



BUILDING HEALTHY COMMUNITIES: A PLAN FOR ADDRESSING THE COMMUNITY PUBLIC INFRASTRUCTURE DEFICIT IN THE NORTHWEST TERRITORIES

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EXECUTIVE SUMMARY

Background

There is increasing recognition nationally of the large and growing municipal infrastructure deficit across Canada, and the impact of this deficit on our quality of life and economic prosperity. The shortfall in infrastructure investment at the municipal level – i.e. the failure to invest appropriately in maintenance, rehabilitation or replacement of existing infrastructure, or to acquire new infrastructure to meet demographic and service demands – has an immediate and direct impact on the quality of life of all our residents. This is a compounding problem – every required infrastructure investment that is delayed leads to increased costs for repair or replacement down the road.

The Federation of Canadian Municipalities (FCM) estimates the national municipal infrastructure deficit at \$60 billion. This represents the investment required to replace, repair or maintain municipal infrastructure across the country. Pressures that are contributing to the deficit include the impact of the fiscal imbalance on municipal governments; increased regulatory requirements in the areas of water, wastewater and solid waste; population growth and the demand for enhanced programs and services.

Other provinces and territories have produced papers outlining the impacts of the municipal infrastructure deficit and proposing solutions. However, to date, no other jurisdiction appears to have gone beyond the FCM estimates and attempted to quantify the magnitude of the deficit, and there is no generally accepted method for doing so.

The Federal Government has announced the New Deal for Cities and Communities, in part as an attempt to come to grips with the infrastructure crisis.

Purpose

The Government of the Northwest Territories (GNWT), Department of Municipal and Community Affairs (MACA) and the Northwest Territories Association of Communities have joined in partnership to produce a discussion paper that is intended to:

- Define and quantify the magnitude of the community public infrastructure deficit in the Northwest Territories (NWT);
- Illustrate how the NWT's infrastructure challenges are unique and require unique solutions; and
- Propose a plan of action.

Unique Challenges for the NWT

Northern communities face pressures that are not shared by the majority of municipalities across Canada. The low population and small assessment base limit own-source revenues available for infrastructure development. The costs of construction and maintenance in the north are high compared to the rest of Canada. Geographical isolation leads to high power and transportation costs, and necessitates that each community develop the full complement of public infrastructure – there is little opportunity to share facilities or achieve economies of scale. The short construction season and lack of all-season access pose planning challenges and often result in increased costs. The stress of building and operating in a harsh northern environment drives construction and operating costs higher, and shortens the life cycle of many assets.

Most NWT communities have been in existence for less than 60 years, and many have not yet fully developed the base of infrastructure that would be taken for granted in other parts of Canada. Recreation infrastructure is an area of particular need.

BUILDING HEALTHY COMMUNITIES: A PLAN FOR ADDRESSING THE COMMUNITY PUBLIC INFRASTRUCTURE DEFICIT IN THE NORTHWEST TERRITORIES

EXECUTIVE SUMMARY (cont'd)

Perhaps the most immediate and critical challenge is the impact that resource development activities are having on community infrastructure. Although the unprecedented boom in development of natural resources brings economic opportunities, communities are coping with a range of impacts, which are expected to increase as activity ramps up. Industrial use of community roads, water systems, and solid waste sites can lead to increased maintenance requirements, and requirements for early replacement of infrastructure. Increased demand for developed industrial land and access to gravel sources presents an added pressure. Because the GNWT does not receive the fiscal benefit of resource development, the government has limited ability to support communities to mitigate these impacts. Based on current understanding of potential activity it is estimated that these activities may lead to an additional \$37 million of infrastructure investment required over a 20-year window.

Findings

Using an extremely conservative methodology, it has been determined that the shortfall in investment in community public infrastructure over a 10-year period is \$186 million (2004 dollars). At current investment levels, 62% of the community infrastructure need is being met, and with every year the gap between investment and need is growing. These figures do not reflect the impact of deferred maintenance, or of resource development. If the effects of deferred capital investment and deferred maintenance were included, it would add approximately \$8 million this year to the infrastructure deficit, and the impact would compound over time.

Conclusion

NWT communities are facing unprecedented infrastructure pressures, and neither the community governments nor the GNWT have adequate resources to address the needs. The current shortfall of \$186 million will continue to increase without drastic action to reverse the trend, and will be aggravated by resource development impacts.

A range of actions is proposed to address the crisis, including:

1. The amount of funding available for community public infrastructure must be increased through enhanced GNWT investment, federal government commitment to sustainable infrastructure funding, and enhancing the autonomy and authority of community governments.
2. Federal funding arrangements must be more flexible.
3. Available funding must be used creatively.
4. Technical innovation must be promoted.
5. Maintenance capacity at the community level must be improved.



PURPOSE

This document is intended to:

- Define and quantify the community public infrastructure deficit in the Northwest Territories (NWT);
- Illustrate how the NWT's infrastructure challenges are unique, and why they require unique solutions; and
- Propose a plan of action that can be moved forward by the Government of the Northwest Territories (GNWT) and NWT communities, in partnership with Canada and other stakeholders.

VISION

The vision of the 15th Legislative Assembly of the Northwest Territories is:

Self-reliant individuals and families sharing the rewards and responsibilities of healthy communities and a prosperous and unified Northwest Territories.

Healthy communities are communities where there is an adequate level of essential services, where there is stability in community governance and administration, where residents contribute to community activities, and where residents have access to a range of opportunities for cultural and recreational activities.

THE COMMUNITY PUBLIC INFRASTRUCTURE DEFICIT

NATIONAL AND TERRITORIAL CONTEXT

Like all governments in Canada, the GNWT is severely challenged to keep up with the demand for new infrastructure, and to invest adequately in the repair and replacement of existing infrastructure. The infrastructure deficit is a very real issue that affects the Government's ability to meet service demands in program areas ranging from transportation to housing to schools. The scope of this paper is limited to the deficit in **Community Public Infrastructure – i.e., the physical assets required by a community government to support the delivery of mandated programs and services in a sustainable manner.** Although in some jurisdictions municipalities are responsible for developing, funding or maintaining airports, highways or public housing, this is not the case in the NWT, so issues related to the deficit in these areas are not addressed in this document (a definition of community public infrastructure can be found in Appendix 1).

Statistics Canada figures confirm that Canada's municipalities have been hard hit by the fiscal imbalance. Over a five-year period from 1998 to 2003, federal government revenues increased by 12%, provincial revenues increased by 14%, and municipal revenues increased by only 4%. The primary source of revenue for municipalities in Canada is property tax, which is relatively unresponsive to economic performance. Like other levels of government, when faced with expenditure growth that outpaces revenue growth, community governments often defer needed infrastructure investments in order to maintain a balanced budget.

The Federation of Canadian Municipalities (FCM) estimates the national municipal infrastructure deficit at \$60 billion. This represents the investment required to replace, repair or maintain municipal infrastructure across the country. The Canada



West Foundation notes that, "...there is strong consensus on the drivers of infrastructure debt... Population growth and the resultant need for new infrastructure, existing infrastructure that requires maintenance and repair, and rising standards for such things as environmental protection..."¹

Just one example of the impact on municipal governments of regulatory requirements is the cost of compliance with proposed Health Canada water turbidity guidelines, which is estimated at one-time capital costs of more than \$35 million in the NWT. In addition to this capital investment, communities will face increased maintenance costs.

In addition to demands for new and enhanced infrastructure, the increased burden on existing infrastructure imposed by increased utilization tends to quicken the aging process, leading to service disruptions due to maintenance and repairs. In this environment governments fall into a cycle of deferred investment in capital and deferred investment in maintenance programs from which it is difficult to escape without access to new financial resources.

As noted above, municipal revenues are not keeping pace with infrastructure demands. It is generally recognized that municipal and community governments across Canada do not have the resources to address the infrastructure deficit without assistance. The Government of Canada's commitment to take action on the needs of cities and communities through the proposed New Deal is an acknowledgement of the urgency of the situation.

¹ Foundations for Prosperity: Creating a Sustainable Municipal-Provincial Partnership to Meet the Infrastructure Challenge of Alberta's 2nd Century, page 4.

Unique Challenges for the NWT

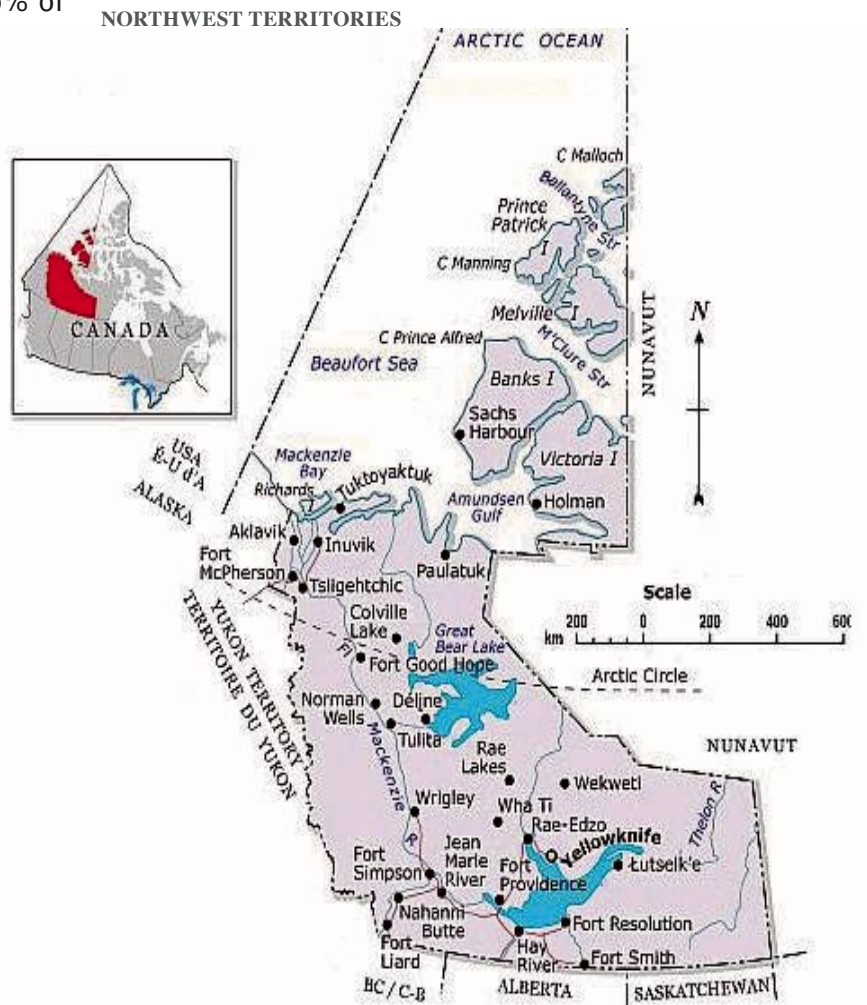
The pressures shared by municipal and community governments across Canada are faced by communities in the NWT. But in addition to these challenges, our communities face pressures that are unique to the northern geographical and socio-political environment.

All NWT communities are small by southern Canadian standards – only six communities have a population greater than 1,000 people (refer to Appendix 3). Many of the NWT's smaller communities are First Nation Communities, where Band Councils are the local governing authority. Smaller communities have virtually no assessment base, and taxation revenues cannot begin to meet local needs. The GNWT funds almost 100% of the infrastructure developed in small communities. Even those communities which are large by northern standards are challenged to adequately finance infrastructure requirements with a limited assessment base.

NWT communities are geographically isolated, which leads to increased infrastructure development costs associated with transportation of materials and supplies, higher power costs and the need to import technical expertise and labour. Geographic isolation also necessitates that each community requires the full complement of community public infrastructure - there is limited opportunity to share resources or take advantage of economies of scale. These factors lead to the “big projects in small communities” syndrome. Building a water treatment system to service a community with a population of 500 people requires a similar investment as

one to service 5,000 people, but small communities do not have the financial capacity to make the investment.

Infrastructure costs in the north are also driven upwards by the unique requirements of our northern climate. Due to the relatively new science of construction in cold climates, much of our existing older infrastructure is experiencing an accelerated rate of decay, as it was substandard when it was initially built. An example of such a problem is the failure of untreated woodpile foundations in a large percentage of our buildings. This results in the need for premature major repairs or even replacement of buildings.



Unique Challenges for the NWT (cont'd)

In addition, many of our communities do not have all season access. Depending on the geographical location, materials, supplies and often equipment must be brought in either by barge in the summer months or on a winter road in the winter months. Crews must contend with a short summer season; construction sites in the winter months must deal with keeping equipment and materials from freezing, few daylight hours and of course the extreme cold. This short shipping and construction season means longer planning cycles are needed. Many projects are delayed due to the missed opportunity for shipping materials and equipment on the winter roads or barges – this too results in higher costs.



The stress of operating in a harsh environment tends to drive construction costs higher, and shorten the life cycle of many assets. Our water treatment facilities have to be equipped with

redundant critical system components in case one fails in the harsh northern climate and another one cannot be shipped for several months; all of our buildings need higher insulation levels. These are added expenses not seen in southern Canada.

The results of these increased infrastructure costs can be seen in the north's substantially higher water rates, as our low populations and resulting consumption levels cannot generate enough revenue to cover the fixed costs of infrastructure let alone the operating costs.



It should be noted that the GNWT's infrastructure deficit is not limited to community public infrastructure. The government's ability to make the needed investments in highways, schools and health facilities is also affected by these pressures.

“The costs of water and sewer services to homes in Arctic communities is approximately 125 times more than in southern Canada.” “Due to subsurfaced soil conditions, which is predominated by permafrost and bedrock, burying the water and sewer lines is too costly to install and operate. The same holds true for above and below ground utilidor systems. The truck haul method is the most widely used means to distribute potable water.”²

Capacity of the GNWT to Support Community Needs

Provincial and territorial governments have a fiduciary responsibility to fund and support local governments. As noted above, the GNWT funds the vast majority of infrastructure development in the Territory's smaller communities, and contributes to infrastructure costs in the larger communities as well. All provinces and territories are struggling to provide adequate levels of support to municipal governments, but the GNWT faces particular challenges due to the pace of resource development activities.

The NWT has one of the fastest-growing economies in Canada, and is experiencing an unprecedented boom in development of natural resources, with three diamond mines in operation or under development, oil and gas exploration and the prospect of a natural gas pipeline on the horizon. This development brings a potential for \$17 billion in revenue from taxes and royalties over the next 20 years. But the GNWT does not reap the benefits of this development. All royalties, and the majority of tax revenues, go directly to the Government of Canada – and prior to April 1, 2004, on average all but twenty cents on the dollar of the extra income that is generated by the GNWT through taxation was clawed back through the funding agreement with Canada. The federal government is negotiating the sharing of resource revenues with the GNWT and aboriginal governments, but progress has been slow. At the October 2004 First Ministers' Meeting, the Prime Minister announced changes to Territorial Formula Financing that may mean the NWT will keep more than 20 per cent of tax revenues, but details of the new

“... in 2003, the GNWT was forced to invest \$1.3 million in emergency repairs to a road in Tuktoyaktuk that had deteriorated due to heavy usage by industrial equipment associated with oil and gas exploration activity.”

formula will not be finalized until 2006. Even though the GNWT does not receive the fiscal benefit, the territorial government bears the full cost of coping with the infrastructure and social impacts of development. Infrastructure costs for territorial and community assets are soaring due to increased utilization of territorial highways, community roads, water, wastewater and solid waste systems.



For example, in 2003, the GNWT was forced to invest \$1.3 million in emergency repairs to a road in Tuktoyaktuk that had deteriorated due to heavy usage by industrial equipment associated with oil and gas exploration activity. In 2001, the community of Fort Liard required an unbudgeted investment of \$300,000 because of increased pressure on the municipal solid waste site due to increased oil and gas activity.

Requests by users such as exploration camps for access to community infrastructure are expected to increase as mineral and oil and gas exploration and production activity ramps up. Communities are also facing increased pressure to make available developed land for both industrial and residential purposes, beyond their ability to finance.

Capacity of the GNWT to Support Community Needs (cont'd)

When these demands are combined with population increases associated with development activity, it is estimated that an additional one-time capital investment of up to \$37 million could be required over a 20-year period. This estimate, based on projected activity associated with a proposed pipeline, reflects increasing demand for developed land, pressure on water and wastewater treatment systems and solid waste sites, and increased usage on community roads.



This represents an infrastructure cost that is not reflected in any of the Government's current planning and forecasting.

In fairness, this impact has been recognized by Canada and some effort made to address it. In 2003, the GNWT received \$65 million from the Canadian Strategic Infrastructure Fund to improve highways and winter roads, which are crucial to supplying resource development activities throughout the NWT.

But this contribution has met only a small part of the need. In the meantime, the GNWT is forced to allocate a large portion of its infrastructure budget to continue to address the impacts of resource development. And when NWT communities are already suffering from the effects of a shortfall in infrastructure investment, they have no ability to cope with the additional impacts of resource development activities.



Challenges Facing NWT Community Governments



Community governments are struggling to find solutions to the infrastructure deficit that will decrease their reliance on the GNWT. Until recently, territorial legislation prevented smaller communities from borrowing to finance infrastructure development. In response to lobbying from community governments, the GNWT has recently amended legislation to provide borrowing authority to most communities. Some communities have pursued creative financing arrangements, including partnerships with industry. Aboriginal communities have identified funding received through Impact and Benefits Agreements with industry as a potential source to enhance infrastructure budgets. And some communities have initiated local fund-raising efforts to finance desperately required recreation infrastructure. While some communities are beginning to explore alternative financing arrangements, most NWT communities are limited in their capacity to address the issue.

In addition to limited capacity to generate own-source revenues, communities are also challenged by a range of other capacity issues. In smaller communities, a handful of municipal staff are tasked with full responsibility for all aspects of community government operations. Wage levels are often not competitive, and staff turnover is high as a result of competition with government,

private business and industry. Innovative procurement efforts such as public-private partnerships require technical expertise, including business and accounting know-how, to implement successfully. This expertise is in limited supply in smaller communities. Finally, communities are hampered in their ability to forecast and plan for infrastructure development by their reliance on the GNWT and the uncertainty of the GNWT's infrastructure budget from year to year.

Meanwhile, our communities are struggling to provide a minimum level of services to residents. Most NWT communities have been in existence for less than 60 years, and some have not yet fully developed the base of infrastructure that would be taken for granted in other parts of Canada. Most communities have no paved roads. Some communities have never had assembly halls or community gymnasiums. In other communities, initial infrastructure was not designed to withstand the rigors of the northern environment and is reaching the end of its useful life sooner than expected.



Challenges Facing NWT Community Governments (cont'd)

Recreation infrastructure is an area of particular need. Small aboriginal communities coping with rapid modernization and culture change are faced with a myriad of health and social issues, including epidemic rates of diabetes, and higher than average rates of substance abuse and family violence. Youth in these communities are particularly vulnerable. The importance of physical activity as a key health determinant is widely recognized, and is an integral building block for healthy communities.



THE NWT COMMUNITY PUBLIC INFRASTRUCTURE DEFICIT

The factors outlined above illustrate that, while all community governments across Canada are suffering from the municipal infrastructure deficit, the NWT faces unique pressures and challenges that require a tailor-made solution.

In this section, we will quantify the community public infrastructure deficit facing NWT communities based on projected costs of meeting basic needs. However, it should be noted that there is no commonly accepted methodology for quantifying and tracking the infrastructure deficit.

The GNWT funds the majority of infrastructure development in the NWT's 27 non-tax-based communities. Community governments are responsible to fund minor infrastructure (e.g. sidewalks, playgrounds) and are responsible for all maintenance. The six municipal taxing authorities are entirely responsible for financing and development of all community public infrastructure, with one exception – the GNWT provides a small contribution for replacement or upgrading of water and sewage treatment systems.

The quantification provided in this paper is conservative. Forecasts of infrastructure need for the 27 smaller communities are drawn from the GNWT's 20-year infrastructure needs assessment, a planning tool that tracks both community and territorial public infrastructure needs. The assessment is updated annually based on consultation with community governments.

Due to the GNWT's limited financial capacity over recent years, resulting in constrained infrastructure development, many communities no longer identify to the government funding required for cultural and recreational needs, as the GNWT's focus over the past decade has been predominantly with infrastructure required for public health and safety

(e.g. water and wastewater systems). Therefore, there are critical projects that are not reflected in the 20-year needs assessment.

Community roads are also not included in the NWT's needs assessment. However, as community populations increase and as adaptation to a modern lifestyle results in increased vehicle ownership and usage, it is expected both that the communities' ability to absorb maintenance costs will be strained, and that there will be increasing pressure for the expansion of community road systems. Granular materials represent a cost driver for many communities that do not have ready access to a gravel source. These pressures are not reflected in the deficit calculations in this document.



The NWT Community Public Infrastructure Deficit (cont'd)

The deficit portrayed in this report estimates the territorial gap in the level of investment available to maintain a stable inventory of assets. We have not attempted to calculate what it would cost to address infrastructure demands based on demographic change or providing an expanded level of service for territorial residents.

As a result, the basis for calculation of the community public infrastructure deficit is understated. Any estimates used were calculated on a conservative basis such as multi-year averages. A description of the methodology used to arrive at all estimates is contained in the appendices.

The FCM has estimated the national infrastructure deficit to be \$60 billion by using a survey approach. By sampling the state of existing infrastructure in municipalities of various sizes, researchers estimated the cost to repair/replace the infrastructure and then extrapolated for the entire population to reach a deficit for all municipalities in Canada.³ As the above-mentioned paper points out, survey methods are open to various criticisms ranging from their self-serving nature to their results being more qualitative in nature than quantitative.

Conversely, some of the larger southern cities have quantified their infrastructure deficit based on their Asset Management system resulting in more empirical estimates. To date, no province or territory has been able to compile this type of detailed analysis. This has resulted in studies

such as Canada West's "Creating a Sustainable Municipal-Provincial Partnership to Meet the Infrastructure Challenge of Alberta's 2nd Century," using proportional population to quantify individual jurisdictions' infrastructure deficits. While this may provide for a "ball park" number for discussion purposes in southern jurisdictions, as with other per capita formulas, it does not provide for meaningful results in the north.

The information presented here is therefore intended to provide a more meaningful order of magnitude, rather than to be a precise quantification of the gap between NWT governments' ability to finance infrastructure development and the need.

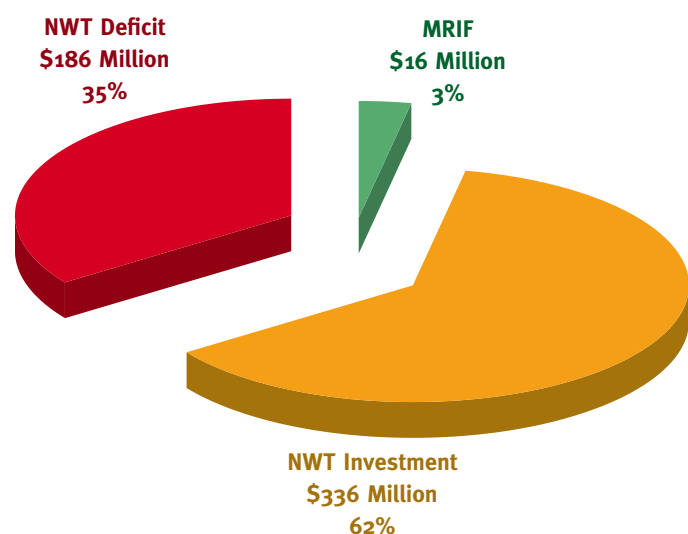
“The FCM has estimated the national infrastructure deficit to be \$60 billion.”

³ Canada West Foundation – A Capital Question Infrastructure in Western Canada's Big Six, page 36.

The NWT Community Public Infrastructure Deficit (cont'd)

Analysis of the magnitude of the gap is based on the first ten years of the GNWT's 20-year needs assessment of all NWT non-tax-based communities and the capital plans provided by the Municipal Taxation Authorities in relation to the level of actual investments, referenced to the average annual GNWT investment. The \$16 million which the GNWT will receive under Infrastructure Canada's Municipal and Rural Infrastructure Fund (MRIF) is also included in the analysis. Based on these sources, it is projected that the 10-year funding shortfall for Community Public Infrastructure today is \$186 million (2004 dollars).

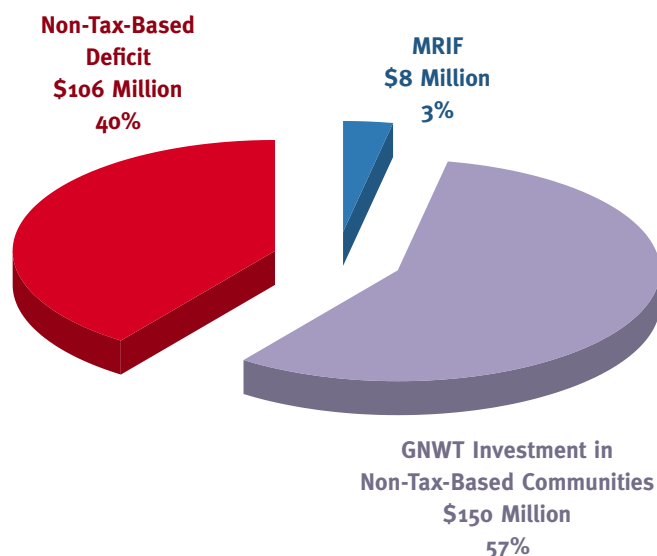
Figure 1:
NWT Community Public Infrastructure Needs
(2004 Dollars)



With the combined investment from the GNWT and the Municipal Taxation Authorities only 62% (Figure 1) of the total need is being met in the larger communities. To further compound these pressures 27 of the NWT's 33 communities are non-tax-based communities, and do not currently collect tax revenue. While these communities only comprise 30% of the total NWT population, they account for 57% of the total infrastructure deficit—\$106 million.

Figure 2:

Non-Tax-Based Community Public Infrastructure Needs (2004 Dollars)



The infrastructure deficit is growing. In the current fiscal situation the GNWT is unable to finance the needs of communities. The GNWT is only meeting 57% (Figure 2) of the total need in the non-tax-based communities.

“The infrastructure deficit is growing. In the current fiscal situation the GNWT is unable to finance the needs of communities.”

The NWT Community Public Infrastructure Deficit (cont'd)

Not included in the estimated infrastructure gap of \$186 million is a growing amount of deferred maintenance and the impacts of deferred capital investment.

The GNWT replaces its assets based on economic replacement principals for most facilities. Our infrastructure is designed to have periodic capital investments in the form of retrofits in addition to regular maintenance and repairs. The fiscal imbalance and increased territorial deficit has pressured the GNWT into a period of financial restraint. This in turn has forced the deferral of capital projects, and limited the amount of infrastructure investment that occurs in accordance with planned replacement schedules. This ultimately increases the operational cost and shortens the economic life of infrastructure. These effects are seen in the increasing number of situations where an economic analysis of retrofit vs. repair reveals that it is more economic to replace an asset rather than retrofit it. Buildings that are five to ten years late for a retrofit quickly become more economical to replace.

Our communities are faced with these aging facilities and increasing operational cost. They are challenged to allocate sufficient funds for maintenance and repair, further compounding the maintenance deficit. As a result, communities struggle to keep the basic services running and maintenance and repair are too often deferred.

The territory now finds itself in a situation where an increasing proportion of its infrastructure is due for some form of capital investment.

Increasingly we are deferring investments required under normal replacement cycles resulting in increased expenditures upgrading and maintaining infrastructure. We are essentially now “fixing only the stuff that breaks” and ultimately decreasing the value of our capital investments.

We estimate that if the effects of deferred capital investment and deferred maintenance in the territories non-tax-based communities were combined, it would add approximately \$8 million this year to our infrastructure deficit (Appendix 2). This amount alone is above the FCM’s estimated proportional population infrastructure deficit amount of nearly \$6 million per year for the whole Territory. Further, the infrastructure deficit grows with each deferred investment, making it something of a moving target.



Impacts of the Infrastructure Deficit in NWT Communities



When governments fail to provide sufficient investment in community infrastructure, the impacts are severe and wide-ranging.

Of greatest concern, of course, is any failure to maintain essential civic infrastructure. Water treatment systems that are not up to standard, or lack of fully operational fire safety equipment, can result in an immediate threat to the health and safety of residents. These impacts are widely recognized and governments strive to ensure that appropriate investment is made to prevent these impacts from being realized. However, within current investment levels the GNWT is having difficulty meeting basic health and safety needs.

The failure to invest in other community infrastructure has equally serious implications, especially over the longer term. Community governments play an essential role in ensuring that a whole range of programs and services are provided to residents. Lack of adequate core infrastructure, such as community administration offices, can impede a community government's ability to operate efficiently and effectively. Lack of sufficient maintenance equipment and facilities

can slowly erode essential civic infrastructure. The frustrations caused by these shortfalls can lead to turnover rates for community government staff.

Failure to properly invest in and maintain local roads can lead to health and safety issues, for example the potential for vehicle accidents from dust or ice conditions. Lack of appropriate investment in solid waste and wastewater treatment systems can have a detrimental impact on the environment, with potentially more serious consequences down the road.

When infrastructure funding is limited, it is unfortunate that recreation facilities are usually the first investment to be cut from the government's capital plan, and yet availability of a range of recreational opportunities is essential to building healthy communities and supporting personal health and well-being. At a time when governments around the world are recognizing the importance of promoting physical activity as a key component in preventing downstream health costs, the lack of support for recreational facilities is becoming a critical issue.

THE SOLUTION

Conclusion

In summary, NWT communities are facing unprecedented infrastructure pressures, and neither community governments nor the GNWT have the resources to address the increasing needs. The current shortfall of \$186 million on infrastructure spending will continue to increase, without drastic action to reverse the trend. Added to this grim prospect is the potential for increased industrial activity to have a significant impact on infrastructure pressures, which neither community governments nor the GNWT will have the resources to address.

Obviously there is no quick fix to the community infrastructure deficit in the NWT. Increased funding is essential. The GNWT recognizes that increased funding alone will not be enough to solve the problem over the long term. The solution will only come through action on a number of fronts, and it will take time to implement initiatives to tackle the problems.

The GNWT and the Northwest Territories Association of Communities are proposing a multi-faceted action plan to tackle the community infrastructure deficit on a number of fronts. This plan will require the cooperation of many partners - the Government of Canada, the GNWT, NWT community governments, and the private sector.



Strategies proposed include the following:

1. The amount of funding available for community public infrastructure must be increased.

- Re-examine the GNWT infrastructure acquisition budget and annual investment levels in CPI.
- Join other provinces and territories in advocating for Canada to implement a permanent municipal infrastructure program.
- Push for implementation of the Federal Government's New Deal to provide fuel tax revenues or an equivalent to communities to support sustainable infrastructure.
- Continue to promote the concepts outlined in the GNWT's New Deal to provide more communities with access to property tax revenues and formula funding for infrastructure development.
- Provide NWT communities with access to low-cost borrowing.
- Seek additional support from Canada to address identified infrastructure impacts of resource development.

2. Federal funding arrangements must be more flexible.

- The Municipal Rural Infrastructure Fund must recognize NWT community needs and ability to provide matching funds.
- Application processes must be tailored to community capacity.

- Canada must ensure that First Nations funds are available to NWT communities where appropriate.

3. Available funding must be used more creatively.

- The GNWT must work with communities to explore innovative procurement approaches – e.g. public-private partnerships and bundled contracts.
- The GNWT should consider developing flexible application-based funding programs to address community priorities, e.g. the Community Initiatives Program.

4. Technical innovation must be promoted.

- Make greater use of innovative technologies and northern design.
- Promote construction of multi-use facilities where cost-effective.

5. Maintenance capacity at the community level must be improved.

- The GNWT should provide appropriate training and support.
- The GNWT should develop tools to help community governments manage the gap, e.g. life-cycle costing.

TECHNICAL APPENDICES

APPENDIX 1

METHODOLOGY

The deficit portrayed in this report estimates the territorial gap in the level of investment available to maintain a stable inventory of assets. We have not attempted to calculate the effect on infrastructure demands due to demographic change or providing an expanded level of service for territorial residents. In this respect we have likely understated our true infrastructure deficit.

The scope of this paper is limited to the deficit in Community Public Infrastructure. Community Public Infrastructure (CPI) is defined as “infrastructure used by the community to provide their programs and services”. Examples of CPI include:

- “Public Buildings” including community offices, fire halls, garages and shops, warehouses, community halls and gyms, arenas, curling rinks, indoor swimming pools, staff housing, libraries, community cultural and visitor centers and museums;
- Water and wastewater facilities and equipment;
- Fire protection, emergency response, and public safety equipment;
- Mobile equipment, including fire and emergency response vehicles, road maintenance equipment, and light vehicles;
- Solid and hazardous waste facilities and equipment;
- Roads, sidewalks, lands and associated drainage systems;
- Community docks and breakwaters;
- Playgrounds, parks and associated equipment; and
- Outdoor Swimming Pools.

Community governments in the NWT are not held responsible for developing, funding or maintaining airports, highways or public housing, so issues related to the deficit in these areas are not addressed in this document.

To arrive at the \$186 million infrastructure deficit, we used a three-step process. First, we determined the community public infrastructure need for the communities in the NWT over the next ten years. Second, we projected the capital investment for the communities at current investment levels. Finally, we calculated the approximate community public infrastructure deficit by subtracting the investment from the need. All calculations have been computed using 2004 dollars and have not been adjusted for the time value of money or inflation.

Need - Community Public Infrastructure

The GNWT is responsible for funding and managing the capital acquisitions of 27 non-tax-based communities. In order to estimate the community public infrastructure need, the GNWT maintains a 20-year needs assessment for each non-tax-based community. The needs assessment is based on normal life cycle replacement of existing infrastructure and consultation with non-tax-based community governments regarding requested new infrastructure. We used the information from this needs assessment to determine that the community public infrastructure need for the non-tax-based communities is approximately \$264 million (Exhibit 1). Since the municipal taxation authorities are responsible for their own capital planning, the infrastructure needs for these communities were provided by each community. As a result, we were able to determine that the ten-year community public infrastructure need for the NWT is approximately \$538 million (Exhibit 1).

Exhibit 1

Combined Needs for NWT Communities
(in Thousands)

<i>Physical Assets</i>	<i>MTA (6)</i>	<i>NTB (27)</i>	<i>10-Year Need</i>	<i>Annual NWT Need</i>	<i>Annual Non-Tax-Based Need</i>
Roads	\$ 45,390	\$ 17,955			
Fire Protection	\$ 9,880	\$ 9,604			
Land development	\$ -	\$ 6,600			
Mobile Equipment	\$ 9,500	\$ 28,902			
Municipal Buildings	\$ 1,000	\$ 49,865			
Erosion Protection	\$ -	\$ 3,642			
Recreation Facilities	\$ 75,148	\$ 63,554			
Sewage Facilities	\$ 63,890	\$ 21,610			
Solid Waste Sites	\$ 14,050	\$ 16,378			
Water Treatment	\$ 55,355	\$ 49,982			
Total	\$ 274,213	\$ 263,655	\$ 537,868	\$ 53,787	\$ 26,366

MTA - Municipal Taxing Authority
NTB - Non-Tax-Based Communities

APPENDIX 1

Investment - Community Public Infrastructure

To determine the projected capital investment for the non-tax-based communities, we used a four-year average of the GNWT's capital plan expenditures. A four-year average was used instead of five years due to 1999's investment being substantially lower than other years. The trend in investment levels is increasing and the inclusion of 1999's investment would result in lower future year projections. This would not be representative of the increasing trend. The projected investment over the next ten years is approximately \$175 million (Exhibit 2). The GNWT capital plan contains a water and sewer cost share component of \$2.5 million per year for municipal taxation authorities, which was deducted from the \$175 million to arrive at an approximate non-tax-based community public infrastructure investment of \$150 million (Exhibit 2). The four-year average has not been adjusted for the time value of money or inflation.

Exhibit 2

Projected Annual Investment in Infrastructure
Non-Tax-Based Communities
(in Thousands)

Non-Tax-Based	Investment (in Thousands)											Total
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14		
GNWT Capital Plan*	\$ 15,815	\$ 19,729	\$ 17,449	\$ 17,449	\$ 17,449	\$ 17,449	\$ 17,449	\$ 17,449	\$ 17,449	\$ 17,449	\$ 17,449	\$ 175,140
MTA W/S cost share	\$ (2,500)	\$ (2,500)	\$ (2,500)	\$ (2,500)	\$ (2,500)	\$ (2,500)	\$ (2,500)	\$ (2,500)	\$ (2,500)	\$ (2,500)	\$ (2,500)	\$ (25,000)
Non-Tax-Based Investment	\$ 13,315	\$ 17,229	\$ 14,949	\$ 14,949	\$ 14,949	\$ 14,949	\$ 14,949	\$ 14,949	\$ 14,949	\$ 14,949	\$ 14,949	\$ 150,140

MTA - Municipal Taxation Authorities

The projected investment for municipal taxation authorities was calculated using a five-year average of their community governments' investment in capital. These investments were obtained from audited financial statements. Similar to the non-tax-based investment calculations, a five-year average was used, as it is more representative of the increasing trend in investment than a ten-year average. Therefore, the projected investment for municipal taxation authorities is approximately \$16 million per year (Exhibit 3). The five-year average was not adjusted for the time value of money or inflation.

Exhibit 3

Municipal Taxation Authorities
Historic Investment
(in Thousands)

Community	Capital Expenditures (in Thousands)				
	2003	2002	2001	2000	1999
Yellowknife	\$ 10,748	\$ 17,447	\$ 7,251	\$ 6,035	\$ 8,505
Inuvik	\$ 5,584	\$ 3,668	\$ 3,281	\$ 692	\$ 687
Hay River	\$	\$ 415	\$ 1,389	\$ 468	\$ 1,732
Fort Smith	\$ 1,741	\$ 584	\$ 1,079	\$ 1,176	\$ 625
Fort Simpson	\$ 460	\$ 1,040	\$ 821	\$ 770	\$ 2,254
Norman Wells	\$ 1,158	\$ 130	\$ 181	\$ 322	\$ 71
Total	\$ 19,691	\$ 23,285	\$ 14,003	\$ 9,463	\$ 13,874
Average Investment (last 5 years)	\$ 16,063				

As previously mentioned, the GNWT provides \$2.5 million to NWT municipal taxing authorities to assist with costs of maintaining and replacing water and sewage systems. Therefore, the total annual capital investment for municipal taxation authorities is approximately \$18.5 million. Projected over ten years, this amounts to about \$185 million.

The Municipal Rural Infrastructure Fund (MRIF) contributions are expected to begin in 2005/06 and continue until 2008/09. These contributions will amount to about \$16 million over the four-year period. Therefore, we have determined that the projected NWT community public infrastructure investment is approximately \$352 million over the next ten years (Exhibit 4). Constant dollars were used to project the annual investment forward ten years.

Exhibit 4

Projected Annual Investment In Infrastructure
NWT Communities
(in Thousands)

NWT	Investment (in Thousands)										Total	
	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14		
MTA Average Investment	\$ 16,063	\$ 16,063	\$ 16,063	\$ 16,063	\$ 16,063	\$ 16,063	\$ 16,063	\$ 16,063	\$ 16,063	\$ 16,063	\$ 16,063	\$ 160,630
MTA W/S cost share	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	\$ 25,000
Total MTA Investment	\$ 18,563	\$ 18,563	\$ 18,563	\$ 18,563	\$ 18,563	\$ 18,563	\$ 18,563	\$ 18,563	\$ 18,563	\$ 18,563	\$ 18,563	\$ 185,630
Non-Tax-Based Investment	\$ 13,315	\$ 17,229	\$ 14,949	\$ 14,949	\$ 14,949	\$ 14,949	\$ 14,949	\$ 14,949	\$ 14,949	\$ 14,949	\$ 14,949	\$ 150,140
MRIF	\$ -	\$ 4,000	\$ 4,000	\$ 4,000	\$ 4,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 16,000
Total NWT Investment	\$ 31,878	\$ 39,792	\$ 37,512	\$ 37,512	\$ 37,512	\$ 33,512	\$ 33,512	\$ 33,512	\$ 33,512	\$ 33,512	\$ 33,512	\$ 351,770

All amounts in 2004 Dollars

MTA – Municipal Taxation Authorities

APPENDIX 1

Deficit – Community Public Infrastructure

The community public infrastructure deficit was determined by subtracting the investment of \$352 million from the need of \$538 million. Therefore, we have determined that a conservative estimate of the 10-year community public infrastructure deficit for the NWT is approximately \$186 million (Exhibit 5).

Exhibit 5

Projected Annual Deficit

NWT Communities

(in Thousands)

<i>Total Annual Deficit</i>	<i>Deficit (in Thousands)</i>									
	<i>2004/05</i>	<i>2005/06</i>	<i>2006/07</i>	<i>2007/08</i>	<i>2008/09</i>	<i>2009/10</i>	<i>2010/11</i>	<i>2011/12</i>	<i>2012/13</i>	<i>Summary</i>
Non-Tax-Based Deficit with MRIF	\$ 13,051	\$ 20,187	\$ 29,603	\$ 39,019	\$ 48,435	\$ 59,851	\$ 71,267	\$ 82,683	\$ 94,099	\$ 105,515
MTA Deficit with MRIF	\$ 8,858	\$ 15,717	\$ 22,575	\$ 29,433	\$ 36,291	\$ 45,150	\$ 54,008	\$ 62,866	\$ 71,725	\$ 80,583
Total NWT Deficit with MRIF	\$ 21,909	\$ 35,904	\$ 52,178	\$ 68,452	\$ 84,727	\$ 105,001	\$ 125,275	\$ 145,550	\$ 165,824	\$ 186,098

All amounts in 2004 Dollars

MTA – Municipal Taxation Authorities

DEFERRED MAINTENANCE (Excluding Municipal Taxation Authorities)

The National Research Council of Canada defines maintenance as “action taken to restore a system or piece of equipment to its original capacity, efficiency, or capability.”⁴ They further estimate the annual cost of maintenance and repair to be 2-4% of the current replacement value (CRV) of the asset. We have based our deferred maintenance calculations on this rationale.

The average CRV of the CPI in the 27 non-tax-based communities is conservatively estimated at \$10 million per community or \$270 million in total. A conservative estimate of the CRV of the 227 km of roads was based on \$238,000 per kilometre. This amounts to \$54 million. Therefore, the total estimated CRV of CPI in the non-tax-based communities is about \$324 million. To calculate the annual deferred maintenance we determined from an analysis of the non-tax-based community’s financial statements that their actual annual expenditures on maintenance and repair was approximately \$4.8 million. This amount was subtracted from the 4% annual cost of maintenance of \$12.9 million to arrive at the estimated annual non-tax-based deferred maintenance deficit of \$8.1 million (Exhibit 6).

Exhibit 6

<i>Deferred Maintenance for Non-Tax-Based Communities Infrastructure</i>	<i>Cost (NTB) (Thousands)</i>
Reasonability Test for Average CRV of CPI for NTB Communities	
Arena	\$3,000
Water Treatment Plant	\$2,500
Maintenance Garage / Parking Garage	\$750
Community Hall / Office	\$1,000
Sewage / Solid Waste	\$1,500
Mobile Equipment	\$750
Total	\$9,500
Estimated Current Replacement Value (CRV) - Infrastructure	\$270,000
Estimated Current Replacement Value (CRV) - Roads	\$54,000
Total Estimated Current Replacement Value (CRV)	\$324,000
Annual Cost of Maintenance (4% of CRV)	\$12,960
Actual Expenditure	\$4,830
Non-Tax-Based Deferred Maintenance Deficit	\$8,130

NTB – Non-Tax-Based Communities

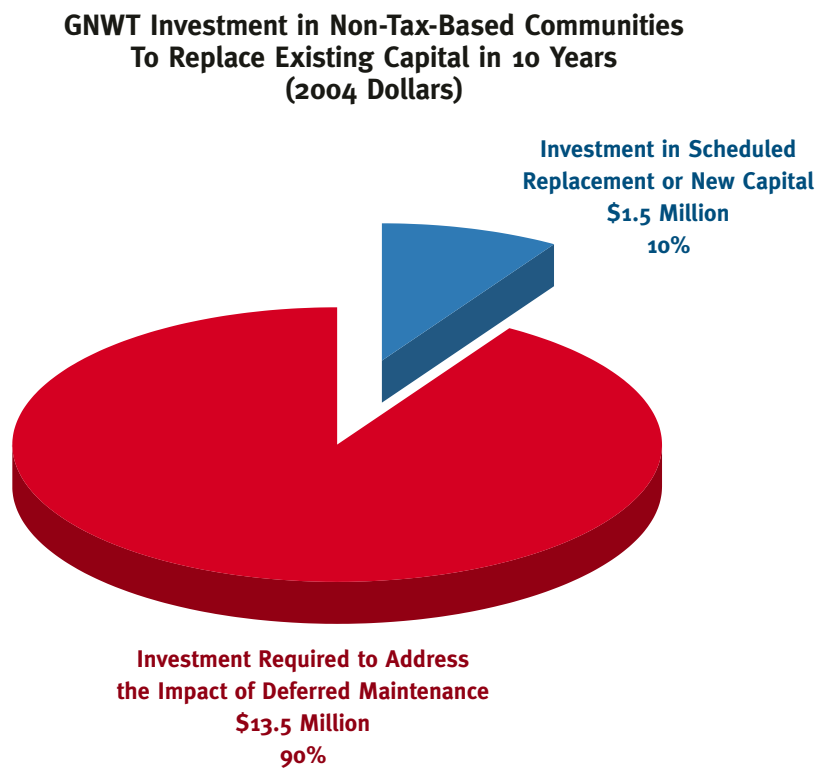
The CRV of CPI for NTB Communities was based upon the 20-year needs assessment.

⁴ APWA International Public Works Congress NRCC/CPWA Seminar Series “Innovations in Urban Infrastructure” 2000, ADVANCED ASSET MANAGEMENT: TOOLS AND TECHNIQUES, page 48.

APPENDIX 2

Therefore, it is estimated that \$8.1 million (54%) of the current \$15 million non-tax-based annual investment should be directed towards replacement of capital to address the deferred maintenance deficit. The combination of deferred capital investment and deferred maintenance is contributing to the infrastructure deficit. Exhibit 7 illustrates the compounding effect of deferring maintenance. If not addressed, 90% of the \$15 million annual investment would need to be directed towards deferred maintenance investments in ten years' time. This amount does not include the increased cost resulting from the deferral of projects needing major repair or replacement.

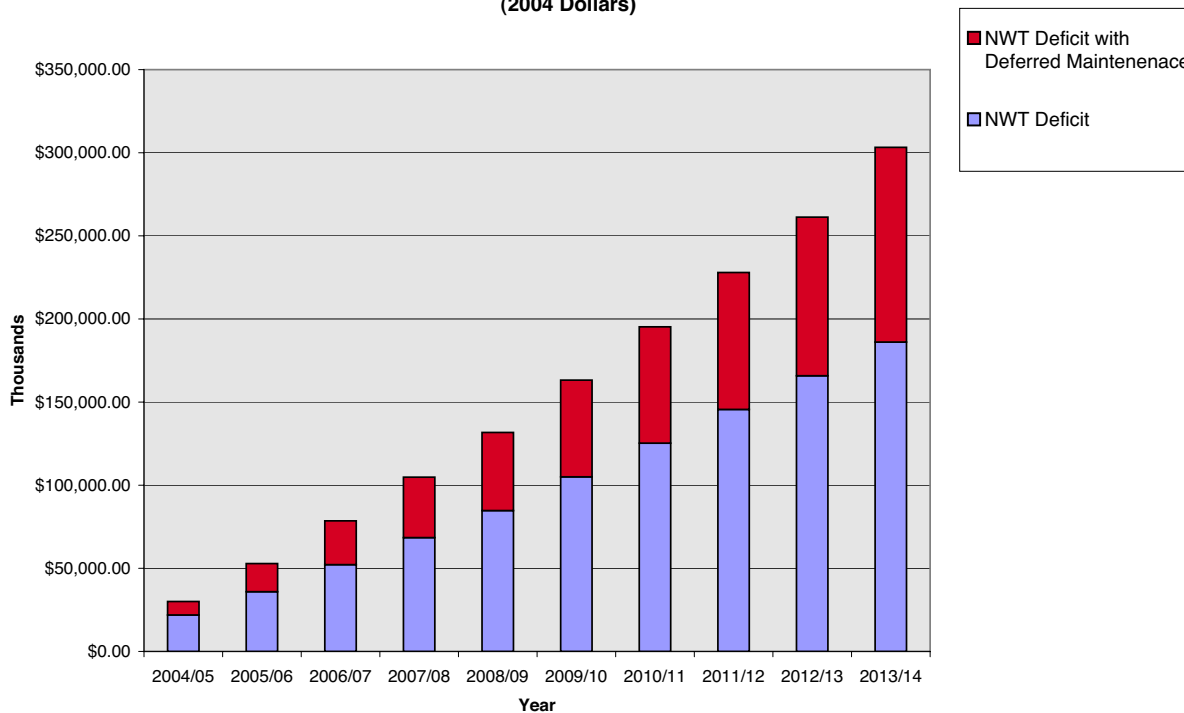
Exhibit 7



Dr. Dana Vanier, a Senior Research Officer at the National Research Council of Canada, suggests that “deferred maintenance cannot be treated simply as a sum of past annual maintenance deficits; it must include the compounding effect of deferring maintenance from one year to the next.”⁵ Therefore, the previous year’s deferred maintenance deficit is added to next year’s maintenance requirement. Four percent of the current year’s investment in new capital is then added to the total. Exhibit 8 shows the compounding effect of deferred maintenance on the overall community public infrastructure deficit.

Exhibit 8

**NWT Community Public Infrastructure Deficit with Deferred Maintenance
(2004 Dollars)**



Although we have previously stated the infrastructure deficit for community public infrastructure to be \$186 million, this funding shortfall does not include the growing effect of deferred maintenance and the impacts of deferred capital investments. Over the next ten years, if the compounding effect of deferred maintenance were capitalized, it would add as much as \$117 million to the infrastructure deficit. This is a conservative estimate, as the calculation assumes that the deferred maintenance deficit begins in 2004. Therefore, the calculation ignores the compounding effect of deferred maintenance prior to 2004.

Municipal and Community Affairs recognizes that it has not been standard practice to capitalize deferred maintenance. However, some provinces have recognized the substantial impact that the deferral of maintenance has on future capital expenditures. For example, Ontario’s “Building a Better Tomorrow” suggests that municipalities can capitalize deferred maintenance based on specific criteria.

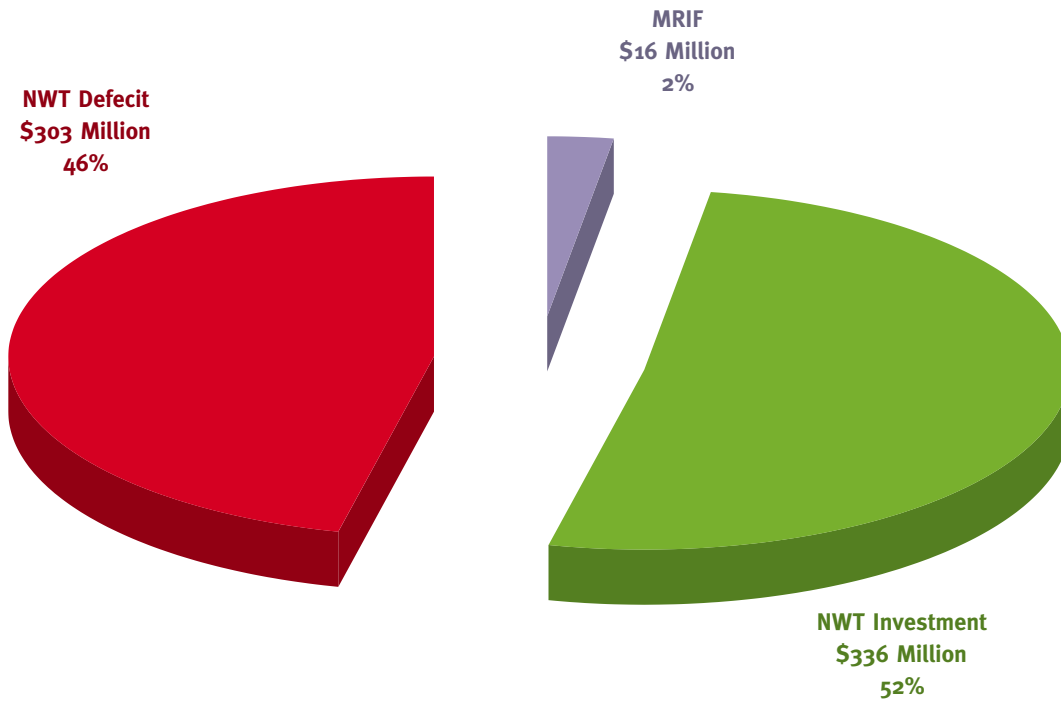
⁵ APWA International Public Works Congress, NRCC/CPWA Seminar Series “Innovations in Urban Infrastructure” 2000, ASSET MANAGEMENT 101: A PRIMER, page 6.

APPENDIX 2

Thus, the CPI deficit over 10 years for the NWT is conservatively estimated to be as much as \$303 million (Exhibit 9).

Exhibit 9

**NWT Community Public Infrastructure Needs with Deferred Maintenance
(2004 Dollars)**



Community	Population
Non-Tax-Based Communities	
2003	
Hamlets	
Aklavik	748
Fort Liard	524
Fort McPherson	910
Fort Providence	837
Holman	470
Paulatuk	323
Rae-Edzo	1,864
Sachs Harbour	153
Tuktoyuktuk	979
Tulita	506
Charter Communities	
Deline	645
K'asho Got'ine (Fort Good Hope)	747
Tsiigehtchic	195
Wha Ti	476
Bands	
	747
Dechi Laot'I Band (Wekweti)	154
Gameti First Nation (Rae Lakes)	278
Jean Marie First Nation	53
Ka'a'gee Tu First Nation (Kakisa)	44
K'atlodeeche First Nation (Hay River Reserve)	268
Lutselk'e Dene Band	377
Nahanni Butte Dene Band	82
Pehdzeh Ki Dene Band (Wrigley)	183
Sambaa K'e Dene Band (Trout Lake)	68
Yellowknives First Nation (Dettah)	203
Settlements	
Behdzi Ahda' First Nation (Colville Lake)	96
Deninoo (Fort Resolution)	562
Enterprise	96
Municipal Taxation Authorities	
City	
Yellowknife	18,028
Towns	
Fort Smith	2,625
Hay River	3,835
Inuvik	3,451
Norman Wells	882
Village	
Fort Simpson	1,273

