

City of Victoria

Aging Infrastructure Review and Assessment

“Challenges and Opportunities”

Presented
By
Engineering and Public Works
Department
May 2010



Infrastructure

Definition

Municipal infrastructure is the collection of various physical assets which are managed and maintained by a municipality to provide services or benefits to its residents and businesses.

City of Victoria Infrastructure

Examples

- Parks, Public Art, Trails, Trees, Shoreline
- Roads, Sidewalks, Plazas, Streetlights
- Vehicles, Machinery, Tools
- Underground Pipes, Pump stations, Hydrants
- Civic Facilities, Furniture, Computers





FCM Report

The Federation of Canadian Municipalities
has released a report entitled:

*DANGER AHEAD: The Coming Collapse of
Canada's Municipal Infrastructure*

Dated November 2007



FCM Report Cont.

The report emphasized the following important facts:

- Canadian municipalities own and maintain most of the infrastructure.
- The infrastructure supports our economy and quality of life
- The majority of the infrastructure was built between 1950 and 1970 and is due for replacement.
- The condition of the infrastructure is deteriorating and the cost of maintaining it is increasing.
- The infrastructure deficit has increased from \$12 billion (1985) to \$123 billion (2007) within Canada.



FCM Report Cont.

- The growth of the municipal infrastructure deficit is accelerating due to the deferral of maintenance and the increasing costs for repair and replacement.
- This challenge can be partially met through the implementation of industry best practices, asset management and technological development.
- Additional funding for infrastructure will be necessary in order for it to be sustainable over the long-term.

City of Victoria Perspective on Aging Infrastructure

- Our municipal infrastructure is vital in sustaining the economic, environmental, social and cultural life of the community.
- The quality of life enjoyed by City's citizens is directly related to the condition of the infrastructure, such as quality of drinking water.
- The Engineering Department manages approximately \$1.7 billion in infrastructure, excluding land value.

City of Victoria Perspective on Aging Infrastructure Cont.

- CoV infrastructure is amongst the oldest in Canada, with some built prior to the turn of the last century.
- Much of it is nearing or has exceeded the end of its design life.
- A multi-faceted approach is required to maintain it in good condition.
- Additional funding is required!

Corporate Strategic Plan and Linkage to Infrastructure

2007-2009 Corporate Strategic Plan

- Vision: To be the most livable city in Canada.
- Mission: To enhance the vitality of our region through exceptional leadership and stewardship of our cultural, social, economic and environmental assets.
- Infrastructure directly relates to the quality of life enjoyed by Victoria's citizens in environmental, economic and social dimensions.
- A key objective is that "Community infrastructure is well-preserved, maintained and planned for future generations."

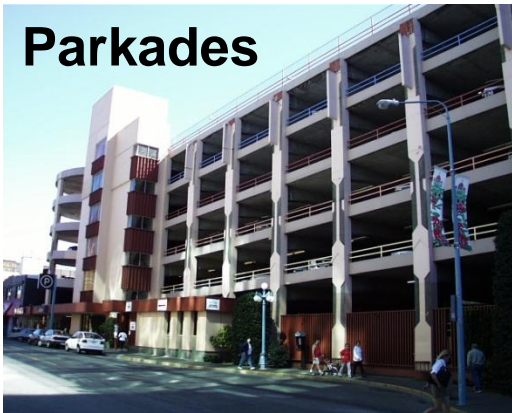


Infrastructure Inventory

<i>Infrastructure Type</i>	<i>Description</i>
Civic Facilities	70 buildings and ancillary structures
Water System	325 km of main, 18,000 services
Storm Drain System	253 km of main, 10,000 services
Sanitary Sewer System	240 km of main, 14,000 services
Roads and Sidewalks	258 km of road, 453 km of sidewalks
Fleet and Equipment	262 vehicles and equipment
Street Lights	6473 units and 728 cluster lights
Bridges	Johnson Street, Point Ellice, Gorge Road

Civic Facilities

Parkades



Police Station



City Hall



Community Centers



Fire Halls



Civic Facilities Challenges

- Need to preserve historical and heritage buildings and structures.
- Need to upgrade buildings to meet current code for safety, health and working conditions.
- Need to minimize risk and liability with aging buildings.
- Continuous increase in the cost of repairing and replacing civic facilities (historically >inflation)
- Need to increase maintenance funding to deal with existing deferred maintenance – VFA audit.
- Rationalize and review our service delivery and programming needs in the city.

Water System



Mains



Services

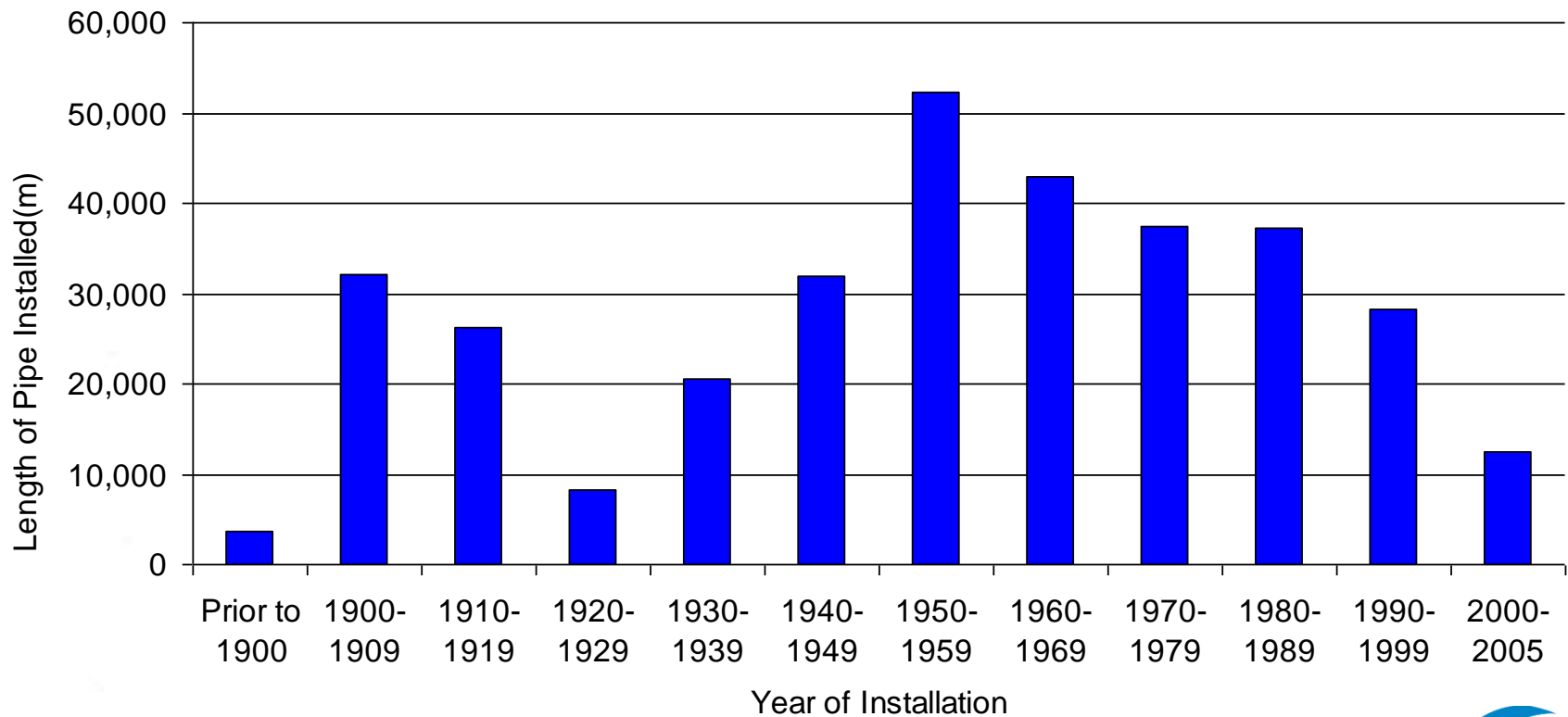


Pump Station



Fire Hydrants

Water System - Age Profile



Water System Challenges

- A moderate percentage of water infrastructure is reaching the end of its useful service life.
- Some material types are not performing as expected and are experiencing premature failure.
- The cost of repairing and replacing the water system has increased dramatically over the past several years (>inflation).

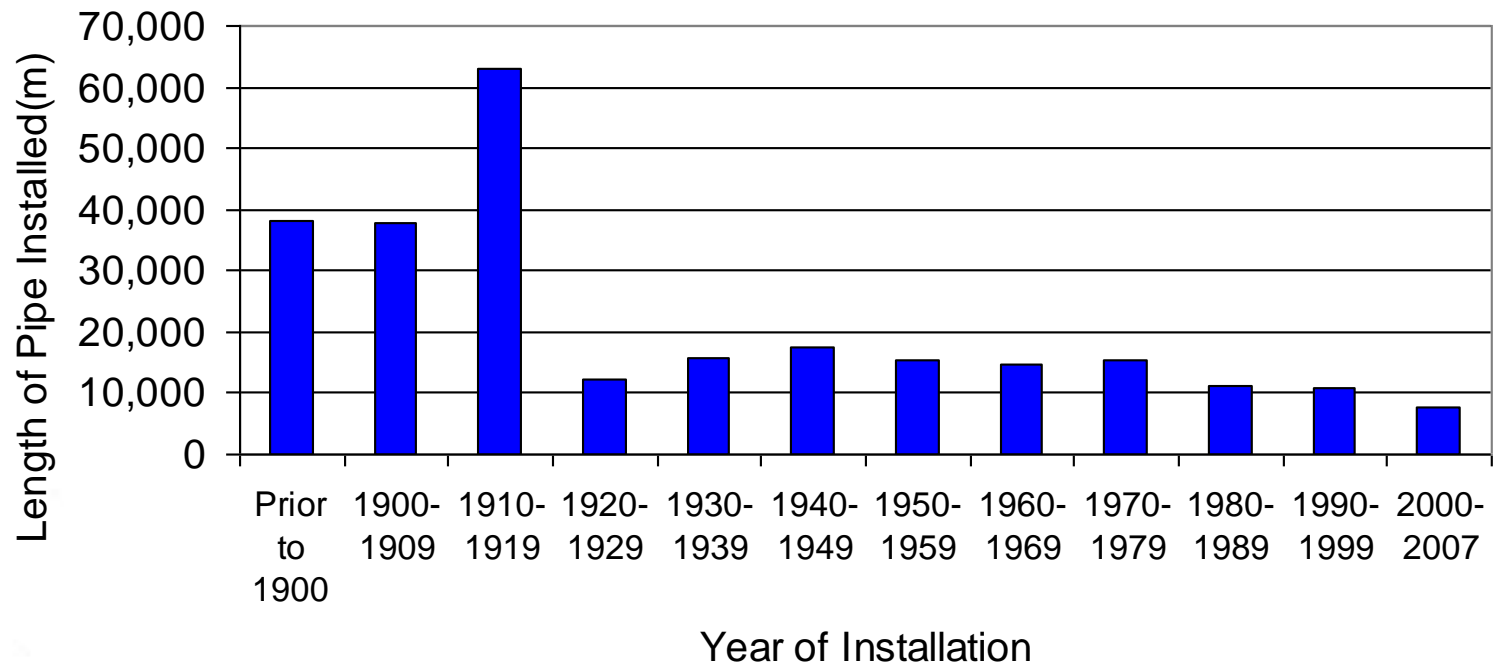
Water System Challenges Cont.

- Numerous water main breaks occur each year, costing on average of \$6,000 each.
- Redevelopment and increased density result in higher demand.
- A system upgrade is required to ensure compliance with the Drinking Water Protection Act.

Storm Drain System



Storm Drain System - Age Profile



Storm Drain Challenges

- The majority of storm drain infrastructure is at, or, approaching the end of its useful service life.
- Cost of repairing and replacing the storm drain system has increased over the last several years (>inflation).
- Our commitments to monitor and control the quality of storm water discharges are increasing (i.e., Bowker Creek).

Sewer System

Pump Stations



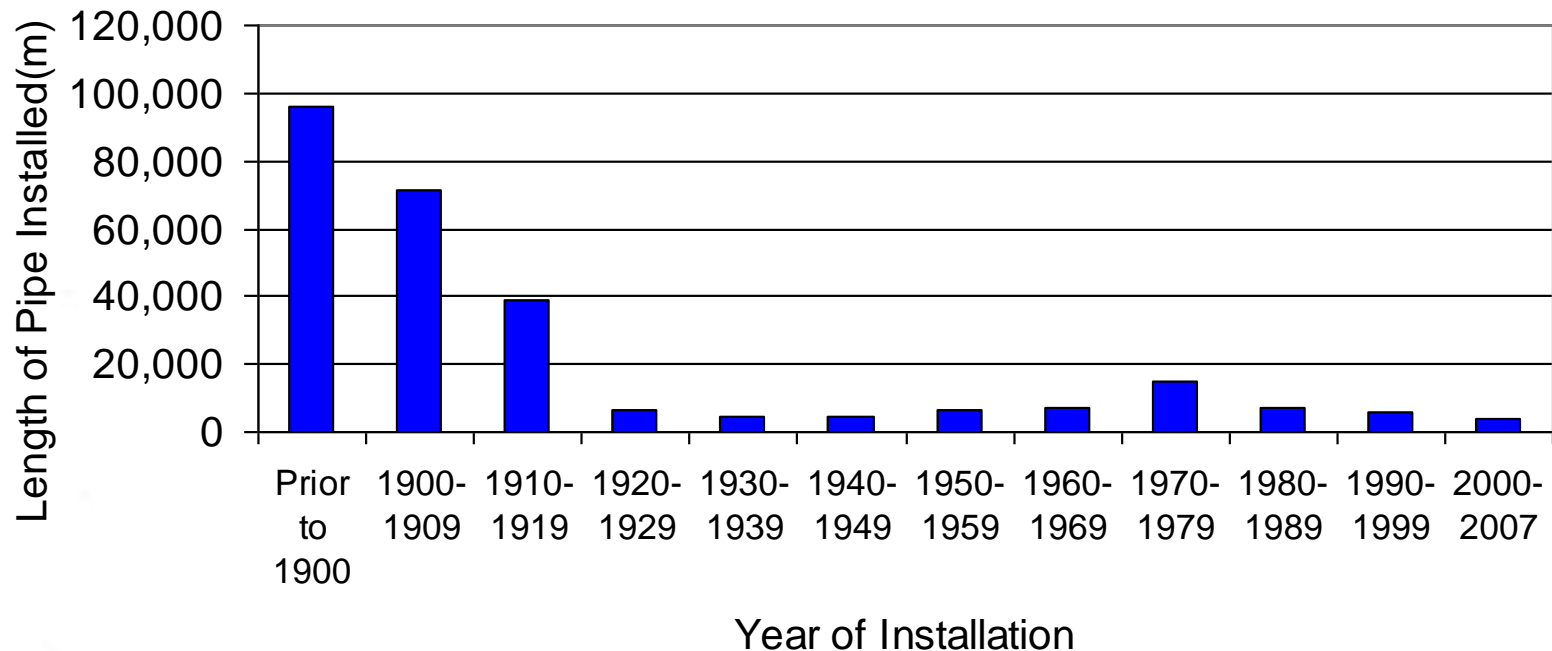
Manholes



Mains



Sewer System - Age Profile



Sewer System Challenges

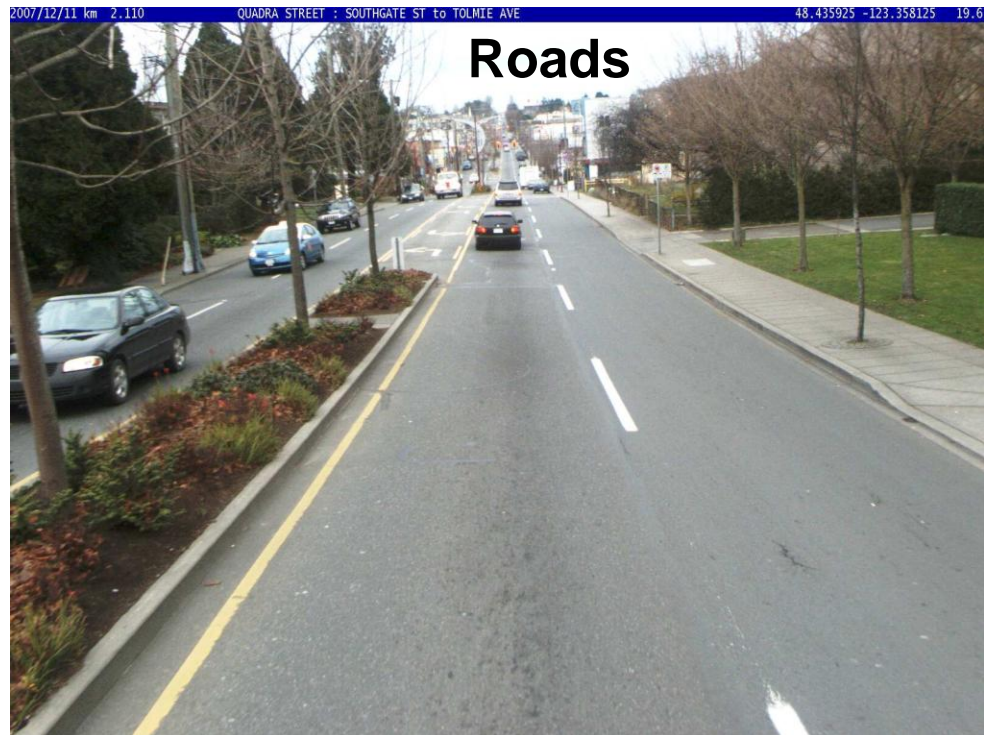
- The majority of our infrastructure is at, or, approaching the end of its useful service life.
- The cost of repairing and replacing the sewer system has increased (>inflation).
- A high percentage of extraneous water is entering the sewer system (inflow and infiltration).
- Increased development densities are resulting in capacity demand.

Road and Sidewalk Network

Sidewalks



Roads



Road and Sidewalk Network Challenges

- A moderate percentage of the road network is reaching the end of its useful service life.
- The deteriorating condition of the road network is due to deferral of maintenance.
- The cost of repairing and replacing the road network has increased (>inflation).
- The advanced age of many road network components results in increased maintenance requirements.
- Approximately 650 pothole complaints occur each year.

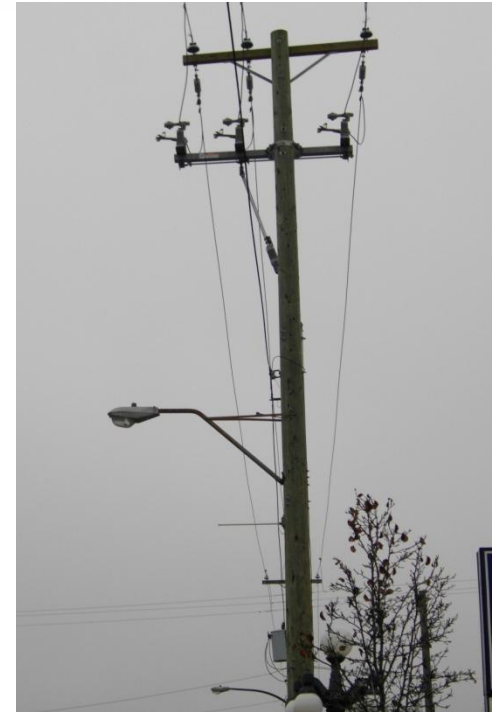
Street Lighting



Cobra Fixtures



Cluster Fixtures



Davit Fixtures

Street Lighting Challenges

- Two material types: galvanized (30 year life cycle) and non-galvanized (20 year life cycle).
- The majority are non-galvanized and have exceeded their useful life-cycle.
- Replacement costs are currently being assessed including both capital and ongoing lifecycle replacement.

Johnson Street Bridge

- Constructed in 1922; opened in 1924.
- Carries pedestrians, cyclists, a commuter train, transit and over 30,000 vehicles per day.
- 2009 Condition assessment study recommended that the bridge's structural, mechanical and electrical components, including seismic vulnerability, be addressed by 2012

Johnson Street Bridge Challenges

- Nearing end of its service life
- Underwent structural, electrical, mechanical and substructure assessment in 2008
- Seismically vulnerable

Infrastructure Replacement Cost

<i>Infrastructure Type</i>	<i>Current Replacement Cost</i>
Civic Facilities	\$ 209,000,000
Water System	\$ 262,000,000
Storm Drain System	\$ 362,000,000
Sanitary Sewer System	\$ 312,000,000
Roads (inclusive)	\$ 465,000,000
Bridges	\$ 102,000,000
Street Lighting	\$ 13,000,000
Fleet and Equipment	\$ 16,000,000
All	\$1,742,000,000

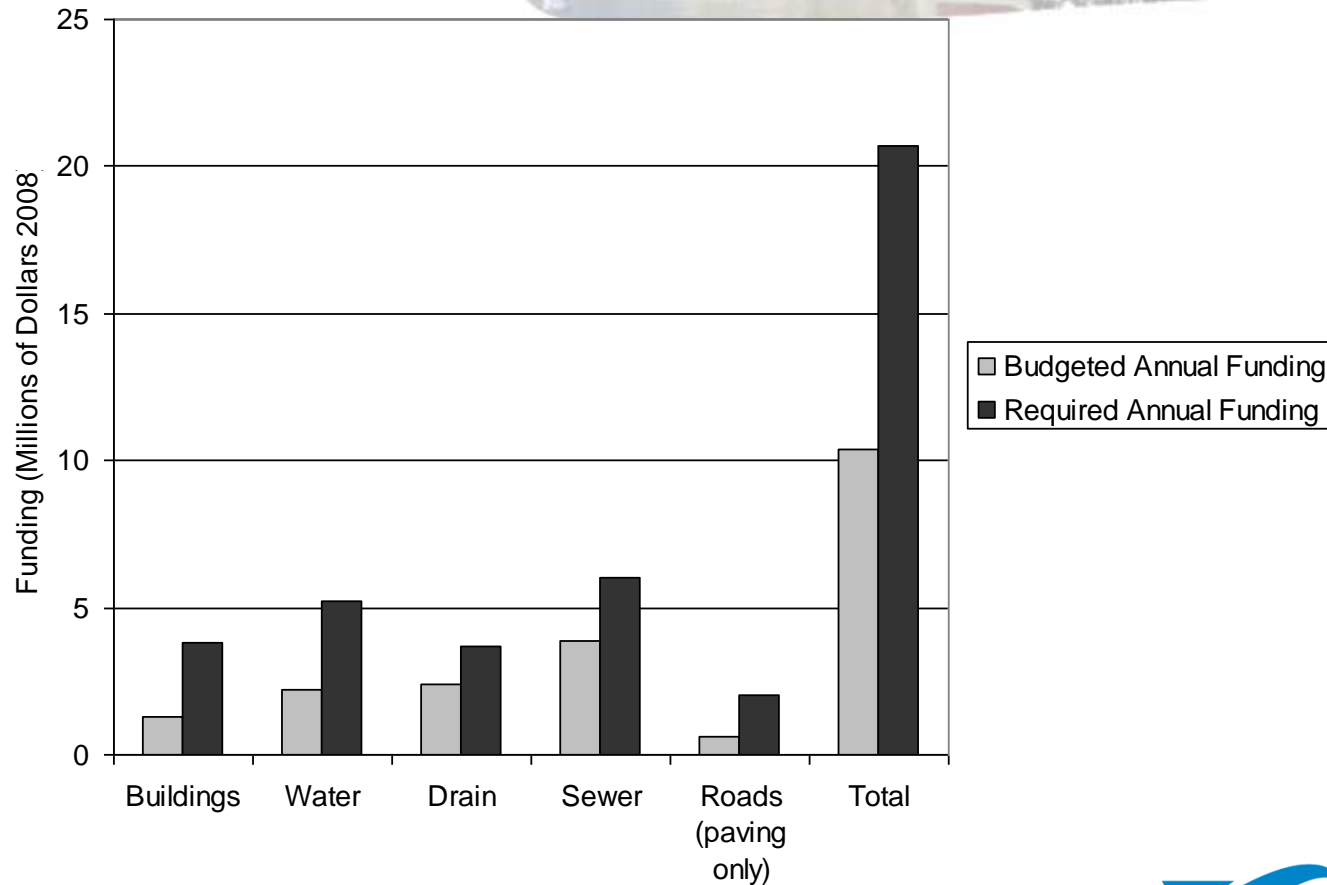
Condition Assessment

Infrastructure Type	Assessed Condition	Assessment Tools
Civic Facilities	Fair	VFA
Water System	Fair	Multi-variate
Storm Drain System	Poor	PACP
Sanitary Sewer System	Poor	PACP
Roads	Good (PCI=91.6)	dTIMS

(1) The rating varies because of newer building inventories such as the BGCC, SOFMA, FH#2 and the Police Station



Current Funding Levels Compared to Necessary Levels



Current Funding Levels and Deficits

Infrastructure Type	2010 Actual Funding (Millions \$)	2010 Recommended Funding (Millions \$)	2010 Funding Deficit (Millions \$)
Civic Facilities	1.7	4.3 (1)	2.6
Water System	1.6	5.3 (2,3)	3.7
Storm Drain System	2.1	3.7(2,3)	1.6
Sanitary Sewer System	4.9	6.2(2,3)	1.3
Roads (paving only)	0.5	2.0 (4)	1.5
Total	10.8	21.5	10.7

(1) Amount required for systemic replacement and the mitigation of deferred maintenance.

(2) Recommended funding level to have no deferred maintenance within 20 years

(3) To be decreased to one percent of replacement value after 20 years

(4) Recommended funding level to ensure maintenance of current system condition



Infrastructure Deficit

- The City's total infrastructure deficit is 467 million dollars
- The City's infrastructure deficit will continue to increase unless measures are taken to address the challenges presented by aging infrastructure and other emergent issues

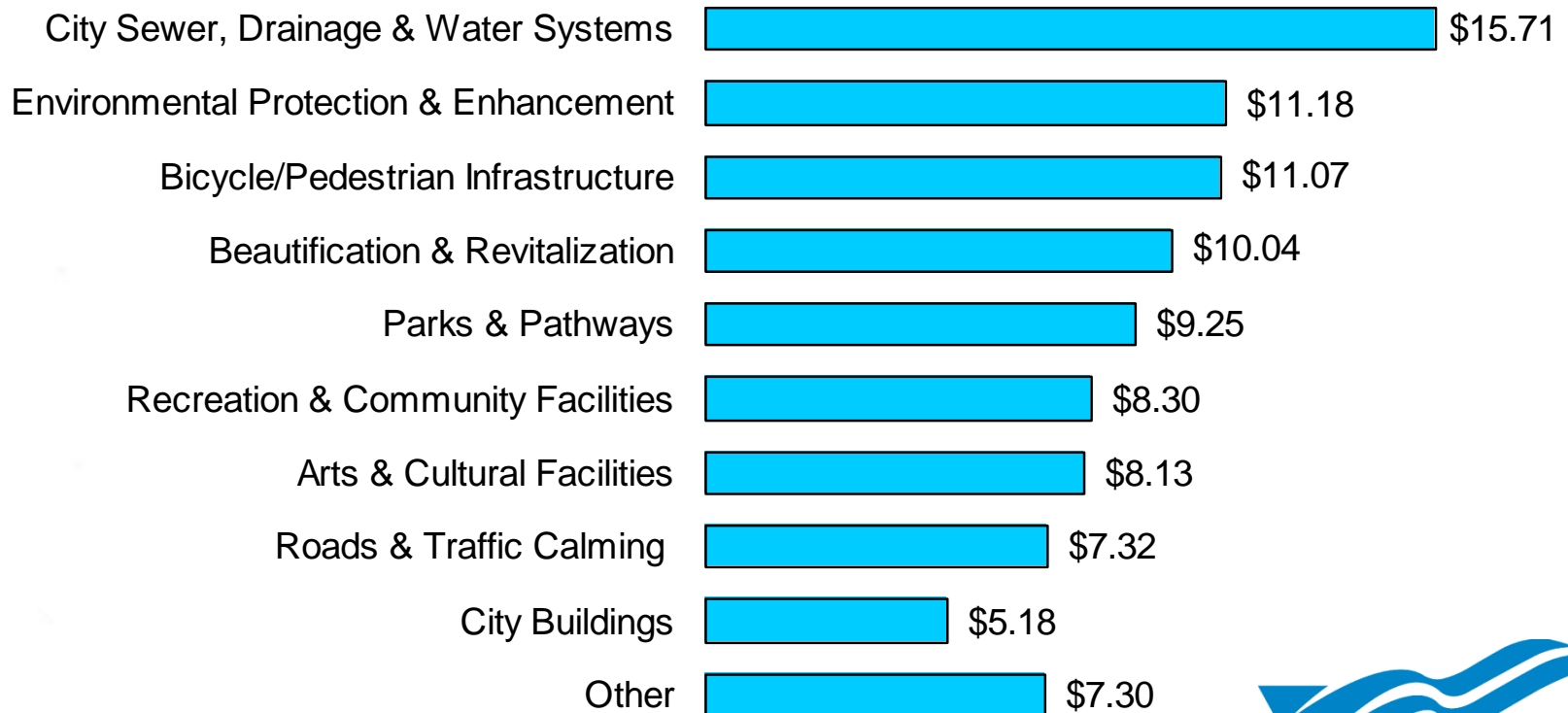
Strategies to Address Aging Infrastructure

Infrastructure Type	GIS AM PSAB 3150	Best Management Practices	Technology	Alternative Funding			Financial Strategy	
				P3	Utility	Grant	20 Year Capital Plan	General Revenue
Civic Facilities	√	√	√	√		√	√	√
Water System	√	√	√		√	√	√	
Storm Drain System	√	√	√		√	√	√	√
Sanitary Sewer System	√	√	√		√	√	√	
Roads	√	√	√	√ *		√	√	√

* Bridges

2008 Citizens Survey City Budget Priorities Capital Projects

How Citizens Would Spend \$100 for Capital Projects



Conclusions

- Infrastructure is critical to the economic, environmental, social and cultural sustainability of the City.
- The quality of life enjoyed by City's citizens is directly related to the condition of the infrastructure.
- The CoV infrastructure is amongst the oldest in Canada.
- Much of the infrastructure is nearing the end of, or exceeding, its design life.

Conclusions ... Cont.

- These challenges can be addressed by:
 - applying asset management principles,
 - applying of new technology,
 - implementing industry best-practices, and
 - Increasing funding.
 - Undertaking a review of “all” City infrastructure (i.e. Recreation Amenities, Parks, Technology, Equipment, Lands, Traffic Control, Streets, Waste Management Equipment, Public Art, Etc.).
 - Building up the Reserve Funds

References

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