CANADIAN INFRASTRUCTURE REPORT CARD

Informing the Future

Key Messages

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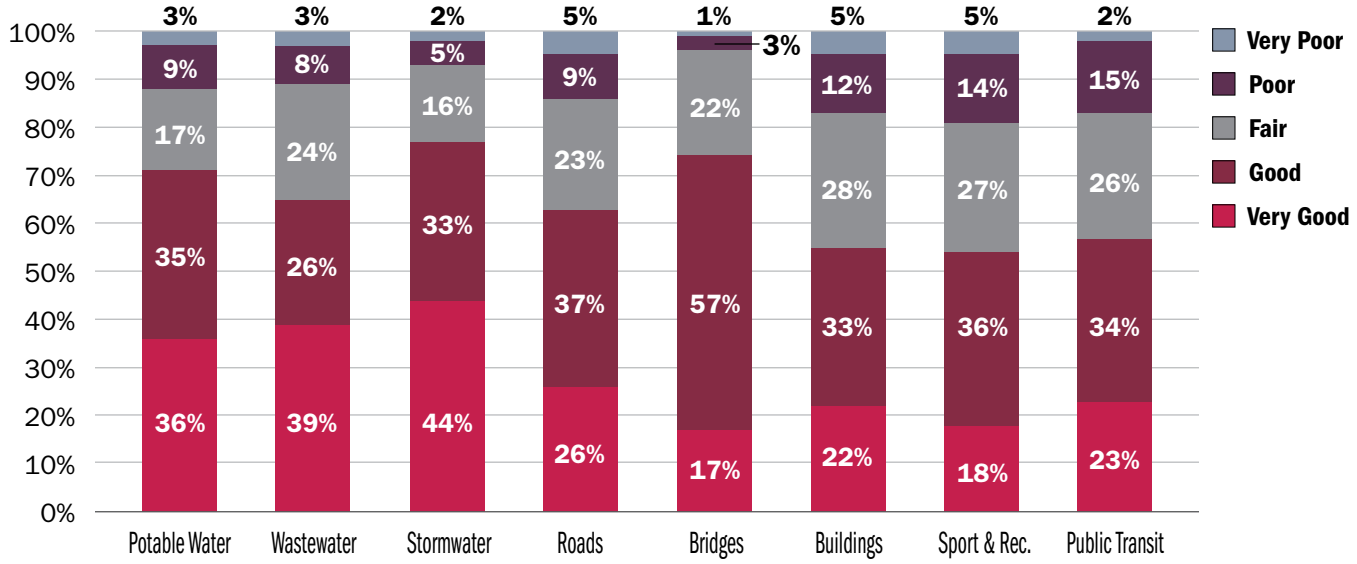
KEY MESSAGES

Municipalities own the core infrastructure assets that are critical to the quality of life of Canadians and the competitiveness of our country. Almost 60% of Canada's core public infrastructure is owned and maintained by municipal governments. According to survey results, the total value of core municipal infrastructure assets is estimated at $1.1 trillion dollars, or about $80,000 per household.[8] Municipal infrastructure gets people and goods moving, provides safe drinking water, handles our waste, creates spaces for sport and recreation, and helps protect our homes against flooding and other natural disasters. The delivery of these essential public services is reliant on a strong foundation of municipal infrastructure. This foundation enables our communities and local businesses to grow, and ensures Canadians can lead safe and healthy lives.

One-third of our municipal infrastructure is in fair, poor or very poor condition, increasing the risk of service disruption. The survey asked municipalities to qualitatively assess their infrastructure according to a five-point rating scale ranging from Very Good to Very Poor (see Glossary of Terms for more detail). Nearly 35% of assets are in need of attention. Assets in fair, poor and very poor conditions represent a call for action. Survey results demonstrate that roads, municipal buildings, sport and recreation facilities and public transit are the asset classes most in need of attention. Figure 3 provides a summary of the physical condition ratings for the sectors included in this report.

Figure 3: Summary of Average Physical Condition Rating



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Increasing reinvestment rates will stop the deterioration of municipal infrastructure. The 2016 CIRC found that rates of reinvestment are lower than targets recommended by asset management practitioners. The rate can vary based on factors such as the age of the infrastructure, the level of service and risk tolerance. The values provided are based on the experience of municipal asset management practitioners and are intended to be informative in nature. Roads and sidewalks, storm water, and sport and recreation infrastructure presented the largest gaps in terms of current and target rates of reinvestment, with water systems-related facilities not far behind. Figures 4 and 5 demonstrate the gap between current and target reinvestment levels. Continuing down this path will result in a gradual decline of physical condition levels that will impact municipal services.[9] When contrasted with target reinvestment rates[10] it becomes clear that current levels of reinvestment in municipal infrastructure are inadequate.

Figure 4: Target Reinvestment Rates vs Current Reinvestment Rate

Infrastructure	Lower Target Reinvestment Rate	Upper Target Reinvestment Rate	Current Reinvestment Rate
Potable Water (linear)	1.0%	1.5%	0.9%
Potable Water (non-linear)	1.7%	2.5%	1.1%
Wastewater (linear)	1.0%	1.3%	0.7%
Wastewater (non-linear)	1.7%	2.5%	1.4%
Stormwater (linear)	1.0%	1.3%	0.3%
Stormwater (non-linear)	1.7%	2.0%	1.3%
Roads and Sidewalks	2.0%	3.0%	1.1%
Bridges	1.0%	1.5%	0.8%
Buildings	1.7%	2.5%	1.7%
Sport and Recreation	1.7%	2.5%	1.3%

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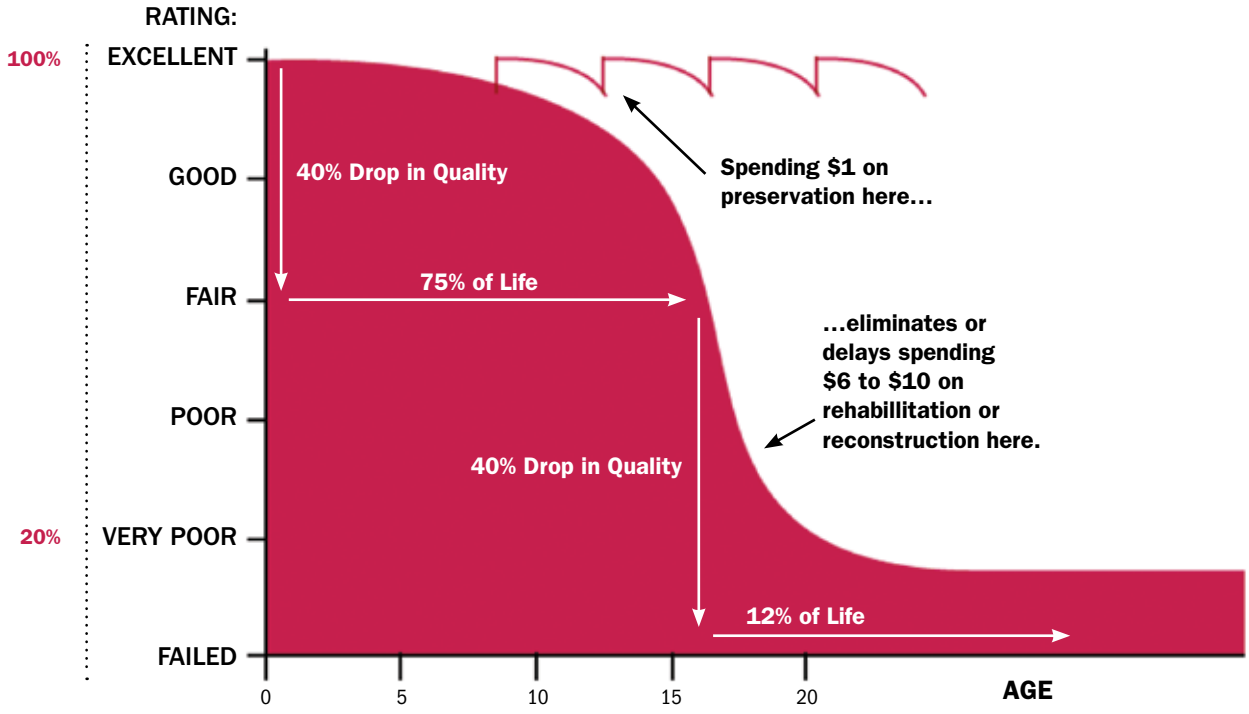
Figure 5: Summary of the physical condition of the infrastructure studied, by replacement value, extrapolated to the entire country

Infrastructure	Extrapolated Replacement Value of All Assets	Assets in Very Poor and Poor Condition	Assets in Fair Physical Condition	Anticipated Condition Based on Reported Reinvestment Levels (Improving, Stable, Declining)
		Replacement Value	Replacement Value	
Potable Water	$207 billion	$25 billion (12%)	$35 billion (17%)	Declining
Wastewater	$234 billion	$26 billion (11%)	$56 billion (24%)	Declining
Stormwater	$134 billion	$10 billion (7%)	$21 billion (16%)	Declining
Roads	$330 billion	$48 billion (15%)	$75 billion (23%)	Declining
Bridges	$50 billion	$2 billion (4%)	$11 billion (22%)	Declining
Buildings	$70 billion	$12 billion (17%)	$20 billion (28%)	Declining
Sport and Recreation Facilities	$51 billion	$9 billion (18%)	$14 billion (27%)	Declining
Transit	$57 billion	$9 billion (16%)	$15 billion (27%)	Unavailable
Total	**$1.1 trillion**	**$141 billion (12%)**	**$247 billion (22%)**	
Replacement Value per Household	**$80,000**	**$10,000**	**$18,000**	

KEY MESSAGES

Increasing reinvestment rates will save money in the long-term. Without an increase in current reinvestment rates, the condition of Canada's core municipal infrastructure will gradually decline, costing more money and risking service disruption. For example, Figure 6[11] demonstrates that when roads, as is typical for many assets,[12] are allowed to deteriorate below a Fair condition rating, the rate of deterioration and reinvestment costs both increase substantially. Investing in preventive maintenance and regular repair will prolong the asset service life, avoiding premature and costly reconstruction and service disruption.

Figure 6: Example of asset deterioration curve (Roads)



Building for today's communities and tomorrow's Canada requires long-term planning. Survey results demonstrate that, if our current rates of reinvestment do not change, the condition of Canada's existing municipal infrastructure will decline. A long-term plan is needed to ensure Canadians can continue to rely upon essential public services without disruption. This would also allow municipalities to plan for projected population growth, keep up with technological innovation, and deal with the increasing impact of extreme weather events.

ASSET MANAGEMENT

The 2016 CIRC survey included a section on asset management for the first time. These questions shed light on the state of Canadian municipal asset management practices.[13]

Survey results point to varied asset management practices according to community size. For instance, 62% of large municipalities, 56% of medium-sized municipalities and 35% of small municipalities reported having a formal asset management plan in place. **All communities, particularly smaller municipalities, would benefit from increased asset management capacity.**

Further, nearly 40% of responding municipalities reported publishing a state of infrastructure report (SOIR).[14] Once again, results varied according to the size of the municipality. Only 10% of small municipalities reported publishing an SOIR, whereas levels reached 56% for medium-sized municipalities and 63% for large municipalities.

Many municipalities reported having undertaken risk assessments, applied new inspection technology to assess the condition of infrastructure, and carried out periodic inspections. Survey results also pointed to a high degree of variability in the condition of the infrastructure assessed, suggesting that having an objective understanding of the physical condition is an area that requires continued attention.

In addition to physical condition, survey questions focused on gaining a better understanding of the ways municipalities are managing their assets. For example, approximately 40% of responding municipalities reported that they use computer-based information and maintenance-management systems to manage their road and transit assets; almost 25% for potable water and wastewater; 20% for stormwater; 22% for sport and recreation facilities and 30% for municipal buildings. Should these figures improve over time, better and more consistent condition reporting can be expected.

Finally, approximately 19% of responding municipalities stated that they use formal mechanisms (i.e. municipal policies or documented practices) to factor climate change adaptation strategies into decision-making. Adaptation strategies were formally factored-in for the following assets: Stormwater (16%); Roads and Bridges (15%); Wastewater (16%); Buildings (14%); Potable Water (14%); Sport and Recreation Facilities (13%); Public Transit (6%). Whether a municipality formally factored in climate change varied somewhat according to size of municipality: 10% for small municipalities, and 27% for both large and medium municipalities.

More detailed information on these areas of asset management is included in the summary of results by category in Part 1, as well as in the detailed reports found in Part 2 of this report.

ENDNOTES

1 FCM's membership was just under 2000 municipalities during the survey period which took place from November 2014 to January 2015.

2 Most of the transit data was collected through a survey distributed to 130 transit operators across the country. The information was supplemented with data that the Canadian Urban Transit Association gathers annually from its members. A total of 37 transit authorities responded to the transit survey, representing a serviced population of just over 17 million (or about 67% of Canada's population serviced by transit) and representing 88% of all transit trips taken in 2013. The list of municipalities/transit authorities that provided data related to transit is contained in Appendix F. Where data in this report is extrapolated for transit, the serviced population is used and the extrapolation factors in different sizes of transit authorities.

3 The full Canadian population used to extrapolate the survey results is 35.7 million. This figure is a Statistics Canada population projection using a medium growth scenario. (See Statistics Canada, Population Projections for Canada, Provinces and Territories, Table 3.1, Components of population growth, medium-growth - historical trends (1981 to 2008) scenario (M1) — Canada, 2009/2010 to 2060/2061

4 Responses received from 37 transit authorities represented a total serviced population of 17.2 million people or 67% of the national total. This population represents 88% of all transit trips taken in 2013. Data from the 37 respondents was extrapolated to the 2013-2014 Canadian transit service population of 25.6 million.

5 Based on 2011 Census data, large municipalities represent 53% of Canada's population (see Statistics Canada, Population and dwelling counts, for Canada and census subdivisions (municipalities), 2011 and 2006 censuses. For the purposes of this report, the remaining 47% is classified under small and medium-sized municipalities. Large municipalities therefore have a 2014 total population of 18.9 million and small and medium-sized municipalities have a population of 16.8 million. The 2014 population is estimated at 35.7 million (see endnote 3). The data collected from the survey represents 94% of the total population of large municipalities in Canada but only represents 13% of the total population of both small and medium-sized municipalities combined, resulting in datasets that are more representative of large municipalities.

6 The 30,000 population limit for small municipalities is quite high for rural and remote communities. This report classifies municipalities as small, medium and large, consistent with Statistics Canada groupings, with one exception. Statistics Canada classifies small municipalities as having populations between 1,000 and 29,999, but this report includes all municipalities with a population under 30,000 as small.

7 The ratio in the chart is General Government Gross Fixed Capital Formation as a percentage of Gross Domestic Product (GDP), which is total government investment in plant, buildings, machinery, equipment, roads, facilities, pipes, and other physical assets. This investment includes new construction and the replacement of assets, but can exclude certain maintenance expenditures. Due to Statistics Canada's transition to a new international protocol for reporting the National Income and Expenditure Accounts, the dataset draws on three sources. Data for 1961-1980 were drawn from Statistics Canada Catalogue No. 13-213S. Data for 1981-2010 were drawn from the Statistics Canada CANSIM Table 384-0002. Data for 2011 and forward were drawn from Statistics Canada CANSIM Table 380-0064. Data analysis by Casey Vander Ploeg.

8 For households in large municipalities (over 100,000 population), this cost is $73,000 and increases to almost $85,000 for households in small and medium-sized municipalities. This discrepancy is due to the fact that large urban centres have higher population density, which means that assets are extended over shorter distances and the costs are shared by more people.

9 The 2016 CIRC survey collected data on the current value, the estimated replacement value and projected annual renewal budget (for rehabilitation, reconstruction or replacement) for most asset categories. Average reinvestment rates were then derived from the data. The transit survey asked respondents to provide data on replacement value of assets and the annual renewal budget, which is how the report derives reinvestment rates. However, very few were able to provide both. For this reason, the report does not assess reinvestment rates for transit assets.

10 There are currently no formal industry-recognized target reinvestment rates. The rate varies across responding municipalities based on factors such as the average age of the infrastructure, the level of maintenance expenditures, risk tolerance and available infrastructure funding. Municipal asset management practitioners in Canada are working to develop tools that municipalities can use to better establish target reinvestment rates for each asset type (rehabilitation, reconstruction or replacement of infrastructure). The values provided in this report are based on the experience of municipal asset management practitioners providing advice to the CIRC PSC and are therefore intended to be informative in nature.

11 Larry Galehouse, James S. Moulthrop, and R. Gary Hicks, "Pavement Preservation Compendium II: Principles of Pavement Preservation - Definitions, Benefits, Issues, and Barriers," TR News, September-October 2003, pp. 4-15, Transportation Research Board (TRB), National Research Council, Washington, D.C.

12 Though only the deterioration curve for roads is included in this report, Appendix E provides a more detailed illustration of infrastructure system/network deterioration over its service life.

13 An important caveat when reading this section is that the survey sample was generated on a voluntary basis, likely resulting in a self-selection bias for communities with existing asset management practices.

14 A SOIR is a tool that documents the inventory and replacement value of the assets owned by the municipality, summarizes the physical condition of each asset type, and ideally documents the state of the services that are provided through the infrastructure systems. The most common infrastructure types included in reported SOIRs are roads and bridges, potable water, stormwater and wastewater.

THANK YOU TO ALL WHO PARTICIPATED

On behalf of the Canadian Infrastructure Report Card (CIRC) team, we would like to thank all municipalities who completed this important survey. Your knowledge and expertise will help inform investment needs and asset management practices across Canada.

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