remote community. A longer term objective is the provision of higher levels

of water services in remote communities.

A. Basic Water Service.

1. The implementing agency will be responsible for the provision of one or more safe drinking water sources in each community in the Program Target Region, reasonably accessible to the majority of residents for twelve months of the year.
2. Water for drinking, culinary and other domestic uses must be safe and should be palatable and aesthetically appealing. It must be free from pathogenic organisms, deleterious chemicals and radioactive substances and should be free from objectional colour, odour and taste. The quality of safe drinking water provided should be within the maximum permissible limits or objectives as set down in the Canadian Drinking Water Standards and Objectives, (1968).²⁴
3. Additional Safe Water Sources. Additional sources will be considered for any isolated enclave of more than ten permanently occupied homes. Additional sources negotiated between the implementing agency and the community should reflect the physical characteristics of the community. The implementing agency will recommend a solution in the event of disputes over the provision of additional sources.

²⁴Canadian Drinking Water Standards and Objectives, Canada Department of Health and Welfare, (1968).

4. Sewage Treatment. Since a significant increase in the amount of water consumed in each household is not expected as a result of basic water supply improvements an upgrading of the sewage treatment system is not immediately necessary.

5. Funding/Administration.²⁵

a. Capital Cost. The implementing agency will be responsible for the total capital cost of providing the basic water service.

b. Operation and Maintenance. The implementing agency will retain complete ownership of the basic water system and thus will be responsible for operation and maintenance of the system. After a one year start up period the community will be responsible for the total operation and maintenance cost of the system.

B. Higher Levels of Service.

1. Water Supply. Higher levels of service imply distribution systems. Distribution is generally the most costly element in more sophisticated water supply systems.

There are two higher levels of service possible. The first of these is an extension of the basic water supply source to additional distribution points

²⁵A summary of Financial Assistance comprises Appendix A.

within the community. Standpipes at varying standpipe/population ratios or additional community wells or pumping stations would provide this level of service.

The second level of service would be delivery of water to the individual home, by truck or by pipe.

2. Sewage Treatment. Sewage services consist of collection and treatment of sewage. Demand for water within the homes in a community dictate the level of waste management services the community should receive. For this reason a water based system cannot be considered until the community expresses the desire for home delivery of water.

Individual in-house systems such as the Clivus or mull-toa composting toilets seem quite natural for many remote communities, but the use of such systems should only be recommended after an engineering study shows them to be safer and/or more economical than conventional systems of collection and treatment.²⁶ Such in-house systems are currently being tested for use in northern communities.

²⁶Both these individual in-house systems rely on organic composting of sewage wastes. For an indepth analysis of this new waste management technology in a northern context see L. Sherwood, A Feasibility Study of 3 Alternative Waste Management Systems for Remote Northern Communities, (Natural Resource Institute, University of Manitoba, 1975).

Where a community opts for a house delivery of water, a compatible level of sewage treatment is necessary. For the purpose of recommending a level of sewage treatment the communities are grouped into two categories based on 1971 population. In communities with less than 200 residents no community sewage treatment system will be provided, nor will a higher level of water supply be considered. Residents in these communities may avail themselves of installing individual in-house systems, if they desire. Cost sharing is available for this option.

For communities with population in excess of 200 the following waste management services may be provided.

- a. Collection of sewage by trucks from holding tanks will be considered as being the compatible level of service (to take care of the second level of water services). A single truck collection operation may serve more than one community.
- b. Comparable (or higher) levels of sewage treatment systems, such as gravity and in-house systems will be considered when a community applies for a higher level of water services. Such systems may be recommended when it is uneconomical or impractical to provide a truck collection system.

3. Funding/Administration.

Level 1

- a. Additional points of water supply (above the basic water supply) will be made available to the residents upon application to the implementing agency.
- b. Capital Costs. The capital cost of providing the additional sources would be on a 75/25 cost sharing basis between the implementing agency and the community.
- c. Operation and Maintenance. After a start up and training period of two years ownership of the system will pass to the community as will responsibility for operation and maintenance costs. The community may opt to leave ownership with the implementing agency in which case it will be billed for the operations and maintenance costs by the agency.

Individual Systems.

- a. Assistance will only be provided upon recommendation of the implementing agency after requests from individuals in communities where higher levels of water and waste management systems are not anticipated or where service by a community system is impracticable.

- b. Capital Cost. The capital cost for the installation of individual domestic systems would be split on a 50/50 basis between the implementing agency and the individual owner.
- c. Operation and Maintenance. The individual home/property owner or resident will be responsible for total operation and maintenance of all systems within his/her property and as such will retain complete ownership of the system.

Level 2.

- a. Due to increased water consumption within the home improved sewage treatment systems are necessary.
- b. Capital Costs. The capital costs involved in providing a high level of water service and a comparable sewage treatment system will be shared on a 75/25 basis between the implementing agency and the community. The agency will also install in-property and in-house fixture's and plumbing and the costs will be shared on a 50/50 basis between the agency and the individual property owner. The agency will bill the community to recover the community's and the property owner's share of the capital costs.
- c. Operation and Maintenance. The ownership of all distribution and collection systems, (except for individual in-house waste systems) and thus

responsibility for operating and maintaining the service will pass to the community after a two year start up and training period. Operation and maintenance costs would be paid by the community from whichever revenue sources it deemed appropriate. It is suggested that a rate ceiling be set on the economic rate²⁷ for water and sewer services above which the implementing agency would provide an operating subsidy. The operation and maintenance of in-house and on-property fixtures will be the responsibility of the individual property owner.

Implementation

There is a need for a joint federal/provincial approach to implementing the program. Water Service improvement is most effectively achieved by planning for entire communities regardless of jurisdictional divisions. A likely mechanism for achieving a joint approach is through the Federal Department of Regional and Economic Expansion (D.R.E.E.). Improvement of water services

²⁷The economic rate is based on the actual operation and maintenance costs incurred in the distribution of water and the collection of sewage. Commercial, institutional and government users may be assessed this rate.

could be carried out under the Manitoba Northlands Development Agreement. One of the sections of this agreement deals with human development and community services. Programs and projects in this section are designed "To assist families and communities in providing a social and physical environment conducive to improved quality of life and participation of people in community affairs and development opportunities".²⁸ Indian reserve communities may participate in these programs on request of band councils and with the co-operation of the Department of Indian Affairs and Northern Development (D.I.A.N.D.).

The actual composition of the implementing agency could be determined in negotiations between D.R.E.E., D.I.A.N.D. and the Department of Northern Affairs (D.N.A.). The final structure of the implementing agency should account for the training and local government development functions necessary for higher levels of services as well as for construction and engineering considerations. Mechanisms for evaluation and assessment of the water service improvement program should be built into the structure and function of the implementing agency. In brief, the functions of the implementing agency include:

²⁸Canada -- Manitoba, Interim Subsidiary Agreement, Manitoba Northlands, (1974), p. 6.

(1) Determination of the order in which basic water services may be delivered to communities affected by the Manitoba Northlands agreement.

(2) Adjudication of disputes over the provision of additional water sources within the context of the basic water service.

(3) Recommending engineering studies be initiated for providing service to communities in order of prioritization.

(4) Determination of the order in which higher levels of service are to be delivered.

(5) Consultation with communities on the cost implications of various systems (both basic and higher level) and the rate structures for the higher level of service.

(6) Exchanging information with various provincial and federal departments and agencies and with other interested groups.

(7) Beginning the development of systems within budgetary constraints.

(8) Initiation of training programs for local operators of community systems.

(9) Ensuring ongoing evaluation and assessment of the program and its output in order to adjust the program guidelines where necessary.

All communities will be considered for upgrading to the basic water service level. For higher levels of service the implementation process is shown diagrammatically in Figures 2 and 3.

The following chapters provide a discussion of some of the criteria that may aid the implementing agency in its tasks.

PHASE 1

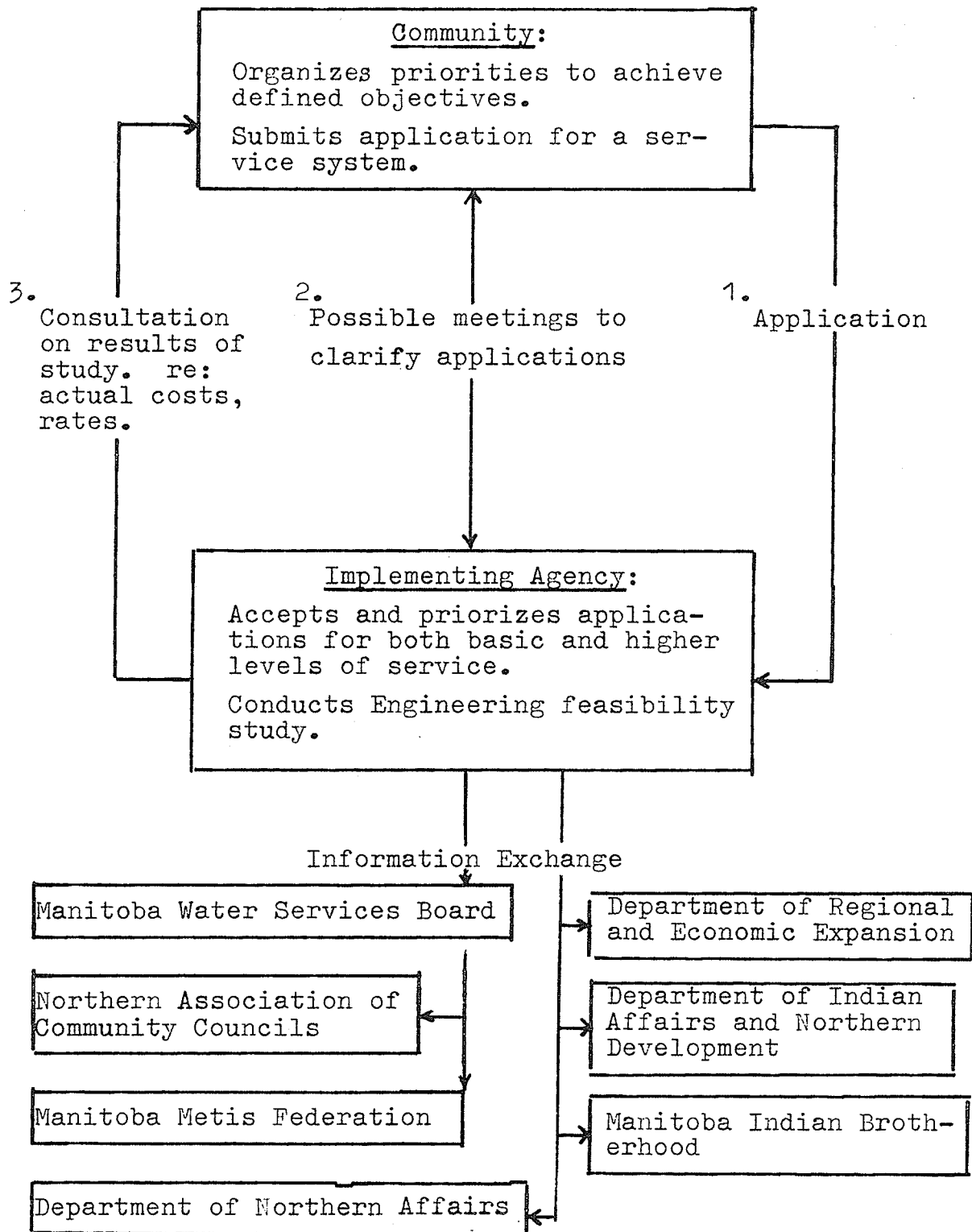


Figure 2

Flow Diagram of Water and Sewage System Implementation

PHASE 2

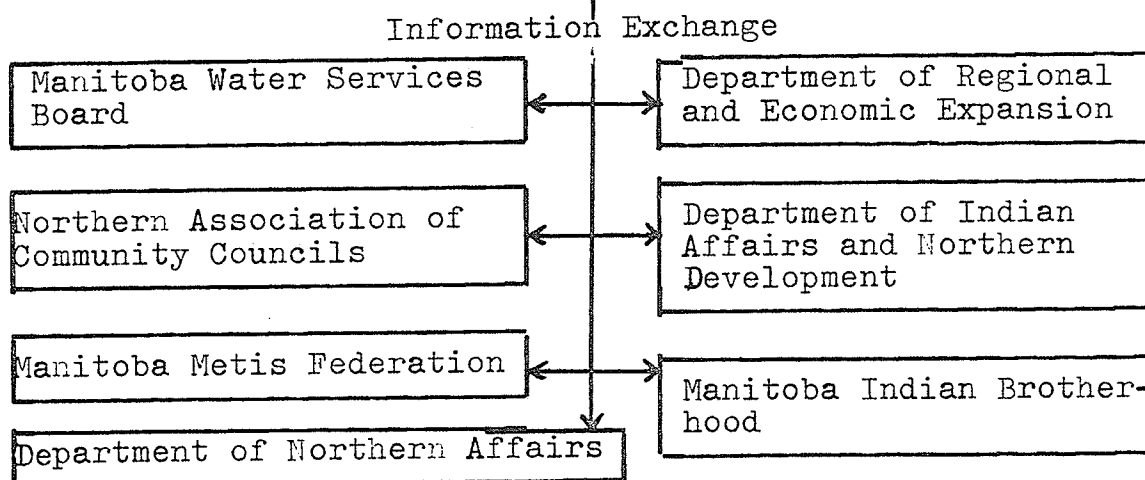
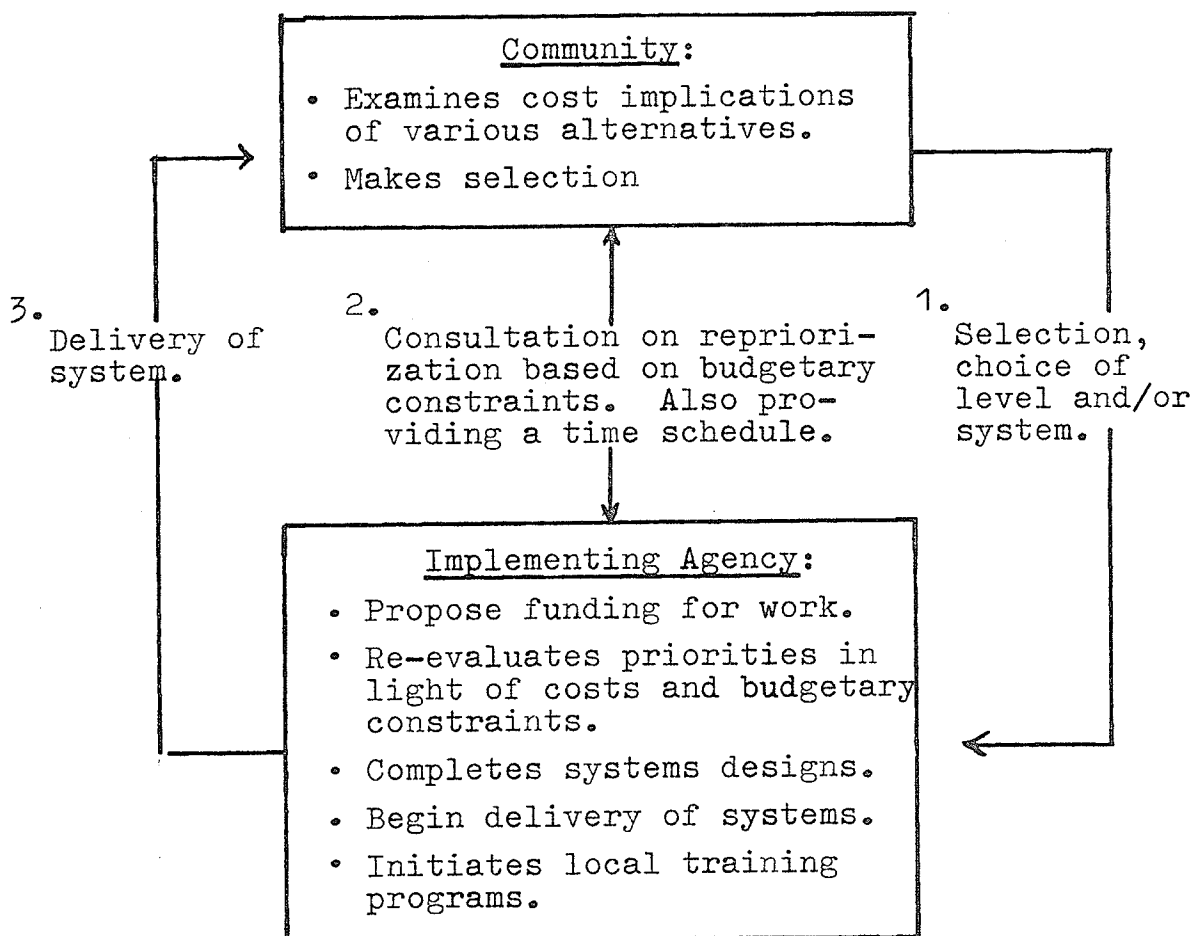


Figure 3

Flow Diagram of Water and Sewage System Implementation

Chapter 3

HEALTH CRITERIA

The objective of water service improvement is to raise health standards of people living in poorly serviced communities. Theoretically, the most direct method of allocating funds for improvements over time would be to examine health records community by community and rank the communities by water-related disease incidence rate. Unfortunately, the procedure is impracticable for two reasons:

(1) Available health data does not extend over a significant time period or is simply unavailable for many remote communities.

(2) The health indicators themselves are subject to various medical and statistical interpretations.

The best use of health statistics is for comparisons between regions or between groups within the region. For example, Table 1 compares the province as a whole, the northern region, unorganized territories, and Indian bands by selected disease type.²⁹

²⁹Source: K. Kavanaugh, Statistical Analyst, M.H.S.C. The statistics are for 1973.

Table 1
Administrative Entity by Disease Type and Rate

Group	Incidence per 1000 pop.	Salmon- ella Infec- tions	Bacillary Dysentery	Food Poison- ing	Enter- itis	Unspecified Dysentery and Diarrhea
Province	.017		.106	.03	.21	4.60
Northern ³⁰ Region	-		.156	.03	.18	10.77
Unorganized Territories ³¹	-		.75	.14	.89	19.48
Indian Bands		.20	.40	.06	.67	18.52

The data available does not permit valid differentiation between small communities in the unorganized category which are a present concern. Even if the data for these "unorganized" communities was available the problem of interpretation remains.

First, the data accounts only for hospital admissions and may not reflect the high incidence rate of

³⁰The northern region comprises that part of the province north of the 53rd parallel.

³¹Unorganized territories comprise primarily northern settlements that are unincorporated and fall under the jurisdiction of the Provincial Department of Northern Affairs.

untreated diarrhea. Second, many enteric infections, while water related, are not always water-borne. Food storage, sanitary practices and nutritional status all may influence the rate of enteric infections in a population.³² Especially where the incidence rate is established from a small sample such considerations are important.

Enteric infection rates are available for Indian bands in Manitoba. In addition to the two constraints mentioned above the rate by bands may not apply to actual communities since the band may be scattered among communities. In spite of all these conditions affecting use of the incidence rate data the rate by Indian band can be used to rank communities for relative severity of health problems (see Table 2).

The biological and physical characteristics of the community drinking water supply could possibly direct decision making. Coliform counts are the standard measure of biological quality. Most people in remote communities drink untreated water. The test of water quality would therefore be the characteristics of the raw water source. Deviation from standards outlined in Canadian Drinking Water Standard and Objectives could

³²Control of Communicable Disease in Man.
op. cit., (1954), pp. 216-218.

Table 2
Indian Bands and Enteric Infection Rate

Indian Band	Community ³⁴ Population	Incidence Rate Per 1000 Population
Moose Lake	750	36.67
The Pas (Cranberry Portage)		33.33
Barren Lands (Brochet)	822	28.33
York Factory ³⁵		27.50
Nelson House	1,500	24.00
Mathias Colomb ³⁶		23.75
Chemahawin (Easterville)	506	22.50
Norway House	2,500	20.00
Gods Lake	1,143	19.09
Split Lake	799	15.71
St. Theresa Point	951	15.56
Oxford House	880	15.00
Shamattawa	414	15.00
Cross Lake	1,917	12.50
Island Lake (Garden Hill)	1,288	10.77
Churchill	2,500	3.33

Table 2 ranks bands by the incidence rate of unspecified enteric infection.³³

³³The incidence rates in Table 2 should be compared to the average rates by group in Table 1.

³⁴Note that the population when included is the population of the community where the majority of the band resides.

³⁵The York Factory band is split between a number of northern communities.

prioritize communities.³⁷ However, biological characteristics are similar for most communities. Coliform counts vary between 0 and 1500⁺⁺ depending on the location the sample was drawn from and the season. Generally, larger communities have more shoreline pollution but the actual counts shed little light on the problem of allocating funds.

Physical indicators of water quality such as salinity and dissolved solids may argue strongly for immediate water service improvement if they exceed maximum permissible standards outlined in Canadian Drinking Water Standards and Objectives.³⁸ On this basis a number of communities with physically poor raw water could be singled out for attention.³⁹

³⁶The Mathias Colomb band is split between Pukatawagan (pop. 967) and Cranville Lake (pop. 75).

³⁷Canadian Drinking Water ... (1968), p. 9.

³⁸Ibid., p. 20.

³⁹Data from Materials for a Sewer and Water Policy, op. cit., (1974). The information is from Water Supply Surveys carried out by Water Resources Branch, Department of Mines, Resources, and Environmental Management, 1973.

Table 3
Community and Raw Water Quality

Community	Water Quality Problem
Barrows	Saline ground water, Turbid surface water.
Camperville	Saline ground water, Turbid surface water.
Duck Bay	Saline ground water Turbid surface water.
Red Deer Lake	No suitable drinking water source nearby.
Pelican Rapids	Saline ground water Turbid surface water

In summary, health criteria, while essential for defining water service improvement objectives and for evaluating the success of improvement programs, are of limited usefulness in making allocation decisions regarding remote communities. To make the criteria truly useful data is needed so that all remote communities could be compared over a sufficient time period. Improved procedures for collection of health statistics could aid in monitoring water problems and in evaluating the success of the improvement program.

Chapter 4

EXISTING SERVICES CRITERIA

Although no remote community has a high level of water services it is possible to differentiate communities on the basis of what services do exist. The criteria of present level of services has been used by the Manitoba Water Service Board for assessing applications from rural southern communities desiring improvement of their level of water services.

The discussion regarding present services considers only the water supply side of the water services system since no remote community has sophisticated levels of sewage management and because the primary concern of the proposed program is to provide a safe community drinking water source. Water supply services could be divided into three main groups based on the degree of choice open to residents.

Category 1. NO CHOICE

The majority of residents depend on raw water taken directly from the lake or river or melted ice or snow. Treatment is left up to the individual.

Category 2. RESTRICTED CHOICE

There may be a good quality, treated sources of water open to the public but access is restricted by

lack of a road system, physical distance, or by seasonal operation of the facility.

Category 3. PUBLICALLY AVAILABLE DRINKING WATER

In this case a good quality source of drinking water is available to the public and is reasonably accessible to the majority of citizens. However, the time and effort spent to procure the water still may be considerable. A variant of Category 3 is the case where most homeowners are served by individual house systems.

The categories are empirically difficult to use for two reasons. First, while the data base used is probably the best available, there may be some errors or omissions within it.⁴⁰ Second, there is the problem of treating borderline cases and of operationally defining both "reasonably accessible" and "majority of residents". Table 4 presents a classification of the communities by the present service criteria.

The classification in Table 4 allows a comparative evaluation of community water supply service needs from the present services viewpoint. Due to the large number of communities in each category (it would be infeasible further subdivide) and due to the reservation expressed concerning the classifying operation the present services criteria is of qualified usefulness in making allocation decisions.

⁴⁰Data from Materials for a Water and Sewer Policy,
op. cit., (1974).

Table 4

Classification of Communities by Present Services

Category 1	Category 2	Category 3
Big Black River	Barrows	Anama Bay
Cross Lake	Berens River	Bisset
God's Lake Narrows	Bloodvein	Brochet
God's River	Cormorant	Camperville
Granville Lake	Easterville	Crane River
Little Black River	Garden Hill	Dallas
Little Grand Rapids	Hole River	Duck Bay
Nelson House	Jackhead	Fisher River
Oxford House	Moose Lake	Ilford
Paungassi	Norway House	Mallard
Poplar River	Pikwitonei	Manigotogan
Princess Harbour	Pine Dock	Pelican Rapids
Red Deer Lake	St. Therese Point	Pine Creek
Red Sucker Lake	Sherridon	Pukatawagan
Shamattawa	Waterhen	Shoal River
Split L		South Indian Lake
Thicket Portage		
Warren's Landing		
Wasagamach		
York Landing		



Chapter 5

POPULATION CRITERIA

Community population is a useful guide for allocation decisions regarding water service improvement for the following reasons:

(1) There is a relationship between health or environmental problems arising from inadequate water services and the population of a community. As a very general rule, in the context of the present low level of services in remote communities, the larger the population the more severe the water related health problem. Of course the relationship is not inviolable; many intervening factors such as the physical quality of the water supply may affect the directness of the relationship for any particular community. It is true that where water services are poor the number of people at risk in the event of a waterborne outbreak is greater in larger communities.

(2) There is a relationship between population and the assessed value of property in the community.⁴¹ Larger communities are in a better financial position to opt for improved water services.

⁴¹See Financial Criteria, Chapter 7, p.56.

Table 5
Remote Communities Ranked by Population (1971)

Community	Population
Norway House	2,762
Cross Lake	1,917
Nelson House	1,504
Garden Hill	1,288
Gods Lake Narrows	1,143
Pukatawagan	967
St. Therese Point	951
Berens River	942
Oxford House	880
Brochet	822
Moose Lake	750
Little Grand Rapids	701
Pelican Rapids/Shoal River	640
Split Lake	635
South Indian Lake	590
Camperville	546
Duck Bay	543
Easterville	506
Crane River	485
Hole River/Hollow Water	475
Pine Creek	470
Poplar River	458
Cormorant	451
Shamattawa	414
Wasagamach	389
Bloodvein	373
Thicket Portage	360
Waterhen	321

Table 5 (continued)

Community	Population
Jackhead	290
Red Sucker Lake	260
Anama Bay	258
Pikwitonei	258
Gods River	214
Little Black River	211
Paungassi	201
Mallard	200
York Landing	199
Barrows	198
Ilford	187
Manigotagan	184
Sherridon	166
Bisset	148
Pine Dock	98
Granville Lake	74
Red Deer Lake	65
Princess Harbour	47
Fisher Bay	53
Big Black River	43
Loon Straits	33
Westgate	33
Warrens Landing	28
National Mills	18
Atik	15
Root Lake	14

In face of social, political and economic uncertainty concerning remote communities it is difficult to make realistic population projections. Three forces are important to the population dynamics of a particular community. These factors are the fertility rate, the mortality rate and the rate of in or out migration. While these three factors affect every remote community they affect each community differently. For instance, there are variations in fertility rates between remote communities that appear to be related to the social composition of the community. Indian communities appear to be characterized by higher fertility rates than either non-treaty or predominately white communities.⁴⁵

The migration factor is extremely difficult to estimate or project since it is related to life style changes, government policy, and is masked by seasonal labour patterns that cause short term population fluctuations.

Since population projection depends on a complex set of assumptions and since historical trends can only be inferred in most cases, no attempt has been made in this

⁴⁴Manitoba North, C. Framingham, J. Sandell, P.P.C.C. Manitoba Government, 1971. The figure represents the aggregate community and reserve population.

⁴⁵W.A. Henderson, op. cit., (1974), p. 19.

practicum to do projections for remote communities.⁴⁶ The method selected is to simply indicate those communities which may grow in the future. The selection is made on the basis of the following growth factors.

Factor 1. Past trends (if available).⁴⁷

Factor 2. Economic potential in the modern economic sector including mining, large scale forestry operations, commercial fishing, construction and tourism.

Factor 3. Present investment and development trends.

Table 6 lists communities with some growth potential in one or more of these dimensions.

Table 6
Remote Communities with Growth Potential⁴⁸

Community	Community
Norway House	Little Grand Rapids
Cross Lake	Pukatawagan
Nelson House	God's Lake Narrows
Garden Hill	Wasagamach
Ste. Therese Point	Shamattawa
Moose Lake	Red Sucker Lake
Split Lake	Cormorant

⁴⁶Enumeration area boundaries have changed for all but 14 communities in the interval between 1951 and 1971. W.A. Henderson, op. cit., p. 16.

⁴⁷Inferred from Appendix to W.A. Henderson, op. cit., (1974).

⁴⁸In the case of Factor 2 and 3 assessment is done from general knowledge of communities gained from various studies, community profiles, and from personal communication.

Chapter 6

POLITICAL AND ADMINISTRATIVE CRITERIA

A broad objective of provincial government policy is to promote the development of effective local government throughout all of northern Manitoba. The local government development program builds on present community capacities and institutions so that "provincial financial and administrative controls are relinquished in parallel with the development of local capabilities to govern".⁴⁹ There is a parallel policy objective within the federal Department of Indian Affairs and Northern Development. The thrust of the policy is the promotion of self administration by Indian bands. The implementation of the water and sewer programs, especially where sophisticated and expensive systems are considered, should recognize and be consistent with the broad policy goal.

Federal -- Provincial/Community Interface

The Northern Affairs Act empowers the Department of Northern Affairs to "assist communities in providing,

⁴⁹Guidelines for the Seventies, Vol. 3, (1971), p. 74.

maintaining and improving local services by providing plans, implementation, administration, and financial assistance".⁵⁰ Similarly, under the Indian Act, the minister of the Department of Indian Affairs and Northern Development with consent of the band "may authorize and direct the expenditure of revenue monies for any purpose that in his opinion will promote the general progress of the band or any member of the band".⁵¹

The planning and implementation process involved in improving community water services has been outlined in Figure 2 and 3. In addition to the community's role in the improvement phase, the community may be responsible for operation and maintenance of the systems, once installed. These roles demand that the community have a certain amount of administrative capability to ensure effective co-ordination in the planning phase and proper management in the operations phase.

Administrative capacity can be indirectly inferred from community population. The general relationship is, the larger the community, the greater the ability to effectively manage local affairs. This relationship rest on the correlation between population and a community's financial potential and because larger communities

⁵⁰ Preface to the New Act internal working papers.

⁵¹ The Indian Act, R.S., C 149, S.I., Section 66, (1).

can draw from a wider range of persons for administrative ability and supporting skills.

Another indirect indication of the capacity of the community to administer local affairs is the present local government status. Under the Northern Affairs Act there are basically three administrative patterns. Community councils, consisting of an elected mayor and council, administer local government and advise the Department of Northern Affairs regarding local services in 23 communities. Community committees serve 14 communities. Committees are composed of residents appointed from the community and play a partly administrative and partly advisory role. The balance of the communities are in the "unorganized" category and are administered by the Department of Northern Affairs. Table 7 categorizes communities by local government status and ranks them by appropriate populations.

Indian band councils also can be viewed as having various capacities for self government. Bands throughout Manitoba have various degrees of responsibility in regard to the administration of local services, education, welfare, and so on. The band council is empowered by the Indian Act to make by-laws in regard to health and local services provided these are not inconsistent with regulations made by the Governor in Council or the minister. Where the Governor in council:

Table 7
Community by Local Government Status and Population⁵³

Community Councils	Popula- tion ⁵⁴	Community Committees	Popula- tion	Unorganized	Popula- tion
Waboden	1,236	Pine Dock	198		30
Norway house	1,019	Bisset	191	Oxford House	139
Duck Bay	741	Dallas/Red Rose	176	Nelson House	52
Camperville	567	Meadow Portage	108	Herb Lake	30
Cross Lake	460	Salt Point	75	Warren's Landing	20
Moose Lake	454	Cranville Lake	74	God's Lake Narrows	-
Cormorant	420	Red Deer Lake	65		
Brochet	353	Princess Harbour	65		
Thicket Portage	318	Fisher Bay	53		
Crane River	314	Anama Bay	50		
Pelican Rapids	296	Big Black River	45		
Pikwitonei	260	National Mills	36		
Berens River	256	Loon Straits	27		

⁵³Source: Peter Caulfield, P.P.C.C.

⁵⁴The population indicated is the population relevant to the political unit. For this reason members of Indian bands are excluded in communities where administration is also carried out by band council and D.I.A.N.D.

Table 7 (continued)

Community Councils	Popula- tion	Community Committees	Popula- tion	Unorganized	Popula- tion
Ilford	202	Westgate	18		
South Indian Lake	200				
Barrows	197				
Waterhen	189				
Sherridon	185				
Easterville	181				
Mallard	154				
Matheson Island	138				
Manigotogan	86				
Hole River	60				

"declares that a band has reached an advanced state of development, the council of the band may, subject to the approval of the Minister, make laws for ...

- (a) the raising of money by
 - (i) the assessment and taxation of interests in land in the reserve of persons lawfully in possession thereof, and
 - (ii) the licensing of businesses,⁵⁵ callings, trades and occupations."

At present, no band in Manitoba exercise taxation powers and there seems to be resistance to their adoption on the part of native people.

⁵⁵Ibid., Section 83.

Chapter 7

FINANCIAL CRITERIA

Introduction

The financial implications of the policy are significant, complex and raise a number of issues in regard to implementation. The basic water service and the higher levels of service both have their own funding and administrative mechanisms. For the basic water service the implementing agency is responsible for the total capital cost while the community will bear the operation and maintenance costs after a one year start up period. For higher levels of service the capital costs are shared between the implementing agency and the community. After a two year start up and training period the community will bear the operations and maintenance costs.⁵⁶ The billing system is administered by the community. Revenues could be obtained from consumer service charges, from assessment levies, from band money and from grants going to the communities. There are three main actors to be considered from the financial point of view: individual users, the communities and the implementing agency.

⁵⁶The operations and maintenance costs may be partly offset by an operating subsidy if the economic rate appears to be unrealistically high.

Individuals

The proposed program distinguishes between commercial users who are assessed the economic rate, and domestic users who may not be assessed the economic rate if it exceeds a predetermined rate ceiling. A rate ceiling is suggested in light of both the high cost of services in remote communities and the low per capita income levels. The rate ceiling should be set at a level which provides a realistic degree of choice for residents in communities considering improvements in services. Income criteria or any other factor dealing with individuals should not be used as aids in prioritizing communities because the level of income is uniformly low and because the program is directed at a problem partly caused by low per capita incomes in the communities.

Communities

The annual charge borne by the community for the basic water service will likely be small, amounting to a few hundred dollars per year in most cases. The amount could be paid from the community's per capita grant from grants made to Indian bands or from assessment levies if an assessment has been carried out. In the case of higher levels of service the communities could theoretically

apply four sources of funds to building and operating systems. The per capita grant, grants made to Indian bands for specific works and operations, assessment levies and direct user charges all could provide monies. In fact, the per capita grant administered to D.N.A. communities is at present totally inadequate to meet significant service charges.⁵⁷ The charges must be paid mainly from local assessment levies, from individual user charges or from special operating grants.

In 1973, of 42 Northern Affairs communities, 20 had not been assessed and therefore had no incoming levies. Where assessments had been done the taxable assessment per capita was low, about \$170./capita. By comparison, the per capita assessment in Manitoban villages was \$1,339 and \$1,135 for all communities excluding cities (1972 statistics). In addition the tax arrears in remote communities are a problem. In 1972 taxes collected as a percentage of levies were 77.43%. In spite of these problems the value of the municipal

⁵⁷The present grant formula gives each community a total unconditional grant equal to \$12 per capita plus a sum equal to the difference between total collections and total uncontrollable levies. This difference amounted to \$1.73 per capita in 1973. Since uncontrollable levies often exceed the value of the total per capita grant, the grant revenue does not appear useful in terms of paying additional water service charges. (Source: Peter Caulfield, P.P.C.C., 1974).

assessment is an important consideration since the assessment can, at least theoretically, meet some portion of the system's costs.

The assessment gives a very indirect indication of the development of community finances. The importance of the assessment in local government affairs and the fact that local infrastructure is conventionally financed partly from assessment levies argues that some weight should be attached to municipal assessment in prioritizing communities. Table 8, page 60, indicates the value of the assessment in various remote communities.

At present, most funding for construction and operation of local services in Indian reserves is provided by the Department of Indian Affairs and Northern Development. Monies are provided in the form of special capital and operating grants to the band. Although there is provision in the Indian Act, no reserve in Manitoba has any assessment for municipal taxation. At present, Indian bands in Manitoba generally do not charge user fees for sewer and water services.

Federal -- Provincial

From the point of view of the implementing agency a financial objective is to spend dollars on water service improvement in the most effective way possible.

Table 8
 Taxable Assessment -- Northern Communities (Fiscal 1973)⁵⁸

Communities	Total Taxable Assessment
Waboden	169,820
Norway House	158,230
Dallas/Red Rose	100,560
Barrows	78,480
Sherridon	73,300
Ilford	72,270
Cross Lake	59,740
Duck Bay	45,030
Moose Lake	43,940
Cormorant	42,550
Thicket Portage	36,940
Camperville	36,390
Manigotagan	36,340
Berens River	31,310
Matheson Island	29,820
Meadow Portage	28,380
Crane River	26,210
Waterhen	24,330
Pikwitonei	24,130
Pine Dock	15,440
Mallard	4,360

⁵⁸The assessment represents values in the provincial portion of the community where there is split jurisdiction, since Indian reserves are not assessed for taxation purposes.

Within the terms of the cost sharing laid out by the proposed program a considerable subsidy to community services may be anticipated. Some of the subsidy may be directed to annual operating costs. Generally, the larger the community, the lower the economic rate for water and sewer services. In smaller communities the economic rate may be substantially greater than the predetermined rate ceiling. In order that the optimal amount of provincial dollars be directed to improvement of water services it is reasonable that higher levels of service should be considered for the larger communities initially since in these communities the operating subsidy per capita will generally be lowest. The priorities from this point of view follow the population rankings provided in Chapter 5.

A critical question raised by implementation of the proposed program is what are its financial consequences? In the absence of engineering reports on the many remote communities that could be considered for improvement at different service level objectives it is difficult to predict costs. A very rough indication of the financial implications of one service improvement objective is presented in Appendix B.

Chapter 8

SYNTHESIS

The preceding chapters have defined the problem, proposed a program designed to correct the problem, and have outlined five criteria that may influence implementation of the program. The criteria vary in their usefulness; some bear direct relevance to the problem and are straightforward in nature, others are indirectly related. The quality and completeness of the data underlying each of the criteria also varies.

The synthesis of the criteria and subsequent application to the program depends on the judgement of the analyst and therefore is a subjective operation, methodologically. The operation proceeds by weighting the criteria and then applying them against a list of candidate communities. Priorization of the communities for water service improvement in this manner yields a guide to implementation and not a prescription for development.

As an illustration of the nature of the priorization method, consider the problem as viewed from two different value perspectives. From the health perspective, great weight could be given to health indicators. Communities with a demonstrated water-borne health problem would tend to receive high priority. From the point of

view of "greatest good for the greatest number" and within budgetary limitations the population criteria would be given heavy weight and larger communities would tend to appear at the top of the list.

One purpose of this practicum is to show how different value perspectives can be brought into balance by weighting the criteria on their own merits as discussed in chapters three through seven. It could possibly be argued that the merits of the criteria were incompletely or incorrectly presented and that a synthesis done on the basis of these criteria would be invalid. If this is indeed the case then a re-analysis of the substance of the criteria is in order but the criteria as categories are still useful. In fact, more data collection is required to render the criteria more truly useful.

The application of the criteria to the program should be done twice to reflect its dual objective structure. The first priority is the development of a basic water supply source in each remote community. A longer term objective is the provision of higher levels of water services in remote communities in an effort to improve living standards so that they are comparable with standards in other parts of the province.

In the case of applying the criteria to achieve the first priority, only the health, present service, and population criteria should be used. The arguments

presented in the political/administrative section do not apply to the relatively simple basic water system. Similarly, the discussion in the financial criteria section does not apply in light of program objectives and the relatively low costs of the systems. For the longer term objective all five criteria should be weighted and applied.

Weightings

1. Basic water service objective. For the basic water service objective the present services criteria should be given most weight. Potentially, health criteria are of critical importance but due to the quality of the data presently available it is a less useful guide than present services criteria. The population criterion is useful because of its relation to the health hazard and from the "greatest good for the greatest number" point of view (see Appendix C for an illustrative application).

2. Higher level of water service objective. For this second objective the population criterion merits heavy weighting on the basis of its correlation to health, political/administrative, and financial considerations. Present service criteria are important, especially where the preferred performance increment for the community can be accurately assessed. Health criteria are theo-

retically useful but practically difficult to collect and interpret. Financial criteria are of considerable importance to higher levels of service especially in relation to the revenue-producing potential of the communities and with reference to the expected degree of subsidization. The political/administrative criterion is useful in order to view the communities as variously equipped to co-ordinate and administer higher level systems (see Appendix C for illustrative application of the criteria).

Results

The prioritized list of communities derived from the operations outlined above and illustrated in Appendix C reflect a particular interpretation of the importance of the criteria to the problem of improving water services. The priorities will come out differently depending on the stance used and the weightings assigned to criteria.

It is important to note that some criteria may be more sensitive than others in the weighting process. For example, the population, financial and political/administrative criteria are all highly interconnected. If the weight assigned to any one of these criteria is changed the rankings may not be much affected since the three criteria reinforce each other. The health criteria on

the other hand, may be more sensitive to a change in the weighting and if changed significantly may yield a significantly different prioritized list.

The illustration contained in Appendix C considered whole communities regardless of jurisdiction. If the prioritization is done only from the Department of Northern Affairs (D.N.A.) point of view the outcome would be much different even though the basic operation remains the same. From the D.N.A. point of view the criteria would all be defined by indicators taken from the communities or portions of communities coming under D.N.A.'s jurisdiction. Health criteria would be defined by infection rates per D.N.A. community; present service criteria would be defined by the systems within the D.N.A. community; population would be the relevant D.N.A. population and so on.

This approach to the water service improvement objective is illogical from certain points of view. Health problems are a function of total community population and present systems are generally available (or not available) regardless of reserve boundaries. It makes good economic sense to plan for community infrastructure improvements from a community wide perspective. However, there may be administrative and jurisdictional problems involved in the "whole community approach" that could make parallel implementation by D.N.A. and the Department

of Indian Affairs and Northern Development attractive.

The prioritized list is useful within the context of the program outlined in Chapter 2. For the basic water service objective, the list provides an indication of where money may be directed first to best achieve the objective over a number of years and within budgetary limitations. Use of the basic water service list is tempered by the objective of higher levels of service. It would be absurd to place a central water supply source in a large and developing community that should really be considered for a higher level of service.

Both lists are guides to allocation rather than prescriptions for development. The distinction is especially important in the case of higher levels of service. The program calls for the community to submit applications for higher level systems and to consider the installation of these systems in light of their revealed costs. Here the prioritized list provides a framework within which implementing agencies can respond to applications for improvements.

Chapter 9

LIMITATIONS AND RESEARCH NEEDS

There are two main types of limitations inherent in the practicum. Firstly, the data itself is limited in regard to what the criteria are designed to achieve. Data used to define health criteria, for example, are not available for all communities discussed in the practicum and health data that is available is qualified by the short time period over which it has been collected. The problem of interpretation of health data further limits the usefulness of the health criteria. Uncertainty regarding population projections for individual communities, future government and other political decisions regarding remote communities, and financial implications for the different actors can all be viewed as data limitations which complicate both the weighting and the application of the criteria.

The second major limitation lies in the essentially political nature of the prioritizing operation. The term political is used here to denote the process of mediating between different sets of goals and value orientations. The importance assigned to the criteria will depend in part on the value orientations of the individuals or groups using the criteria. From a number of different value perspectives, different sets of priorities for a water

service improvement program might be expected to emerge. This practicum attempts to present the information and the basic rules for deciding on priorities. The illustration of the use of the criteria contained in Appendix C reflects the author's value orientation on the water service improvement objective.

The proposed program outlines a framework within which water service improvement can be achieved with the provision of sufficient funding. An important research need is to estimate the amount of money needed to reach politically defined objectives. For instance, should remote communities be brought up to southern rural standards in terms of water service infrastructure? If this is a stated policy objective, research could be directed at defining the southern rural standards, applying the standards to remote communities and assessing the financial implications of this objective. A portion of the methodology for this investigation is outlined in Appendix B. In addition to estimation of gross money requirements, more research is needed to discover what financial arrangements are equitable in remote communities.

Further attention should be directed toward incorporating ongoing training, education and evaluation components into the water service improvement program. These components are essential for successful operation and management of systems once installed and for adjustment of program guidelines to changing conditions.

Chapter 10

CONCLUSIONS

The introduction to this practicum referred to the management problem involved in allocating limited resources -- money, labour and equipment -- among competing users and over time. In structure this problem is identical to the standard formulation of the economic problem; how much of what for whom and over what time period. For remote communities the market system is judged to be inadequate to solve this problem. It is generally handled, albeit imperfectly, by the political and bureaucratic systems.

A great deal of energy and thought has been devoted to the problem of allocating resources to and among remote communities. The authors of one report noted a "lack of priorities and standards resulting in a wasteful allocation of scarce provincial resources" and proposed guidelines for service investments that are "integrated with the economic role of a community".⁵⁹ The problem is a complex one because of the many and sometimes conflicting development objectives and because of the trade offs that must be made with the

⁵⁹Northern Roles Analysis, Planning and Priorities Committee of Cabinet, (1972), p. 3.

economic realities in the province. No satisfactory set of overall investment guidelines have yet been established.

This practicum discusses service investment guidelines related to one component of community infrastructure only. Decisions on implementation and level of service of water and sewer programs ought to be tempered by broad developmental and service investment guidelines. In the context of remote communities these are all political decisions. The criteria presented in this practicum comprise a referent system within which political decisions regarding allocation can be made under conditions of reduced uncertainty as to implication.

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APPENDIX A

SUMMARY OF FINANCIAL ASSISTANCE

The cost sharing schedule presented below can be distilled into four basic principles:

(1) The basic water service is funded entirely by the implementing agency.

(2) Water distribution and sewage collection and treatment systems are cost shared 75% by the implementing agency, 25% by the community.

(3) In-property (i.e. house) fixtures and plumbing are cost shared 50% implementing agency, 50% resident/homeowner.

(4) Operation and maintenance of in-property fixtures and plumbing is the homeowner/resident responsibility. Operation and maintenance of distribution, collection and treatment systems is the community's responsibility.

The financial responsibilities spelled out in this appendix should be viewed in light of rate ceilings that could be developed to offset onerous water service charges. Indeed, the cost share breakdowns themselves should be closely scrutinized and changed if necessary to ensure reasonable choices for communities and individuals. Operating subsidies may reduce the financial burden on the community. These subsidies could be designed

to take effect after a predetermined rate, set either on a gallonage or a monthly basis. It is envisioned that all money directed to assistance in system operation or in debt retirement on behalf of either communities or homeowner/residents would come from the province.

FIGURE 4

Summary of Financial Assistance

TYPE OF SYSTEM	CAPITAL COST	OPERATIONS AND MAINTENANCE
A. Basic Water Services	100% Implementing Agency	100% Implementing Agency for first two years.
1b) Additional water sources in community (i.e. standpipe).	75% Implementing Agency 25% community	100% community/residents after two years.
B. Higher Levels of Services.		
Water Supply.		
2a) Truck water delivery	100% Implementing Agency for intake and treatment module. 75% Implementing Agency on truck distribution. 25% community on truck distribution.	100% Implementing Agency for first two years. 100% community/residents after two years.
	50% Implementing Agency on in-property fixtures and plumbing. 50% resident/owner on in-property fixtures and plumbing.	100% resident/owner.
2b) Piped water supply	100% Implementing Agency for intake and treatment module. 75% Implementing Agency on distribution system. 25% community on distribution system	Same as for 2a), above

Summary of Financial Assistance

Figure 4

TYPE OF SYSTEM	CAPITAL COST	OPERATIONS AND MAINTENANCE
2b) Piped water supply (continued)	50% Implementing Agency on in-property fixtures and plumbing. 50% resident/owner on in-property fixtures and plumbing.) same as for 2a), above
<u>SEWAGE MANAGEMENT</u>		
3a) Truck collection and treatment	75% Implementing Agency on all capital costs. 25% community on all capital costs.) 100% Implementing Agency for first two years.) 100% community/residents after two years.
	50% Implementing Agency on all in-property fixtures and plumbing. 50% resident/owner on all in-property fixtures and plumbing.) 100% resident/owner.
3b) Pipe collection and treatment of sewage	75% Implementing Agency on all capital costs. 25% community on all capital costs.) 100% Implementing Agency for first two years.) 100% community after two years.
	50% Implementing Agency on in-property fixtures and plumbing. 50% resident owner on in-property fixtures and plumbing.) 100% resident/owner.
4) Other		
Private systems such as clivus, septic fields, individual house systems.	50% Implementing Agency on all costs. 50% resident/owner.) 100% resident owner.

Summary of Financial Assistance (continued)

APPENDIX B

NOTES ON FINANCIAL IMPLICATIONS

In order to present the financial implications of a water service improvement program a possible program objective is defined below.¹ The objective of the implementing agency might be to develop water services in remote communities to the following level:

- For communities of population greater than 500, water and sewer services would be extended to each house.

- For communities of population 500-200 a water supply system would be developed using either stand-pipes or community wells.

- For communities of population 200-50 the basic water source would be developed.

Note that the objective is arbitrarily defined by population. The objective is not intended to be prescriptive, rather it is a structure within which community requests for improvement can be viewed and weighed as to cost implications. Although the analysis proceeds with reference to the three level objective defined above

¹The objective is the authors own creation and does not reflect government policy or even suggest that policy be modelled upon it.

it would be a simple task to alter the objectives by changing the population categories to examine the effect of different objectives on costs. Within each level of the overall objective, phasing-in of the program may be aided by application of the criteria discussed in the practicum and illustrated in Appendix C.

Table 1 outlines costs by community for systems that would achieve the stated program objectives. The cost estimates presented in the table are drawn from estimates made by the Engineering and Construction Services Branch, Manitoba Department of Northern Affairs. The cost estimates are very rough; they serve only to illustrate the magnitude of the costs involved in a program of water service improvement in northern Manitoba.

The methodology behind the estimates presented in Table 1 is straightforward. For each community estimates have been prepared for 5 water supply and 3 sewage management systems. Not all systems would provide equal levels of service; indeed, some alternatives are infeasible in certain communities due to physical factors.

The low cost system that would achieve the objective has been selected from the alternatives and is briefly described in column 3 of Table 1.² The overall

²More comprehensive discussion of cost estimates, limitations of the cost data, and description of alternative systems is contained in Materials for a Water and Sewer Policy for Manitoba's Remote Communities.

cost implications arising from Table 1 are summarized in Table 2. The total capital, operating, and capitalized costs are presented for all communities and also by each category of communities set out in the objective.

Table 3 presents cost sharing implications for the three different parties involved in the water service improvement process. The cost sharing rules are contained in the summary of financial assistance, Appendix A. Some simplifying assumptions have been employed to break out the community and resident/owners shares from the total capital costs. To estimate the communities' share of the costs in the 500-200 population category, the total capital costs of the central water treatment module was subtracted from the total capital costs. For all communities in the category the average costs of the module was taken to be \$120,000/community.³ The capital portion left after this operation is shared 75/25 between the implementing agency and the community. The same process was used to break out the costs of the basic water module in the 500 plus population category. In this case the average cost used was \$374,000/community. To estimate the costs borne by resident/owners an average cost of \$2500/home was assumed.⁴ Using these

³The figure was derived from the Engineering and Construction Services Branch estimates.

⁴The figure was derived from estimates obtained from the Water Resources Branch, Manitoba Department of Mines, Resources and Environmental Management and from

assumptions the cost sharing formulae were applied to reveal, in an approximate way, the financial burden on each of the three parties.

Table 4 describes the cost share breakdown for the entire capital portion of the program under the assumption of Manitoba Northlands Development Agreement funding.

It is important to note that the provincial expenditures incurred by a water services improvement program may be substantially larger than indicated by the capital cost breakdowns. The true extent of provincial involvement, within the program proposed here, depends upon the amount of subsidy directed to operation of the systems and possibly to debt retirement on behalf of the communities and resident/owners. For example, if the full operating and debt retirement charges were passed on in the form of user charges levied on each home in the 500 plus communities, the total annual charge would average \$479/yr.(40/mo.)⁵. This charge may be too

personal communication with Mr. Les Sherwood of the Natural Resource Institute. The estimate includes costs of holding tanks and necessary fixtures and plumbing to complement truck water and sewage systems.

⁵Assuming total population in this category equal to 17,513 and 5 persons per home. Community and resident / owner financial responsibility derived from Table 3. The calculation also assumes that each home uses about the same amount of water per year.

onerous for residents of remote communities. Income levels in these communities are generally low. Of course, not all costs of the system need be recovered through user charges. Monies could be obtained from assessment levies, per capita grants to the communities or from special grants to the communities and resident/owners. The latter two modes of reducing the financial burden on residents of remote communities imply financial commitment from the province in excess of that formally set out in the proposed program. On the basis of presently available data it is difficult to estimate the magnitude of the extra provincial contribution.

Table 1
Costs of Achieving a Sewer and Water Objective⁶

Community	Popula- ⁷ tion	Possible System	Capital Costs (000 of \$)	Annual Oper- ations and Maintenance (000 of \$)	Annual Capital- ized Costs + Operations and Maintenance ^g (000 of \$)
Anama Bay	258	Community wells	44	2	65
Barrows	198	Central source	120	7	19
Beren's River	942	Truck delivery and collection	885	31	121
Bloodvein	373	Standpipes	200	7	27
Brochet	822	Truck delivery and collection	1760	31	211
Camperville	546	Truck delivery and collection	828	28	112
Cormorant	451	Standpipes	200	7	27
Crane River	485	Standpipes	340	7	41
Cross Lake	1917	Truck delivery and collection	3580	71	436
Duck Bay	543	Truck delivery and collection	710	28	101
Easterville	508	Truck delivery and collection	603	28	89

⁶A discussion of both the objective and the data sources is included in this appendix.

⁷Where population growth potential is indicated and where the system should be so designed, a 1990 design population was estimated and used. A

Table 1 (continued)

Costs of Achieving a Sewer and Water Objective

Community	Popula- tion	Possible System	Capital Costs (000 of \$)	Annual Oper- ations and Maintenance (000 of \$)	Annual Capital- ized Costs + Operations and Maintenance (000 of \$)
Hollow Water	455	Standpipes	200	7	27
Garden Hill	1288	Truck delivery and collection	2183	57	280
Gods River	214	Standpipes	338	7	41
Gods Lake Narrows	1143	Truck delivery and collection	1025	57	263
Granville Lake	74	Central source	120	7	19
Ilford	187	Community wells	44	2	65
Jackhead	290	Standpipes	200	7	27
Little Black River	211	Standpipes	223	7	30
Little Grand Rapids	701	Truck delivery and collection	1360	31	170
Mallard	200	Community wells	44	2	65
Manigotagan	184 [†]	Central Supply	120	7	19

discussion of the projection technique and its rationale is contained in Materials for a Water and Sewer Policy for Northern Manitoba.

³Annual Capitalized cost represents the capital cost of each project capitalized at 8% over a period of 20 years plus the annual operations and maintenance costs of the system.

Table 1 (continued)

Community	Popula- tion	Possible System	Capital Costs (000 of \$)	Annual Oper- ations and Maintenance (000 of \$)	Annual Capital- ized Costs + Operations and Maintenance (000 of \$)
Moose Lake	750	Truck delivery and collection	828	28	113
Nelson House	1504	Truck delivery and collection	2763	59	337
Norway House	2762	Truck delivery and collection	4570	102	567
Oxford House	880	Truck delivery and collection	803	41	123
Faungassi	201	Standpipe	203	7	28
Pelican Rapids	640	Truck delivery and collection	443	28	73
Pikwitonei	258	Standpipe	200	7	27
Pine Creek	470	Standpipes	300	7	38
Pine Dock	98	Community wells	44	2	65
Poplar River	458	Standpipes	400	10	50
Pukatawagan	967	Truck delivery and collection	1820	46	231
Red Deer Lake	65	Central source	120	7	19
Red Sucker Lake	260	Standpipes	200	7	27
St. Theresa Point	967	Truck delivery and collection	1975	46	248

Table 1 (continued)

Community	Popula- tion	Possible System	Capital Costs (000 of \$)	Annual Oper- ations and Maintenance (000 of \$)	Annual Capital- ized Costs + Maintenance (000 of \$)
Shamattawa	414	Standpipes	400	10	50
Sherridon	166	Central source	120	7	19
Split Lake	635	Truck delivery and collection	1460	57	206
Thicket Portage	360	Standpipes	200	7	27
Wasagamack	389	Standpipes	400	10	50
York Landing	199	Standpipes	200	7	27

Table 2
Summary of Table 1

	Total Capital Costs	Total Annual Operations and Maintenance	Total Annual Capitalized Costs (Plus O & M)
For all Communities	32,377,000	914,000	4,269,000
Community Population 500 Plus	27,597,000	767,000	3,681,000
Community Population 500-200	4,092,000	108,000	480,000
Community Population 200-50	688,000	39,000	108,000

Table 3
Cost Share Implications (in Dollars)

Target Group of Communities	Total Capital Costs	Implementing Agency	Community	Resident /Owner	Annual Operations and Maintenance (Communities)	Annual Debt Charges Carried by Implementing Agency	Annual Recoverable Debt
200-50 Population	688,000	688,000	-	-	39,000	108,000	-
500-200 Population	4,092,000	about 3,549,000	about 543,000	-	108,000	about 372,000	about 55,000 (From Communities)
500 Plus Population	27,597,000	about 20,098,000	about 3,120,000	about 4,378,000	914,000	about 2,045,000	about 763,000 (From Communities and Resident/Owners)
All Communities	32,377,000	about 24,335,000	N/A	N/A	1,061,000	about 2,525,000	N/A

Table 4
Federal/Provincial Cost Share Implications⁹

	Total Capital Cost	Annual Capitalized Cost ¹⁰
Implementing Agency	32,377,000	3,295,000
Federal Portion	19,426,000	1,977,000
Provincial Portion	12,951,000	1,318,000

⁹Table III assumes funding under the Manitoba Northlands Sub-Agreement which draws 60% federal funds, 40% provincial funds. Note that the cost breakdown is done for the entire capital portion of the program even though a significant portion of these costs will eventually be recovered from the communities and from resident/owners.

¹⁰Costs are capitalized at 8% for a period of 20 years.

APPENDIX C

ILLUSTRATIVE PRIORIZING OPERATION

Both the weights assigned to the criteria and the operations conducted in this appendix are intended to be illustrative. It is absolutely essential to understand that the weights are attached to criteria on the basis of value judgements concerning the importance and usefulness of the criteria. Different weights may result from different value orientations; for example, a political orientation may produce a different weighting system than would a bureaucratic orientation. In terms of the weights presented below an example is offered in the relative importance of present service criteria over health criteria. In the opinion of the author the data supporting the health criteria is not strong. Present services becomes an operationally more useful criteria. The prioritizing operation is done twice to reflect the two objectives of the proposed program -- the basic water service objective and the higher level of service objective.

A. Basic Water Service Objective.

Criteria	Weight
1. Present Services	
Category 1	6
Category 2	4
Category 3	2

2. Health*	
Infection Rate/1,000 pop.	Weight
40-25	3
25-15	2
15 or less	1
3. Population	
1000+	4
1000-500	3
500-150	2
150 or less	1

Discussion.

The prioritized list of communities provides a framework within which the proposed program may be implemented. The framework should be used with reference to specified program objectives. For basic water services, attention should be directed to those communities ineligible to apply for higher levels of service (i.e., standpipe or individual house systems) because of their small population (less than 200). For intermediate and larger communities the basic water service system should be viewed as a core component of a future higher level water system.

Where communities receive identical scores they could be differential first on the basis of present services, then on the basis of health and finally, if the score is still identical, on the basis of population.

*Add 1 point where physical water quality problems exist (i.e., high salinity). The health criterion would receive higher weight were it possible to collect good data for all communities over an appropriate time period. For purpose of this illustrative ranking, communities not accounted for by health statistics are assumed to fall in the 25-15 (continued on page 94)

Basic Water Services Objective

Community	Present Services	Health	Popu- lation	Total
Norway House	4	2	4	10
Cross Lake	6	1	4	11
Nelson House	6	2	4	12
Garden Hill	4	1	4	9
Gods Lake Narrows	6	2	4	12
Pukatawagan	6	2	3	11
Ste. Therese Point	2	2	3	7
Berens River	4	2	3	9
Oxford House	4	2	3	9
Brochet	2	3	3	8
Moose Lake	4	3	3	10
Little Grand Rapids	6	2	3	11
Pelican Rapids/Shoal River	2	3	3	8
Split Lake	6	2	3	11
South Indian Lake	2	2	3	7
Camperville	2	3	3	8
Duck Bay	2	3	3	8
Easterville	4	2	3	9
Crane River	2	3	2	7
Hole River/Hollow Water	4	2	2	8
Pine Creek	2	3	2	7
Popular River	6	2	2	10
Cormorant	4	2	2	8
Shamattawa	6	2	2	10
Wasagamach	6	2	2	10
Bloodvein	4	2	2	8
Thicket Portage	6	2	2	10
Waterhen	4	2	2	8
Jackhead	4	2	2	8
Red Sucker Lake	6	2	2	10
Anama Bay	2	2	2	6

Community	Present Services	Health	Popu- lation	Total
Pikwitonei	4	2	2	8
Gods River	6	2	2	10
Little Black River	6	2	2	10
Paungassi	6	2	2	10
York Landing	6	2	2	10
Mallard	2	2	2	6
Barrows	4	3	2	9
Ilford	2	2	2	6
Manigotagan	2	2	2	6
Sherridon	4	2	2	8
Bisset	2	2	2	6
Pine Dock	4	2	1	7
Granville Lake	6	2	1	9
Red Deer Lake	7	3	1	11
Princess Harbour	6	2	1	9
Fisher Bay	2	2	1	5
Big Black River	6	2	1	9
Loon Straits	2	2	1	5
Westgate	-*	2	1	-
Warrens Landing	6	2	1	9
National Mills	-	2	1	-
Atik	-	2	1	-
Root Lake	-	2	1	-

*No data available.

B. Higher Levels of Water Service Objective.

Criteria	Weight
1. Population*	
1000+	7
1000-500	5
500-150	3
150 or less	1
2. Present Services	
Category 1	3
Category 2	2
Category 3	1
3. Health**	
Infection Rate/1,000 pop.	
40-25	3
25-15	2
15 or less	1
4. Political/Administrative	

The weight of this criterion is partly reflected in the weight assigned to the health criterion. The data obtained for Indian Reserve community did not permit the construction of a classification for political and administrative capacity.

*Add 1 point where population growth potential is indicated.

**Add 1 point where physical water quality problem exists (i.e., high salinity).

(continued from page 91) category. The infection rate average for all unorganized communities is 19.48/1,000 pop. and for all Indian bands, 18.52/1,000 pop.

5. Financial

The weight of this criterion is partly reflected in the weight assigned to the health criterion. The data obtained for Indian Reserve communities did not permit a classification by revenue generating ability.

Higher Level Service Objective

Community	Popu- lation	Present Services	Health	Total
Norway House	8	2	2	12
Cross Lake	8	3	1	12
Nelson House	8	3	2	13
Garden Hill	8	2	1	11
Gods Lake Narrows	8	3	2	13
Pukatawagan	6	1	2	9
Ste. Therese Point	6	2	2	10
Berens River	5	2	2	9
Oxford House	5	3	2	10
Brochet	5	1	3	9
Moose Lake	6	2	3	11
Little Grand Rapids	6	3	2	11
Pelican Rapids/Shoal River	5	1	3	9
Split Lake	6	3	2	11
South Indian Lake	5	1	2	8
Camperville	5	1	3	9
Duck Bay	5	1	3	9
Easterville	5	2	2	9
Crane River	5	1	3	9
Hole River/Hollow Water	3	1	2	6
Pine Creek	3	1	3	7
Poplar River	3	3	2	8

Community	Popu- lation	Present Services	Health	Total
Cormorant	4	2	2	8
Shamattawa	4	3	2	9
Wasagamach	4	3	2	9
Bloodvein	3	2	2	7
Thicket Portage	3	3	2	8
Waterhen	3	2	2	7
Jackhead	3	2	2	7
Red Sucker Lake	4	3	2	9
Anama Bay	3	1	2	6
Pikwitonei	3	2	2	7
Gods River	3	3	2	8
Little Black River	3	3	2	8
Paungassi	3	3	2	8
York Landing	3	3	2	8
Mallard	3	1	2	6
Barrows	3	2	3	8
Ilford	3	1	2	6
Manigotagan	3	1	2	6
Sherridon	3	2	2	7
Bisset	1	1	2	4
Pine Dock	1	2	2	5
Granville Lake	1	3	2	6
Red Deer Lake	1	3	3	7
Princess Harbour	1	3	2	6
Fisher Bay	1	1	2	4
Big Black River	1	3	2	6
Loon Straits	1	1	2	4
Westgate	1	-*	2	-
Warrens Landing	1	3	2	6
National Mills	1	-	2	-
Atik	1	-	2	-
Root Lake	1	-	2	-

*No data available

Discussion.

The prioritized list for higher levels of service may be viewed in light of two higher levels of service outlined in the proposed program. Communities could be split into two groups for the purpose of setting medium-term servicing goals. Communities above about 500 population could be considered, upon application, for water and sewer systems that would service each house in the community. Provision of these systems would be constrained by cost and other infrastructure constraints such as internal roads. Communities with populations between the 500 range and 200 could be considered, upon application, for community type water systems such as standpipe or community wells. The 500 population benchmark figure is chosen in reference to water services levels in rural southern communities.

An alternate method of using the prioritized list would be to apply it against all communities applying for higher level services and then let the cost constraints imposed by the proposed program determine what level of service the community will opt for.

In cases where communities receive identical total scores, differentiation would be done on the basis of present population. If population growth was expected, this would have some weight in the outcome.