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Enhancing Ontario's Rural Infrastructure Preparedness: Inter-Community Service Sharing in a Changing Climate — Environmental Scan

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Environmental Scan:

Enhancing Ontario's Rural Infrastructure Preparedness: Inter-Community Service Sharing in a Changing Climate

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Given the research that has been done in this environmental scan and the gaps found in this research, it is our aim to find out:

1. What types of service sharing are going on in Ontario municipalities, particularly in rural/remote areas?
2. How can inter-community service sharing (ICSS) benefit the asset management planning process in these rural/remote areas to enhance capacities for climate change resilience?

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MUNICIPAL ASSET MANAGEMENT: ORGANIZED ARTICLES BY THEME/SUB-THEME

Background	Ontario AMP	CC, Infrastructure and AMP	AMP in Rural Canada	Best Practises/Recommendations
			• Cowin (2013) • Federation of Canadian Municipalities (2012) • Kulig et al. (2007) • Breen (2015) • Government of Canada (2007) • Minnes & Vodden (2014)	
What is asset management	**Current state of municipal asset management**	**Climate change Adaptation in Municipalities**	**Challenges in AMP**	
• Ministry of Infrastructure Ontario (2012). • New Zealand Asset Management Support (NAMS) (2008). • Saskatchewan Municipal Asset Management. (2008). • Cowin (2013) • BC Climate Action Toolkit (n.d.) • Public Sector Digest (2016) • Schraven, Hartmann, &	• Ministry of Infrastructure Ontario. (2012). • Federation of Canadian Municipalities (2012) • Cowin (2013) • Public Sector Digest (2016) • Ministry of Rural Affairs (2014) • Kumaraswamy (2011) • El-Dirably, Kinawy, & Piryonesi (2016) • Federation of Canadian	• Ministry of Infrastructure Ontario (2012) • Robinson & Gore (2005) • Ivey et al. (2004) • Gore (2010) • Corfee-Morlot et al. (2009) • Robinson et al. (2008) • National Round Table on the Environment and Economy (2011) • You et al. (2014) • Andrey et al. (2014) • Canadian Climate Forum (2015) • Transportation Research Board. (2008)	• Federation of Canadian Municipalities (2012) • Mirza & Haider (2003) • Breen (2015) • Government of Canada (2007) • Ministry of Rural Affairs (2014) • Kumaraswamy (2011) • Schraven, Hartmann, & Dewulf (2011) • Breen (2013) • El-Diraby et al. (2016)	• Ministry of Infrastructure Ontario (2012) • Saskatchewan Municipal Asset Management (2008) • Cowin (2013) • Mirza & Haider (2003) • National Round Table on the Environment and Economy (2011) • Canadian Climate Forum (2015) • Rayner (2010) • BC Climate Action Toolkit (n.d.) • Municipal Finance Officers' Association of Ontario. (2014). • Us. Department of Transportation Federal Highway Administration (2009)

Dewulf (2011) • Grubisic, Nusinovic, & Roje (2009) • Jolicoeur & Barrett (2004) • Cardoso et al. (2016) • Minnes & Vodden (2014) • Federation of Canadian Municipalities (2017) • Government of Ontario (2016)	Municipalities (2017) • Government of Ontario (2016) • El-Diraby, Kinawy, & Piryonesi (2016)			• Kumaraswamy (2011) • Schraven, Hartmann, & Dewulf (2011) • Grubisic, Nusinovic, & Roje (2009) • You et al. (2014) • Jolicoeur & Barrett (2004) • Cardoso et al. (2016) • Transportation Research Board (2008) • Breen (2013) • Breen, Minnes, & Vodden (2015) • Brodhead, Darling, & Mullin (2014) • Minnes & Vodden (2014) • Government of Ontario (2016) • El-Diraby et al. (2016)
		Defining infrastructure and its importance		
		• Public Safety Canada (2009) • NAMS (2008) • Saskatchewan Municipal Asset Management (2008) • Cowin (2013) • Breen (2015) • Government of Canada (2007). • Kulig et al. (2007) • Kulig, Hegney, & Edge (2010) • Robinson et al. (2008) • Federation of Canadian Municipalities (2012) • Mirza & Haider (2003) • Andrey et al. (2014) • Canadian Climate Forum (2015)		

		• BC Climate Action Toolkit (n.d.) • U.S. Department of Transportation Federal Highway Administration. (2009) • Cardoso et al. (2016) • Transportation Research Board (2008) • Breen (2013) • Brodhead, Darling, & Mullin (2014) • Minnes & Vodden (2014) • Canadian Council of Professional Engineers (2008)		
		Rural infrastructure challenges		
		• Douglas (2003) • *Ivey et al. (2004)* • Government of Canada (2007) • Federation of Canadian Municipalities (2013) • Ministry of Rural Affairs (2014) • Breen (2013) • Breen, Minnes, & Vodden (2015) • Minnes & Vodden (2014) • Kitchen & Slack (2001) • Lauzon et al. (2015) • Skovron (2016) • ROMA (2015)		
		How climate change will affect infrastructure/assets		
		• Public Safety Canada (2009)		

		• Corfee-Morlot et al. (2009) • Kulig et al. (2007) • Breen (2015) • Robinson et al. (2008) • Government of Canada (2007) • Mirza & Haider (2003) • National Round Table on the Environment and the Economy. (2011) • Andrey, Kertland, & Warren (2014) • Canadian Climate Forum (2015) • Transportation Research Board. (2008) • You et al. (2014) • Rayner (2010) • Caruson & MacManus (2008) • Brodhead, Darling, & Mullin (2014) • Minnes & Vodden (2014) • Canadian Council of Professional Engineers (2008) • Hedensted et al. (2012) • Schlecht (2016)		
		Incorporating climate change within asset management		
		• Rayner. (2010) • BC Climate Action Toolkit (n.d.) • You et al. (2014) • Andrey et al. (2014) • Canadian Climate Forum (2015)		

		• U.S. Department of Transportation Federal Highway Administration. (2009) • Transportation Research Board. (2008) • Canadian Council of Professional Engineers (2008)		

INTER-COMMUNITY SERVICE SHARING (ICSS): ORGANIZED ARTICLES BY THEME/SUB-THEME

Background	**ICSS in Ontario**	**ICSS for rural communities**
• Dollery & Akimov (2008) • Spicer (2013a) • Spicer (2015b) • Spicer (2014) • Public Sector Digest (2016) • Hepburn, LeSage, & McMillan (2004) • The Conference Board of Canada (2005) • Service Nova Scotia (2006) • Corradini et al. (2014) • AUMA (2007) • Warner (2006) • Hulst et al. (2009) • Carr & Hawkins (2013) • Bel and Warner (2015b) • Warner & Hefetz (2002) • Commonwealth of Massachussetts (2008) • Spicer (2016) • Arnold (2015) • Conteh (2012) • Farmer (2008) • Feiock (2007) • KPMG (2013) • Towns Task Force. (2014) • Morton, Yu-Che, & Morse (2008) • Municipal Finance Officers' Association of Ontario (2014b) • Municipal Capacity Development Program (2015) • Bel & Warner (2015a) • Spicer (2013b) • Dudas et al. (2009)	**Barriers**	Background on service provision in rural communities • Characteristics of remote areas & role of local government

• Lintz (2016) • Kolsut (2016) • Rayle & Zegras (2013) • McLean, Paget, & Wallisser (2006) • Roche & Humeau (1999) • Dollery, Kortt, & Drew (2016) • Arriola, Pangan, & Romano (2015) • Schlecht (2016)		
What has led to the interest for ICSS (Canadian context)	• Douglas (2003) • KPMG (2013) • Municipal Capacity Development Program (2015) • Hepburn et al. (2004) • Somerset Country Municipal Managers Association & the Somerset County Business Partnership (2006) • The Conference Board of Canada (2005) • AUMA (2007) • Carr & Hawkins (2013) • Bel and Warner (2015b) • Lackey, Freshwater, & Rupashinga (2002) • Commonwealth of Massachussetts (2008) • Spicer (2016) • Arnold (2015) • Conteh (2012) • Farmer (2008) • Feiock (2007) • Municipal Finance Officers' Association of Ontario (2014b) • Morton, Yu-Che, & Morse (2008) • Spicer (2013b) • Rayle & Zegras (2013)	• Kitchen & Slack (2001) • Dollery & Akimov (2008) • Lauzon et al. (2015) • Roche & Humeau (1999) • Pagliacci et al. (2016)
• Robinson & Gore (2005) • Ivey et al. (2004) • Gore (2010) • Corfee-Morlot et al. (2009)	**Best practices**	**Benefits**

• Government Finance Officers Association (2007) • Spicer (2013a) • Spicer (2015b) • Spicer (2014) • KPMG (2013) • Towns Task Force (2014) • The Conference Board of Canada (2005) • Warner (2006) • Hulst et al. (2009) • Warner & Hefetz (2002) • Lackey, Freshwater, & Rupashinga (2002) • Spicer (2016) • Arnold (2015) • Conteh (2012) • Farmer (2008) • Ortiz-Guerrero (2013) • Municipal Finance Officers' Association of Ontario (2014b) • Morton, Yu-Che, & Morse (2008) • Breen, Minnes, & Vodden (2015) • Spicer (2013b) • Hefetz, Warner, & Vigoda-Gadot (2012) • Rayle & Zegras (2013) • McLean, Paget, & Wallisser (2006) • Roche & Humeau (1999) • Hedensted et al. (2012) • Schlecht (2016)		
Theory and related terms	• Dollery & Akimov (2008) • Government Finance Officers Association (2007) • Municipal Finance Officers' Association of Ontario (2014b) • Municipal Capacity Development Program (2015) • Bel & Warner (2015a)	• Corfee-Morlot et al. (2009) • Douglas (2003) • Robinson et al. (2008) • Spicer (2014) • Dollery & Akimov (2008) • Corradini, Polzonetti, & Riganelli (2009) • Municipal Finance Officers' Association of Ontario

	• Public Sector Digest (2016) • Hepburn et al. (2004) • Towns Task Force (2014) • The Conference Board of Canada (2005) • AUMA (2007) • Service Nova Scotia (2006) • Somerset Country Municipal Managers Association & the Somerset County Business Partnership (2006) • Warner (2006) • Carr & Hawkins (2013) • Bel and Warner (2015b) • Municipal Capacity Development Program (n.d.a) • Municipal Capacity Development Program (n.d.b) • Municipal Capacity Development Program (n.d.c) • Municipal Capacity Development Program (n.d.d) • Lackey, Freshwater, & Rupashinga (2002) • Commonwealth of Massachussetts (2008) • Spicer (2016) • Arnold (2015) • Farmer (2008) • Morton, Yu-Che, & Morse (2008) • Spicer (2013b) • Dudas et al. (2009) • McLean, Paget, & Wallisser (2006) • Dollery et al. (2016) • Arriola et al. (2016) • Schelcht (2016)	(2014b) • Municipal Capacity Development Program (2013) • Bel & Warner (2015a) • Hepburn et al. (2004) • AUMA (2007) • Warner (2006) • Bel and Warner (2015b) • Municipal Capacity Development Program (n.d.a) • Municipal Capacity Development Program (n.d.b) • Municipal Capacity Development Program (n.d.c) • Municipal Capacity Development Program (n.d.d) • Warner & Hefetz (2002) • Mohr, Deller, & Halstead (2010) • Lackey, Freshwater, & Rupashinga (2002) • Spicer (2016) • Arnold (2015) • Conteh (2012) • Farmer (2008) • Feiock (2007) • Ortiz-Guerrero (2013) • Towns Task Force. (2014) • Morton, Yu-Che, & Morse (2008) • Breen, Minnes, & Vodden (2015) • Spicer (2013b) • Dudas et al. (2009) • Lintz (2016) • Hefetz et al. (2012) • Rayle & Zegras (2013) • Roche & Humeau (1999) • Pagliacci et al. (2016)

• Spicer (2013a) • Spicer (2015b) • Spicer (2014) • Hepburn et al. (2004) • Ortiz-Guerro (2013) • Warner (2006) • Hulst et al. (2009) • Bel and Warner (2015b) • Warner & Hefetz (2002) • Mohr, Deller, & Halstead (2010) • Farmer (2008) • Breen, Minnes, & Vodden (2015) • Spicer (2013b) • Hefetz et al. (2012) • Rayle & Zegras (2013) • Arriola et al. (2015) • Schlecht (2016)		**Challenges**
How it applies to asset management planning and infrastructure		• Douglas (2003) • Robinson et al. (2008) • Spicer (2014) • Corradini et al. (2014) • Bel & Warner (2015a) • Bel & Miralles (2003) • Hepburn et al. (2004) • Warner (2006) • Bel and Warner (2015b) • Mohr, Deller, & Halstead (2010) • Lackey, Freshwater, & Rupashinga (2002) • Commonwealth of Massachussetts (2008) • Farmer (2008) • Ortiz-Guerrero (2013) • Municipal Finance Officers' Association of Ontario (2014b) • Morton, Yu-Che, & Morse (2008) • Dudas et al. (2009)

		• Lintz (2016) • Hefetz et al. (2012) • Roche & Hummeau (1999) • Dollery et al. (2016)
• Ministry of Infrastructure Ontario (2012) • Corfee-Morlot et al. (2009) • Robinson et al. (2008) • Dollery & Akimov (2008) • Transportation Research Board (2008) • Municipal Capacity Development Program (2013) • Caruson & MacManus (2008) • Public Sector Digest (2016) • KPMG (2013) • Towns Task Force (2014) • Carr & Hawkins (2013) • Municipal Finance Officers' Association of Ontario (2014b) • Municipal Capacity Development Program. (2015) • Bel & Warner (2015a) • Breen (2013) • Breen, Minnes, & Vodden (2015) • Spicer (2013b) • Lintz (2016) • Kolsut (2016) • Rayle & Zegras (2013) • Roche & Humeau (1999) • Pagliacci et al. (2016) • Schlecht (2016)		

Background Document – Academic & Grey Literature Annotated Bibliography:
Enhancing Ontario's Rural Infrastructure Preparedness: Inter-Community Service Sharing in a Changing Climate

MUNICIPAL ASSET MANAGEMENT PLANNING (AMP)		
Reference	Key Points & Conclusions	Theme:
Ministry of Infrastructure Ontario. (2012). *Building together: guide for municipal asset plans.* Retrieved from https://www.ontario.ca/page/building-together-guide-municipal-asset-management-plans	**This guide sets the context of implementing a municipal infrastructure strategy, what asset management is in Ontario, and why it is important.** The guide also describes the elements of a detailed asset management plan (AMP) and the sections it should have: executive summary, introduction, state of local infrastructure, expected levels of service, asset management strategy, and financing strategy. To enhance AMP, the guide describes in more detail the following actions to help create a successful outcome: direction and support, public engagement, external support and collaboration, and an open and ongoing process. The guide also states that the province is aware that small municipalities may not have adequate financial capacity to undertake AMP; however, entitlement funding is available.	• **Background:** What is asset management; • **Ontario AMP:** Current state of municipal AMP • **CC, Infrastructure, and AMP:** Climate change adaptation in municipalities (how it will affect infrastructure assets) • **Best Practises and Recommendations** --- • **Background:** How it applies to asset management planning and infrastructure
Public Safety Canada. (2009). *National strategy for critical infrastructure.* Retrieved from https://www.publicsafety.gc.ca/cnt/rsrcs/pblctns/srtg-crtcl-nfrstrctr/srtg-crtcl-nfrstrctr-eng.pdf	**The goal of this strategy is to promote a more resilient and secure Canada, by outlining a collaborative approach for federal, provincial, and territorial emergency management initiatives.** The strategy recognizes the importance of critical infrastructure, a risk management approach, and the importance of information sharing and protection. This strategy provides useful definitions for critical infrastructure, which mentions assets. This resource is useful to deepen our understanding of how assets relate to critical infrastructure, and how natural disasters (which will only increase in the face of climate change) are a particular threat to communities.	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance • **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets*
New Zealand Asset Management Support (NAMS) (2008). *Infrastructure Asset Management Defined.* Retrieved from http://www.nams.org.nz/pages/173/i	**This article defines infrastructure asset management.** The importance of infrastructure asset management is outlined, a description of infrastructure assets is provided (including examples), and key elements of infrastructure management are listed. This article is useful for definitions, and to deepen our understanding of how assets and infrastructure are connected.	• **Background:** What is asset management; • **CC, Infrastructure, and AMP:** Defining infrastructure and its importance

nfrastructure-asset-management-defined.htm		
Saskatchewan Municipal Asset Management. (2008). *Asset management: getting started guide.* Retrieved from http://assetmanagementsk.ca/+pub/document/pdfs/Asset%20Mgmt%20Getting%20Started%20Guide_web.pdf	**The goal of this guide is to provide information about asset management and how it has use in supporting municipal operations.** While it focuses on municipal asset management, it has use to those involved in managing infrastructure assets as well. An informative introduction to asset management planning is provided, along with how asset management principles are applied to municipal operations, tips for getting started in your community, and a list of common terms and links to additional resources.	• **Background:** What is asset management; • **CC, Infrastructure, and AMP:** Defining infrastructure and its importance • **Best Practises and Recommendations**
Cowin, D. (2013). *Asset management and managing the infrastructure deficit: what people have done and what you can learn* [PDF document]. Retrieved from https://www.amcto.com/imis15/Documents/AC%20Presentation.pdf	**This presentation focuses on the topic of asset management and managing the infrastructure deficit.** A definition of asset management is provided, including what its objectives are, key questions, why it is important, benefits, and its current status. It is highlighted that local government owns most of the assets and that transportation and environmental assets matter "most". The infrastructure deficit is described, and key resources are provided to gain a better understanding of AM, which will be useful for additional research on this topic.	• **Background:** What is asset management; • **Ontario AMP:** Current state of municipal AMP • **CC, Infrastructure, and AMP:** Defining infrastructure and its importance • **AMP in Rural Canada** • **Best Practises and Recommendations**
Federation of Canadian Municipalities. (2012). *Canadian infrastructure report card Volume 1: 2012 municipal roads and water systems.* Retrieved from http://www.fcm.ca/Documents/reports/Canadian_Infrastructure_Report_Card_EN.pdf	**This report focuses on developing a rigorous, repeatable process for assessing the condition of Canada's infrastructure. This will serve to inform the public, decision-makers and other stakeholders about infrastructure issues and trends.** *Methodology:* 346 municipalities registered for the survey, with 123 responses. *Findings:* The report emphasizes the importance of having asset management systems in place, and provides a summary of the physical condition assessment of the infrastructure studied, extrapolated to the entire country. It was found that many municipalities lack the internal capacity to assess the state of their infrastructure accurately on their own. Under current practices (investment, operations, maintenance), most infrastructures, even if in good-to-very-good condition now, will require ever-increasing investment as it ages. And, a significant amount of municipal infrastructure falls between "fair" and "very poor" (average about 30%).	• **Ontario AMP:** Current state of municipal AMP • **CC, Infrastructure, and AMP:** Defining infrastructure and its importance • **AMP in Rural Canada:** Challenges
Robinson, P., & Gore, G. (2005). Barriers to Canadian municipal response to climate change. *Canadian Journal of Urban Research, 14*(1), 102-120.	**This article focuses on the potential role that Canadian municipalities can take regarding the response to climate change in addition to the barriers they face in doing so.** *Methodology:* Survey evidence from 392 Canadian municipalities between the summer of 1998 and spring of 1999.	• **CC, Infrastructure, and AMP:** Climate change adaptation in municipalities

	Findings: Priority barriers; CC not widely recognized as a local government issue. Capacity barriers; municipal governments still require funding, allocation of staff time and staff training to initiate/continue the response). Information barriers: "no-action municipalities" tend to not identify CC as a priority (this can be overcome by having access to information about programs and policies that can lead to emissions reductions). Different efforts are needed to encourage "no-action municipalities'" response vs. "action municipalities" efforts. *Recommendations:* Provide municipal governments with the appropriate financial and technical support of CC response efforts. Efforts to gain widespread Canadian municipal response to CC need to be directed to a variety of different stakeholders (i.e. integrate CC mitigation and adaptation strategies into curriculum of planning schools).	• **Background:** What has led to the Interest for ICSS (Canadian Context)
Ivey, J.L., Smithers, J., De Loe, R.C., & Kreutzwiser, R.D. (2004). Community capacity for adaptation to climate-induced water shortages: linking institutional complexity and local actors. *Environmental Management, 33*(1), 36-47.	**This report focuses on the local capacity for climate change adaptation, specifically regarding water shortage management in Ontario, Canada.** *Methodology:* Empirical case study analysis (Upper Credit River); interview data were used to substantiate data obtained from other primary and secondary sources. *Findings:* Planning for collaborative adaptation to CC may be considered a low priority to some municipal and other local water managers. Organizations with explicit and widely understood roles in local water management provide an obvious area for collaboration; effective action is enhanced when the 'actors' in water management understand and accept their responsibilities and are prepared to coordinate efforts through one or few lead agencies. There was also the belief that high quality data on future local conditions may remain elusive – at least in the near term. *Recommendations:* Improve knowledge of CC and its impacts for understanding local vulnerabilities and identifying responses. Foster local partnerships, identify alternative pathways for response, and establish transparent institutional arrangements at lower-and upper-tier levels for the translation of knowledge into action in local communities.	• **CC, Infrastructure, and AMP:** Climate change adaptation in municipalities • **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; *Rural infrastructure challenges* _____ • **Background:** What has led to the Interest for ICSS (Canadian Context)
Gore, C. (2010). The limits and opportunities of networks: municipalities and Canadian climate change policy. *Review of Policy Research, 27*(1), 26-46.	**This article focuses on the role municipalities have had in climate change policy, why it has been weak in the past, and what their influence could be in the future.** *Methodology:* A review of emerging literature, and an assessment of the suitability of municipal climate networks for taking action on climate change and its influence on Canadian national climate policy. *Findings:* The article claims that the role of municipalities and municipal networks in climate governance needs more attention and cites references as examples of mutual learning between municipalities to	• **CC, Infrastructure, and AMP:** Climate change adaptation in municipalities _____ • **Background:** What has led to the Interest for ICSS (Canadian Context)

	advance climate action. It was also noted of the challenge of clearly defining inter-municipal climate action in Canada. The article concludes by claiming that there is an opportunity for future research on the factors motivating action across municipalities and cities, the dynamics and arrangements of those relationships, and whether and how municipalities may aim to influence national and international climate policy. A second area of research open to potential is examining how, if, and under what circumstances municipal climate policies and programs are uniting; it is important to understand the extent to which policymakers and researchers can anticipate or expect continued collaboration and under what conditions.	
Corfee-Morlot, J., Kamal-Chaoui, L., Donovan, M.G., Cochran, I., Robert, A., & Teasdale, P. (2009). *Cities, climate change and multilevel governance.* (OECD Environment Working Papers No. 14). OECD Publishing.	**This paper focuses on the linkages between national, regional and local policies to explore and further support multilevel, regional and urban governance to better address the issue of climate change.** The paper highlights that with respect to adaptation, analyses of impacts and adaptation options at a city-scale level and relevant decision-making is at a very early stage. In a smaller section on inter-municipal action to combat climate change, the paper claims that inter-municipal cooperation within metropolitan areas has been identified as a key obstacle for well functioning and competitive metro regions. However, that inter-municipal collaboration can help tackle congestion, air pollution, health problems, noise and GHG emissions. The paper also addresses how some local governments have used resource-pooling strategies to achieve savings through co-ordinated action, such as projects to purchase energy-efficient products for common use (e.g. Clinton Foundation).	• **CC, Infrastructure, and AMP:** Climate change adaptation in municipalities • **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets* _____ • **Background:** What has led to the Interest for ICSS (Canadian Context) • **Background:** How it applies to asset management planning and infrastructure • **ICSS for Rural Communities:** Benefits
You, H., Connelly, E.B., Lambert, J.H., & Clarens, A.F. (2014). Climate and other scenarios disrupt priorities in several management perspectives. *Environmental Systems and Decisions, 34*(4), 540-554.	**This article focuses on the implications of climate and other conditions on management perspectives, including asset management, project selection, policy-making, demography/geography, and research & development.** *Methodology:* Multi-criteria priority setting to set a baseline priority for a group of initiatives (assets, policies, projects, locations). A broad consideration of vulnerability of the system to emergent and future conditions, including climate change was provided. The aim of this vulnerability assessment was to identify the most vulnerable sub-system and the most concerning stressors for the system. A case study was also used to understand and respond to the impacts of climate change on the US transportation system, using the Hampton Roads region of Virginia, USA.	• **CC, Infrastructure, and AMP:** Climate change adaptation in municipalities • **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets* • **CC, Infrastructure, and AMP:** Climate change in municipalities; *Incorporating*

	Four perspectives were used to assess the vulnerability in the system, including asset management, project selection, policy analysis, and demographic issues. *Findings:* When taking into account different perspectives, the assessment of priorities can identify different influential stressors. When informed from multiple perspectives, adaptation resource allocation and policy-making can be more rational. It should be noted that in this framework, a broad level of participation is ideal as to avoid including any potentially extreme inputs that could disrupt the prioritization of initiatives.	*climate change within asset management* • **Best Practises and Recommendations**
Douglas, D. (2003). *Towards more effective rural economic development in Ontario: An applied research project.* Retrieved from http://www.uoguelph.ca/~djdougla/Src%20Led.pdf	• **This report focuses on rural economic development in Ontario and presents recommendations following research conducted over three years.** There is a section that recognizes the challenge of rural municipalities to receive provincial financial support, claiming that provincial grants are rapidly decreasing. As such, rural communities have to be more proactive, more efficient, more strategic, and more effective in their economic development. Another section details how inter-municipal collaboration has been used to provide positive benefits to most municipalities regardless of size. Some of the benefits included improvements with information sharing and communication. To counteract resource deficits, rural municipalities will engage in a greater degree of community animation, inter-municipal partnerships, and work with various levels of government, etc. This report has use in establishing the rural municipal context as well as to promote inter-municipal service sharing to overcome challenges (i.e. local economic development).	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; *Rural infrastructure challenges* _____ • **ICSS in Ontario:** Barriers • **ICSS for Rural Communities:** Challenges • **ICSS for Rural Communities:** Benefits
Federation of Canadian Municipalities. (2013). Rural communities and the long-term infrastructure plan. Retrieved from http://www.fcm.ca/Documents/reports/FCM/Rural%20_communities%20_and%20_the%20_long%20_term%20_infrastructure%20_plan_EN.pdf	**This brief report focuses on a proposed long-term infrastructure plan for rural and small communities.** Specific challenges to these communities are highlighted (e.g. financial barriers), as well as benefits of such a plan for these rural municipalities (e.g. funding, capacity building).	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; *Rural infrastructure challenges* • **AMP in Rural Canada**
Kulig, J.C., Reimer, B., Townshend, I., Edge, D.S., Neves-Graca, K., & Lightfoot, N. (2007). *Understanding resiliency and risk: a final report of the Lost*	**This report focused on community resiliency and the Lost Creek Fire as a case study.** Particularly, the report aimed to determine who was at risk during and after the disaster; why they were at risk; and what characteristics identify individuals at different levels of risk and how these different levels	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance • **CC, Infrastructure, and**

Creek fire pilot case study. Retrieved from http://www.ruralwildfire.ca/sites/ruralwildfire/files/Corwsnest%20Pass,%20AB%20-%20Final%20Report-Case%20Study%202007.pdf	may be defined. Notably, this report includes an important sentence: "resiliency issues are particularly noticeable within rural communities where there are limited resources, infrastructure, and human capital that can be summoned to address such adversity" (p. 8).	**AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets* • **AMP in Rural Ontario**
Kulig, J.C., Hegney, D., & Edge, D.S. (2010). Community resiliency and rural nursing: Canadian and Australian perspectives. In *Rural nursing: Concepts, theory and practice*, 3rd Ed., ed. C.A. Winters and H.J. Lee, 385-400. New York, NY: Springer.	**This book focuses on nursing in rural Canada and Australia.** However, under the section "Rural Public Health", characteristics and barriers to community resiliency were listed. Characteristics included positive infrastructure like a diverse economy. Barriers to resiliency included negative infrastructure characteristics such as poor access to services (p. 394). This information can be valuable for setting the context as to why strong infrastructure is necessary in municipalities.	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance
Breen, S. (2015). *Uncertain foundation: infrastructure in rural Canada*. Retrieved from http://rplc-capr.ca/wp-content/uploads/2015/12/Infrastructure-in-Rural-Canada-Report.pdf	**This report focuses on the topic of infrastructure in rural Canada.** An overview of information regarding defining infrastructure and its importance; the state of infrastructure in Canada based on assessments and inventories; the infrastructure deficit and potential solutions; and a discussion of the information and its relevance for rural Canada is provided. *Methodology:* A literature review using academic and other online search engines (over 130 documents reviewed). This report also cites some valuable references for further research in this topic area.	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance • **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets* • **AMP in Rural Canada** • **AMP in Rural Canada:** Challenges
Robinson, J., Berkhout, T., Burch, S., Davis, E.J., Dusyk, N., Shaw, A., Sheppard, S., & Tansey, J. (2008). *Infrastructure and communities: the path to sustainable communities.* Retrieved from http://pics.uvic.ca/sites/default/files/uploads/publications/WP_Sustainable_Communities_November2008.pdf	**The focus of this paper is on communities and infrastructure.** While the paper also examines the role that 'sustainable communities' can play in long-term climate change mitigation and adaptation goals, key pieces of information can be used for our research. Notably, the recognition that rural and remote communities face issues linked to their capacity to offer adequate employment, public transit and social services to their residents. Also, the paper notes that more sustainable infrastructure aids in reducing emissions because they change the underlying drivers as emissions (in addition to building resilience as cited in other articles). This information can help build the argument for why focusing on infrastructure is important in our study.	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance • **CC, Infrastructure, and AMP:** Climate change in municipalities _____ • **Background:** How it applies to asset management planning and infrastructure • **ICSS for Rural Communities:**

		Challenges • **ICSS for Rural Communities:** Benefits
Government of Canada. (2007). *Building Canada: Modern infrastructure for a strong Canada.* Retrieved from http://publications.gc.ca/collections/collection_2008/ic/Iu154-4-2007E.pdf	**This report provides information on a long-term infrastructure plan for the federal government to collaborate with provinces, territories and municipalities to take action.** The report provides background information on infrastructure within a Canadian context, and discusses how it applies to the economy, environment, and communities. Information is also provided on where rural/remote communities are lacking when it comes to infrastructure (e.g. highways needing repair). The report will be beneficial for background information, setting the Canadian context, and highlighting some infrastructure issues that rural communities face.	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance • **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; *Rural infrastructure challenges* • **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets* • **AMP in Rural Canada** • **AMP in Rural Canada:** Challenges
Mirza, M.S., & Haider, M. (2003). *The state of infrastructure in Canada: implications for infrastructure planning and policy.* Retrieved from http://www.ibrarian.net/navon/paper/The_State_of_Infrastructure_in_Canada__Implicatio.pdf?paperid=13769239	**This report focuses on the current infrastructure deficit for the entire infrastructure in Canada, following a review of findings from the 1985 and 1995/96 surveys.** The report highlights the importance of infrastructure – how all Canadians depend on it. The infrastructure deficit is described and its implications for the future. Challenges for infrastructure provision and management are listed (e.g. aging/growing population), and lessons learned from the survey are described (e.g. Incorporate tools like GIS). This report can be used to strengthen the argument for why infrastructure is important, set the tone for incorporating climate change into its management (e.g. increasing natural disasters), and it can be used for comparing current literature on infrastructure to see how/if information on the topic has changed.	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance • **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets* • **AMP in Rural Canada:** Challenges • **Best practises and recommendations**
National Round Table on the Environment and the Economy. (2011). *Paying the price: the economic impacts of climate change for Canada.* Retrieved from	**The focus of this report is to assess the economic costs of climate change over time using various climate and growth scenarios.** The report highlights that the value and number of assets exposed to damages related to climate change will be much higher and provides some examples of what that could look like (e.g. Forest fires as a threat to assets in forest-based	• **CC, Infrastructure, and AMP:** Climate change adaptation in municipalities • **CC, Infrastructure, and AMP:** Climate change in

http://www.fcm.ca/Documents/reports/PCP/paying_the_price_EN.pdf	communities; houses and roads in coastal communities). This report can be used to support the argument that asset management planning (AMP) will need to account for climate change.	municipalities; *How climate change will affect infrastructure assets* • **Best Practises and Recommendations**
Andrey, J., Kertland, P., & Warren, F.J. (2014). Water and transportation infrastructure, *in* Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation, (ed.) F.J. Warren and D.S. Lemmen; Government of Canada, Ottawa, ON, p. 233-252.	**This report focuses on climate change impacts and adaptation in the relation to physical infrastructure in the water and transportation sector.** Key threats of CC to water infrastructure is discussed, such as flooding, drought, permafrost degradation etc., and the information provided sets the tone as to why robust and reliable water infrastructure is pertinent in the context of water availability and supply, water quality, and storm-water and wastewater management. Key climate change vulnerabilities are also discussed within the context of transportation infrastructure (e.g. pavement rutting, rail buckling). Specific issues related to coastal communities, northern regions, and on the Great Lakes shipping are also mentioned. Importantly, mention of asset management and its use for monitoring and decision-making was also highlighted as being increasingly used as a cost-effective approach for designing and maintaining systems. This report has use to strengthen the argument regarding climate change impacts on key infrastructure, and to make note that asset management is increasingly being recognized as an important approach in this respect.	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance • **CC, Infrastructure, and AMP:** Climate change adaptation in municipalities • **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets* • **CC, Infrastructure, and AMP:** Climate change in municipalities; *Incorporating climate change within asset management*
Canadian Climate Forum. (2015). *The impact of climate change on Canadian municipalities and infrastructure*. Retrieved from http://www.climateforum.ca/wp-content/uploads/2015/05/CCF-CCMunicipalities-PSD-April2015-FINAL.pdf	**This brief report focuses on how climate change will affect Canadian municipalities and infrastructure.** Brief examples are listed to set the tone of the argument, including a list of climate change consequences in Canada and how our infrastructure will be affected. A comprehensive risk assessment is advocated for to feature climate change as a high priority in infrastructure development and management. Recommendations for action are also described such as effective governance (e.g. predictable, long-term, and stable funding from governments); knowledge generation (e.g. national research and development initiative); and standards, policies, and planning strategies (e.g. differentiate by region and type of infrastructure climate change impacts and risks for key infrastructure initiatives throughout Canada). An important knowledge gap is identified: understanding complex relationships between climate and infrastructure in Canada in terms of exposure and vulnerability to climate hazards.	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance • **CC, Infrastructure, and AMP:** Climate change adaptation in municipalities • **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets* • **CC, Infrastructure, and AMP:** Climate change in municipalities; *Incorporating climate change within asset management*

		• **Best Practises and Recommendations**
Rayner, R.F. (2010). Incorporating climate change within asset management, in Lloyd, C. (Ed).. Asset Management: Whole Life Management of Physical Assets, Thomas Telford Press, London.	**This article focuses on incorporating climate change within asset management.** Environmental criteria are used as inputs to the design and construction of an asset, and the article describes established techniques for deriving them for AMP. Issues regarding climate change uncertainty are also reviewed, for which a risk management approach is advocated. This approach takes into account four major factors for assessing climate change impact and adaptation: exposure to climate stressors; vulnerability; resilience; and adaptation. The article also highlights that the incorporation of climate change into asset design has so far been limited. It is concluded that given the large scientific and political uncertainties, engineers and asset managers must make effective use of a limited capacity to accurately project environmental conditions over the lifetime of assets and asset systems.	• **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets* • **CC, Infrastructure, and AMP:** Climate change in municipalities; *Incorporating climate change within asset management* • **Best Practises and Recommendations**
BC Climate Action Toolkit. (n.d.). *Asset management for sustainable service delivery*. Retrieved from http://www.toolkit.bc.ca/Plan-Do/Asset-Management-Sustainable-Service-Delivery	**This article focuses on achieving sustainable service delivery through an iterative asset management process.** The article describes what sustainable service delivery is, how asset management can support it, and identifies infrastructure as being a significant investment for every local government. A description of asset management is included, in addition to a brief list of best practises that reinforce it: community infrastructure, infrastructure, properly built and effectively maintained infrastructure, financial sustainability, and well-informed decisions. The article states that an important element of asset management is understanding and managing risk; climate change and climate change impacts must be considered while managing physical/natural assets and maintaining (or improving) the level of service being delivered. The article then describes the BC Framework for asset management for sustainable service delivery. This framework is meant to reflect the current international best practises, noting that it must be scalable to community size, character and capacity. It lists the Town of Gibson's new Eco-Asset Strategy as a community example.	• **Background:** What is asset management; • **CC, Infrastructure, and AMP:** Defining infrastructure and its importance • **CC, Infrastructure, and AMP:** Climate change in municipalities; *Incorporating climate change within asset management* • **Best Practises and Recommendations**
Breen, S.P. (2013). *Where are we and how did we get here? Drinking water infrastructure in the Kootenay region of British Colombia 2013 initial impressions report.* Retrieved from http://cdnregdev.ruralresilience.ca/w	**This report focuses on a review of regional development and drinking water infrastructure in the Kootenay region of BC.** The infrastructure deficit is described, and how drinking water infrastructure relates to that challenge. *Methodology:* eleven interviews were conducted, targeting those involved in planning, operating, and maintaining local drinking water systems, as well as provincial and federal ministries. *Findings:* Prominent	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance • **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; *Rural*

p-content/uploads/2013/08/2013-Initial-Impressions-Final.pdf	themes included: current state of drinking water infrastructure; governance, management, and planning; infrastructure programs; collaboration; place-based development; challenges; sustainability; linking drinking water infrastructure and development; and ideas for the future. *Discussion/conclusion:* Many of the themes were linked through a common element of governance. Examples included issues pertaining to top-down policies and programs, downloading of responsibility and cost, and lack of consideration of place. It was made clear that improvements were necessary to be made that reflect the local context and also that facilitate long-term planning. Ideas for the future, made by interviewees, included: larger, fact based, discussion on water quality risk and water treatment should actually be required; resident buy-in and understanding as a requirement for future changes; continued improvement of relationships and collaborations; appropriate economies of scale and appropriate financing; and transparent funding programs. It was also mentioned that a common issue in rural BC, was that larger municipalities tended to have more resources at their disposal. Higher-level interviewees noted that while rural communities are never purposefully excluded from funding, yet 2011 and 2013 interviewees highlighted capacity limitations as an application issue; financially stable communities have in house grant writers or are able to hire someone to write them.	*infrastructure challenges* • **AMP in Rural Canada:** Challenges • **Best Practises and Recommendations** _____ • **Background:** How it applies to asset management planning and infrastructure
Brodhead, J., Darling, J., & Mullin, S. (2014, October 1). *Crisis and opportunity: time for a national infrastructure plan for Canada.* Retrieved from http://canada2020.ca/crisis-opportunity-time-national-infrastructure-plan-canada/	**This article focuses on Canadian infrastructure, highlighting the need for urgent federal attention to the issue of their funding and financing.** The economic benefit of public infrastructure is reviewed, including an estimation of the size of Canada's infrastructure deficit. The paper also examines how the federal government's role has changed over the last 50 years in the financing of infrastructure. There is a need for transparent rules for infrastructure programs and planning, as well as the prioritization and sharing of best practices across Canada. The paper also highlights the need for financial tools in municipalities and public sector entities that cannot efficiently access capital markets.	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance • **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets* • **Best Practices and Recommendations**
Public Sector Digest (PSD). (2016). AMO conference 2016 in review. Retrieved from https://www.publicsectordigest.com/sites/default/files/AMO%202016%20CONFERENCE%20REVIEW.pdf	**This review article focuses on a multitude of topics, but aimed to "bridge the gap" with municipalities facing a significant fiscal challenge.** For example, there are sections on municipal asset management, the asset management plan, and the infrastructure gap is commented upon. There is also a brief section on climate change for municipalities, and another, "innovation through collaboration", where municipal service-sharing agreements are discussed. The article uses the partnership between	• **Background** • **Background:** What is asset management; • **Ontario AMP:** Current state of municipal AMP _____

	Morris-Turnberry and North Huron as an example case study, for which the two municipalities entered a 2 year pilot project to share additional services to improve asset management and long term planning, ability to hire staff with more expertise, etc. The article also provides some best practise "tips" on service sharing, despite being very general.	• **Background:** How it applies to asset management planning and infrastructure • **ICSS in Ontario:** Best Practises
Schraven, D., Hartmann, A., & Dewulf, G. (2011). Effectiveness of infrastructure asset management: challenges for public agencies. *Built Environment Project and Asset Management, 1*(1), 61-74.	**This article aims to better understand the decisions in infrastructure asset management at public agencies and the challenges involved when improving the effectiveness of decision-making.** *Methodology:* A literature review on asset management at public agencies, and a case study based on The Netherlands. 12 semi-structured interviews took place. *Findings:* Key challenges are: establishment of alignment between infrastructure objectives, situation and intervention, formulation of infrastructure objectives, and the management of multiple actors with different interests. *Recommendations:* Have clearly defined infrastructure objectives that are consistent with the goals and interests of multiple stakeholders, and the development of new skills and knowledge to cope with these various challenges.	• **Background** • **Background:** What is asset management; • **AMP in Rural Canada:** Challenges • **Best Practises and Recommendations**
Grubisic, M., Nusinovic, M., & Roje, G. (2009). Towards efficient public sector asset management. *Financial Theory and Practise, 33*(3), 329-362.	**This article focuses on raising the importance of public sector reform, and to illustrate how adopting full accrual accounting may help public asset reporting, control and management processes.** The article concentrates on Croatia to fill gaps in research on developing countries' public sector reforms. However, the information provided could be used to facilitate a better understanding of public asset management and how a lack of reliable information on public assets in place hinders the determination of an asset's value, budgeting for asset management activities, and evaluating asset performance. Similar to other articles, the authors promote a transparent, standardized, and accountable way of reporting public asset management.	• **Background** • **Background:** What is asset management; • **Best Practises and Recommendations**
Jolicoeur, P.W., & Barrett, J.T. (2004). Coming of age: strategic asset management in the municipal sector. *Journal of Facilities Management, 3*(1), 41-52.	**This paper focuses on legitimizing the application of strategic asset management within the municipal sector, and proposes a unique empirical approach to rationalize property in support of service delivery.** The proposed methodology for effective asset rationalisation is: (1) user needs assessment, (2) functional audit, (3) operational dynamics assessment, (4) market validation, (5), recommendation. The article ends by highlighting the importance of the adoption of a balanced review process to encompass all stakeholders to determine a solution that best meets the	• **Background:** What is asset management; • **Best Practises and Recommendations**

	financial and service delivery needs of the municipality. If asset management is integral to municipal strategic planning, then it must be afforded the appropriate placement, resources, and priority for success.	
Cardoso, M.A., Pocas, A., Silva, M.S., Ribeiro, R., Almeida, M.C., Brito, R.S., Coelho, S.T., & Alegre, H. (2016). Innovation results of IAM planning in urban water services. *Water, Science, and Technology, 74*(7), 1518-1526.	**This article focuses on the main innovation results from the implementation of sustainable infrastructure asset management (IAM) planning in urban water services, including the challenges involved with setting up the process.** The main principles of the IAM methodology are: (1) considering that infrastructures behave as a system, (2) planning for the long-term, and (3) addressing performance, risk, and cost. Related to plan development, utilities recognized the importance for decisions of considering the infrastructure behaviour as well as the long-term horizon – supporting the key principles of the IAM methodology. The challenges involved a lack of communication within the different information systems and within the organization, and insufficient information (requiring considerable resources and resulting in a significant effort). The most important success factors were the commitment of both the project team and top managers, which suggests that the IAM methodology may be successfully implemented by utilities in different sizes or serving areas.	• **Background:** What is asset management; • **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; • **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets* • **Best Practises and Recommendations**
Minnes, S., & Vodden, K. (2014). *Exploring solutions for sustainable rural drinking water systems: A study of rural Newfoundland and Labrador drinking water systems.* Retrieved from http://www.mun.ca/harriscentre/Rural_Water_Report.pdf	**This report focuses on communities of 1,000 residents or less in rural Newfoundland and Labrador and the unique challenges these communities face in regards to drinking water systems.** Four main components of drinking water systems were explored: (1) source water quality and quantity; (2) infrastructure and operations, (3) public perceptions, awareness, and demand; and (4) policy and governance. *Methodology:* A mixed methods research approach was implemented, including both quantitative and qualitative research methods (i.e. media scan, workshops, surveys, literature review). From the research, it appeared as though there is insufficient funding and human resources at both local and provincial levels in Newfoundland to achieve sustainable drinking water systems. Under the discussion section, it was highlighted the issues of aging and inadequately maintained infrastructure and identified measures, such as improved asset management, that could be used to reduce infrastructure risks. Recommendations included a need for the better understanding and emphasis at the local level on regional solutions, and on community-based solutions that focus on capacity development and engagement/education of local decision-makers, staff, the public, and other groups that can help local governments address infrastructure challenges.	• **Background:** What is asset management; • **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; • **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; *Rural infrastructure challenges* • **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets* • **AMP in Rural Canada** • **Best Practises and Recommendations**

Canadian Council of Professional Engineers (2008). *Adapting to climate change: Canada's first national engineering vulnerability assessment of public infrastructure.* Retrieved from https://pievc.ca/sites/default/files/adapting_to_climate_change_report_final.pdf	**This report focuses on an engineering vulnerability assessment of four categories of Canadian public infrastructure: storm-water and waste water; water resources; roads and associated bridges; and buildings.** Seven themes were developed: (1) some infrastructure components have high engineering vulnerability to climate change; (2) improved tools are required to guide professional judgement; (3) infrastructure data gaps are an engineering vulnerability; (4) improvement is needed for climate data and climate change projections used for engineering vulnerability and design of infrastructure; (5) improvements are needed in design approaches; (6) climate change is one factor that diminishes resiliency; and (7) engineering vulnerability assessment requires multi-disciplinary teams. The report also provided several recommendations: (a) revise and update the engineering vulnerability assessment protocol; (b) conduct additional work to further characterize the vulnerability of Canadian public infrastructure to climate change; (c) develop an electronic database of infrastructure vulnerability assessment results; (d) assess the need for changes to standard engineering practices to account for adaptation to climate change; and (e) initiate an education and outreach program to share learning from the assessment with practitioners and decision-makers.	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; • **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets* • **CC, Infrastructure, and AMP:** Climate change in municipalities; *Incorporating climate change within asset management*
Ministry of Rural Affairs. (2014). *Rural roadmap: The path forward for Ontario.* Retrieved from http://www.omafra.gov.on.ca/english/rural/roadmap-2014.pdf	**This report focuses on the "voice' of rural Ontario in order to determine strengths and where needs should be addressed.** The report begins by discussing what rural communities have highlighted as being important to tell, and what the Ontario government has done already to ensure rural communities receive the programs, services, and opportunities they need to flourish. Priorities are also mentioned, outlining a dynamic rural plan, which will be developed in collaboration with various stakeholders and ministries. The report outlines some of the challenges rural communities face (e.g. shrinking budgets, mobility, long-term infrastructure plans) as well as the solutions the Ontario government has developed (e.g. Small, Rural and Northern Municipal Infrastructure Fund to support capital and asset management investments in critical infrastructure). The report is also beneficial to outline the current state of asset and infrastructure management in rural Ontario.	• **Ontario AMP:** Current state of municipal AMP • **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; *Rural infrastructure challenges* • **AMP in Rural Canada:** Challenges
Kumaraswamy, M. (2011). Editorial: Integrating "infrastructure project management" with its "built asset management". *Built Environment Project and Asset Management, 1*(1), 5-13.	**This editorial article aims to draw attention to the divide between research regarding project management and asset management – despite being so closely related.** The article itself is quite brief in this discussion, while also conveys the rational behind a new journal in addressing emerging imperatives in our built environment. The article has use to strengthen the argument for synergising research on project and asset	• **Ontario AMP:** Current state of municipal AMP • **Best Practises and Recommendations** • **AMP in Rural Canada:** Challenges

	management, and to highlight the need to do more given the poor status of existing infrastructure assets in many developed countries (e.g. Canada).	
Municipal Finance Officers' Association of Ontario (2014a). *Presenting Ontario's asset management: Honour roll.* Retrieved from http://www.dfainfrastructure.com/wp-content/uploads/2014/07/Asset-Management-Honour-Roll-Billings1.pdf	**This report recognizes 9 municipalities whose asset management work sets a "new bar" for Ontario.** The report describes each case study by their adopted trend-setting practises within financial asset planning (e.g. Budgeting in the region of Halton and use of shared services). Under 'next steps', the report also lists suggestions where municipal AMP could benefit from (i.e. inter-municipal contracting). This report may be a resource for potential case studies in future research.	• **Best Practises and Recommendations**
U.S. Department of Transportation Federal Highway Administration. (2009). *Literature review: climate change vulnerability assessment, risk assessment, and adaption approaches.* Retrieved from https://www.fhwa.dot.gov/environment/climate_change/adaptation/publications/vulnerability_assessment/	**This report focuses on three major categories of activities to address global climate change adaptation: vulnerability assessments, risk assessments, and adaptation approaches.** The report provides a clear definition of what each of the three categories are and how they are different, including case study examples – not limited to the United States; rather, Canada, Australia, United Kingdom, etc. The information provided is useful to support the argument for how climate change and increasing temperature/precipitation will affect our infrastructure. Additionally, the report mentions that cross-agency collaboration is another example of other potential adaptation actions for transportation planning.	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; • **CC, Infrastructure, and AMP:** Climate change in municipalities; *Incorporating climate change within asset management* • **Best Practises and Recommendations**
Federation of Canadian Municipalities. (2017, January 2). *About: Municipal Asset Management Program.* Retrieved from http://www.fcm.ca/home/programs/municipal-asset-management-program-/about-municipal-asset-management-program.htm	**This page focuses on the announcement of a new municipal asset management program delivered by the Federation of Canadian Municipalities, funded by the Government of Canada.** The Municipal Asset Management Program (MAMP) is a five-year, $50-million program aimed to support Canadian Cities and communities to make better-informed decisions regarding infrastructure. It is to be implemented in Spring 2017, and is estimated to reach 1,000 municipalities across the country in the next five years.	• **Background:** What is asset management • **Ontario AMP:** Current state of municipal AMP
Government of Ontario. (2016). *Discussion paper- potential municipal asset management planning regulations.* Retrieved from https://www.ontario.ca/page/discussion-paper-potential-municipal-	**This paper focuses on providing information on the new regulation for municipal asset management planning in Ontario.** The paper includes an overview of what asset management is, what asset management planning in Ontario is, and includes highlights of the regulation such as a strategic asset management policy, an infrastructure asset inventory, lifecycle management strategy, etc. It is recognized that there are differences between municipalities.	• **Background** • **Background:** What is asset management • **Ontario AMP:** Current state of municipal AMP • **AMP in Rural Canada:** Benefits

asset-management-planning-regulation	Specifically, that Ontario's municipalities are diverse and a small rural or northern Ontario faces different challenges compared to a large municipality in the Greater Toronto area. The article lists this as a fundamental consideration for the regulation to reflect. The paper finishes by listing some considerations for municipalities, such as how can the regulation support knowledge sharing and collaboration among municipalities.	
El-Diraby, T.E., Kinawy, S., & Piryonesi, S.M. (2016). A comprehensive review of approaches used by Ontario municipalities to develop road asset management plans, presented at the Transportation Research Board 96th Annual Meeting, Washington, 2017. Washington, DC: Transportation Research Board.	**This conference paper focuses on a review of approaches used by Ontario municipalities to develop road asset management plans.** A sample of 24 out of a rough total of 440 municipalities in Ontario was used in this study. It was found that most of the sampled municipalities, especially small ones, face issues regarding data collection, data management, and defining and meeting levels of service. The biggest challenge to the success of asset management in Ontario was a lack of adequately trained human resources.	• **Ontario AMP:** Current state of municipal AMP • **AMP in Rural Canada:** Challenges • **Best Practises and Recommendations**
Hedensted Lund, D., Sehested, K., Hellesen, T., & Nellemann, V. (2012). Climate change adaptation in Denmark: enhancement through collaboration and meta-governance? *The International Journal of Justice and Sustainability, 17*(6-7), 613-628.	**This article focuses on climate change adaptation in Denmark and how it can be enhanced through collaboration between municipalities.** It is argued that increased collaboration and meta-governance is needed to assist municipalities to produce adaptation measures with added value. In Denmark, sector policy and technical professionals have largely dominated climate change adaption. This is problematic because climate change/adaptation efforts affect multiple policy fields. Therefore it becomes extremely important to include actors from different fields in order to add value to solutions. In the survey used to analyze 10 municipal climate change adaption strategies and interviews with planners from 5 municipalities, it was found that perceptions saw collaborating municipalities as being important to climate change adaptation. This article relates to inter-municipal collaboration because it demonstrates the importance that citizens and municipal officials place on inclusivity to gather different forms of knowledge, values, and resources.	• **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets* _____ • **Background:** What has led to the Interest for ICSS (Canadian Context)
Skovron, W. (2016). *Asset management and the AAMDC.* [PDF document]. Retrieved from https://www.google.ca/url?sa=t&rct=	**This presentation file focuses on the challenges that rural and small urban municipalities may face in adopting asset management.** Background information is provided on rural municipalities, such as how they are often responsible for large areas with low population densities. The	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; *Rural infrastructure challenges*

j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwj4hLPN9YPSAhUQwWMKHREOD4sQFggfMAA&url=http%3A%2F%2Fwww.lgaa.ab.ca%2F_literature_231863%2F2016_Asset_Management_3&usg=AFQjCNGk2SVCdcOU-OKLHaB27pALxePTCQ&sig2=bdjNf1Fm5pqjcZUCrusx-Q	presentation also notes that most rural municipalities have a relatively limited set of asset types, and relatively basic infrastructure.	
Rural Ontario Municipal Association (ROMA). (2015). *The rural and northern lens & a voice for rural and northern Ontario.* Retrieved from https://www.roma.on.ca/ROMA-Docs/Reports/2015/AVoiceforRuralandNorthernOntario201501.aspx	**The purpose of this report is to represent the interests of Ontario rural and northern municipal governments and call attention to their communities' needs and requirements to thrive and succeed.** The report frames the issue by stating that in today's economic and demographic climate, there is the need for increased awareness of rural and northern issues across provincial government. Many rural communities face low population densities and long distances, which is difficult for municipal governments to assume additional responsibilities. The report encourages the Province to determine the best way to achieve the appropriate economics of scale for service delivery in these areas.	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; *Rural infrastructure challenges*

INTER-COMMUNITY SERVICE SHARING (ICSS)

Reference	Key Points & Conclusions	Theme
Dollery, B., & Akimov, A. (2008). Are shared services a panacea for Australian local government? A critical note on Australian and International empirical evidence. *International Review of Public Administration, 12*(2), 89-102.	**This article focuses on the attention given to shared local services as an alternative means of achieving greater operational efficiency within an Australian context.** The article examines the available empirical evidence on the outcomes of shared local service arrangements in Australia and other advanced countries. There lacks solid empirical evidence on the economic effects of shared services in Australian local government and the data that does exist is exclusively in the form of surveys and case studies. The article lists six most common areas of shared services, generally, as well as those in regional and especially remote areas (i.e. shared equipment, road works, IT services, health and planning, etc.). It also states that the success of particular arrangements will vary depending on the specific circumstances and that all possible impediments/shortcomings should be carefully considered prior to the conclusion of any agreement. This article can be used to frame a similar argument within a Canadian rural context.	• **Background** • **Background:** How it applies to asset management planning and infrastructure • **ICSS in Ontario:** Best Practises • **ICSS for Rural Communities**: Background • **ICSS for Rural Communities:** Benefits

Government Finance Officers Association. (2007). *Alternative service delivery: shared services.* Retrieved from http://www.gfoa.org/alternative-service-delivery-shared-services	**This article focuses on shared service delivery.** Background is provided as to why governments are leaning towards cooperating to deliver services and the article discusses the potential reasoning behind why suburbs/rural areas, particularly, may share services. The article then lists recommendations/best practises of service sharing for municipalities.	• **Background:** What has led to the Interest for ICSS (Canadian Context) • **ICSS in Ontario:** Best Practises
Spicer, Z. (2013a). *Inter-local cooperation in Canada. Scale, scope and intensity.* Retrieved from https://www.assocsrv.ca/cpsa-acsp/2014event/Spicer.pdf	**This report focuses on the state of inter-local cooperation in a Canadian context, and introduces additional methods for studying the intensity of these agreements.** Six Canadian metropolitan areas were examined. It was found that there has been a general increase in the number of agreements signed, possibly due to the need for cooperation as a result of budget constraints. Most municipalities prefer to form agreements with fewer municipal partners, rather than more, and most agreements are within a closer geographical location. Similar to American literature on this topic, emergency services were the most popular in agreements. The concept of "cooperative intensity" was also introduced as a way to better understand the types of agreements being formed. This report can be used to understand inter-local cooperation in a Canadian context, and to help identify where future research is needed.	• **Background** • **Background:** Theory and Related Terms • **Background:** What has led to the Interest for ICSS (Canadian Context)
Spicer, Z. (2015b). Regionalism, municipal organization, and interlocal cooperation in Canada. *Canadian Public Policy, 41*(2), 137-150.	**This article focuses on inter-local cooperation in Canada and provides some background on its theory.** The article discusses the perspective of new regionalism, which emerged in the 1990s. In this perspective, it is argued that effective governance can be achieved through voluntary cooperative agreements between governments. Inter-local cooperation stems from the theory of new regionalism, as it emphasizes the use of flexible networks that address regional problems through voluntary means. The article further explores inter-local cooperation in six Canadian metropolitan cities. In particular, this article has use for information regarding new regionalism and the theories that inter-local cooperation stems from.	• **Background** • **Background:** Theory and Related Terms • **Background:** What has led to the Interest for ICSS (Canadian Context)
Hepburn, N., LeSage, E., & McMillan, M. (2004). *Shared service arrangements: determinants of success. A study of economic development and recreation and culture.* Edmonton, Alberta: Western Centre for Economic Research,	**This book focuses upon the extent and nature of certain shared services in the Alberta region, and to discover the determinants of success for shared services.** Although this book focuses on the prevalence and types of recreation and culture, and economic development shared services, it is still useful information for why shared services are important, how they have came to be, and best practises to be applied for other types of shared services. *Methodology:* A review of existing literature – both academic and grey. *Major*	• **Background** • **Background:** Theory and Related Terms • **ICSS in Ontario:** Barriers • **ICSS in Ontario:** Best Practises • **ICSS for Rural**

University of Alberta.	*findings:* Motivations for sharing services are typically utilitarian, and root difficulties are shared amongst the academic literature as having to do with free-rider problems. Factors for success are also listed (e.g. clearly defined goals), in addition to recommendations (e.g. monitoring). This book has use in a variety of sub headings under this environmental scan.	**Communities:** Challenges • **ICSS for Rural Communities:** Benefits
Somerset Country Municipal Managers Association & the Somerset County Business Partnership (2006). *A white paper report: removing the barriers to shared services.* Retrieved from http://www.njleg.state.nj.us/propertytaxsession/opi/somerset.pdf	**This report focuses on some of the barriers to intermunicipal service sharing and how to remove them.** Although brief, this article is beneficial to provide further information on some of the barriers that municipalities face (e.g. lack of support for employees), with additional recommendations on how to resolve them.	• **ICSS in Ontario:** Barriers • **ICSS in Ontario:** Best Practises
The Conference Board of Canada. (2005). *Services in the public sector lessons for success.* Retrieved from http://www.andrewbgraham.ca/uploads/1/2/5/1/12517834/_shared_services_in_the_public_sector-1.pdf	**This briefing newsletter focuses on shared services in the public sector; notably, the lessons for success.** The briefing begins by recognizing how shared services are becoming more popular across Canada, and that they have resulted in cost savings –especially public sector organizations. A few barriers are mentioned, for which the briefing includes mechanisms to address them, as well as numerous "lessons learned". This briefing has its use to provide additional background information, highlight some of the barriers that may arise, and to list the best practises for when shared services are chosen within this sector.	• **Background** • **ICSS in Ontario:** Barriers • **ICSS in Ontario:** Best Practises
The Alberta Urban Municipalities Association (AUMA). (2007). Intermunicipal cooperation: research paper and survey results. Retrieved from https://www.auma.ca/sites/default/files/Advocacy/Programs_Initiatives/Intermunicipal_Cooperation/76025_backgrounder_intermunicipal_cooperation.pdf	**This paper focuses on outlining research conducted and a survey conducted on inter-municipal cooperation in Alberta.** The paper lists the general benefits of inter-municipal cooperation (e.g. increased emphasis on cumulative effects), the benefits to municipalities (e.g. mutual economic benefits), and the benefits to citizens (e.g. increased quality of life). Barriers to inter-municipal cooperation are also addressed (e.g. lack of trust among municipalities) in addition to some guidelines for inter-municipal cooperation during the preliminary and planning stages for municipalities. Lastly, the paper lists the survey questions and a summary of the given responses. One of the suggested tools survey participants asked for was a basic guideline for municipalities as well as examples of structures that are currently working so that each region does not have to "reinvent the wheel". AUMA also believes inter-municipal cooperation is most meaningful when it is truly 'voluntary'; if forced, municipalities may feel taken advantage of.	• **Background** • **ICSS in Ontario:** Barriers • **ICSS in Ontario:** Best Practises • **ICSS for Rural Communities:** Benefits
Warner, M.E. (2006). Inter-municipal	**This article focuses on inter-municipal cooperation in the United States,**	• **Background**

cooperation in the U.S.: A regional governance solution? *Urban Public Economics Review, 6*(1), 221-240	**seeking to examine whether this form of voluntary cooperation can result in efficiency and equity objectives without losing the local identity and voice.** *Methodology:* Survey results of more than 1200 municipalities over 1992-2002. *Findings:* Efficiency benefits of cooperation have lessened over time partly due to a lack of adequate monitoring. The citizen voice was found to be in support of cooperation in the beginning of the decade, whereas at the end of the decade this was not found to be true. Results suggest that there is a need for a more democratic form of inter-municipal cooperation to ensure accountability, efficiency, and responsiveness.	• **Background:** What has led to the Interest for ICSS (Canadian Context) • **Background:** Theory and Related Terms • **ICSS in Ontario:** Best Practises • **ICSS for Rural Communities:** Benefits • **ICSS for Rural Communities:** Challenges
Hulst, R., van Montfort, A., Haveri, A., Airaksinen, J., & Kelly, J. (2009). Institutional shifts in inter-municipal service delivery: An analysis of developments in eight Western European countries. *Public Organization Review, 9*(3), 263-285.	**This article focuses on inter-municipal service cooperation within eight European countries, analyzing how these arrangements tend to change over time in terms of their scope, composition, and degree of organizational integration.** In terms of scope, it was found that national legislation and incentive structures are important to determine the immediate impacts of cooperation. For example, if national legislation puts forth responsibility onto municipalities themselves to organize their cooperation, the local government will tend to seek arrangements that best meet the needs of local preferences. Regarding composition of cooperative arrangements, large scale and strong financial dependency of local government, in the U.K., explains the near absence of purely intermunicipal cooperation until recently. Pressures from central government to improve efficiency and external factors such as the growing economies of scale of IT have encouraged local governments to develop inter-municipal call centres and to collaborate. Lastly, for the organizational integration of cooperative arrangements, it was found that a revaluation of the private sector as a potential producer of public services have resulted in a growing popularity of contract like arrangements between municipalities and in the (joint) outsourcing to the private sector.	• **Background** • **Background:** What has led to the Interest for ICSS (Canadian Context) • **Background:** Theory and Related Terms
Carr, J.B., & Hawkins, C.V. (2013). The costs of cooperation: what the research tells us about managing the risks of service collaborations in the U.S. *State and Local Government Review, 45*(4), 224-239.	**This article focuses on American literature examining shared service delivery to identify major themes about the barriers to establishing and managing these types of arrangements.** The article identifies risks arising from issues of division, coordination, and defection as being majorly cited in the literature. The article describes these risks in detail, providing examples and commenting, in passing, ways to reduce these risks. Then, in another section, the article goes into more detail about the research to date that discusses three different approaches to reduce these risks: contract design; institutional design; and local networks. In summary, the article provides insight into some of the challenges involved with negotiating and bargaining	• **Background** • **Background:** How it applies to asset management planning and infrastructure • **ICSS in Ontario:** Barriers • **ICSS in Ontario:** Best Practises

	shared service agreements due to transaction costs, asset specificity, and measurement difficulty. These challenges can be overcome by crafting agreements that fit the context of the agreement (e.g. restrictive/adaptive agreements), institutional design (e.g. managed network), and by local networks across regions to mitigate transaction risks.	
Bel, G., & Warner, M.E. (2015b). *Factors explaining inter-municipal cooperation in service delivery: A meta-regression analysis.* Retrieved from http://www.ub.edu/irea/working_papers/2015/201521.pdf	**This paper focuses on findings from a meta-regression analysis based on existing empirical literature on inter-municipal cooperation.** The paper provides some background information on what inter-municipal cooperation is, why it has gained importance, and some of its underlying theory. *Methodology:* Meta-regression analysis of 49 articles (incl. working papers). *Major findings:* Strong evidence that spatial and organizational factors, and fiscal constraints are important drivers of cooperation. Results did not provide insight to explain divergence in results on community wealth, economies of scale or racial homogeneity. The article also points out that cooperation is high in rural communities, and lists potential useful references for further research.	• **Background** • **Background:** Theory and Related Terms • **ICSS in Ontario:** Barriers • **ICSS in Ontario:** Best Practises • **ICSS for Rural Communities:** Benefits • **ICSS for Rural Communities:** Challenges
Spicer, Z.D. (2013b). *Regional organization and the dynamics of inter-municipal cooperation: policy coordination between Ontario's separated cities and counties.* Doctoral thesis. The University of Western Ontario, London, Ontario.	**This thesis focuses on city-county separation in Ontario and the dynamics of inter-municipal cooperation.** *Methodology:* An analysis of primary documents and interviews. Agreements from every county in Ontario were gathered (n =275) with the time frame of 1995-2011. Interviews were conducted in three regions: 1) London and Middlesex County, 2) Barrie, Orillia and Simcoe County, and 3) Guelph and Wellington County. Research questions were: under what conditions does cooperation occur between institutionally autonomous municipal governments? And, does the continued use of city-county separation as an institution still achieve its intended objectives? *Findings:* Separated cities and counties are not forming cooperative agreements at expected rates. Since there exists few common servicing demands, cooperation is not a natural phenomenon. Separated cities and counties in Ontario also appeared not to be entering into informal agreements either. The author attributes this to the possibility of the nature of city-county separation as an institution itself. Urban areas were initially separated from rural areas because they were seen as economically, socially and politically distinct. With little in common, the areas should have different service needs and demands, deeming service sharing cooperation unnecessary. This thesis can help set the context and support for why ICSS is an opportunity for rural-rural service sharing. If rural-urban municipalities do not typically share services due to a lack of common service needs and demands, then rural communities may have more motivation and opportunity to do so.	• **Background** • **Background:** What has led to the Interest for ICSS (Canadian Context) • **Background:** Theory and Related Terms • **Background:** How it applies to asset management planning and infrastructure • **ICSS in Ontario:** Barriers • **ICSS in Ontario:** Best Practises • **ICSS for Rural Communities:** Benefits

	The thesis also identifies factors that influence cooperation (e.g. social capital and interaction, power asymmetry, strong political leadership etc.). Factors that negatively influence cooperation include: larger and heterogeneous group composition, fewer local governments, and weak political leadership.	
Warner, M.E., & Hefetz, A. (2002). Applying market solutions to public services: An assessment of efficiency, equity and voice. *Urban Affairs Review, 38*(1), 70-89.	**This article focuses on comparing privatization with intermunicipal cooperation and evaluating each on efficiency, equity, and democracy grounds.** *Methodology:* A regression analysis of a national survey of local government service delivery from 1992 and 1997. *Findings:* Both alternatives encourage efficiency, but intermunicipal cooperation is more associated with equity and voice compared to privatization. Important to note is that cooperation and privatization are higher among higher-income municipalities, whereas higher-poverty municipalities favour cooperation over privatization.	• **Background** • **Background:** What has led to the Interest for ICSS (Canadian Context) • **Background:** Theory and Related Terms • **ICSS for Rural Communities:** Benefits
Mohr, R., Deller, S.C., & Halstead, J.M. (2010). Alternative methods of service delivery in small and rural municipalities. *Public Administration Review, 70*(6), 894-905.	**This article focuses on service delivery in small and rural municipalities.** Constraints faced by these communities are discussed in comparison to those in larger and more urban areas, and how fiscal stress, prior experiences, and future expectations may shape decision-making. It is likely that challenges are magnified in small and rural local governments, hindering their capacity to fully benefit from outsourcing provision responsibilities to private providers. As such, using formal and informal agreements may assist in supporting neighbouring municipalities in cases of emergency services. *Methodology:* Survey data from approximately 1,000 municipalities in Illinois, New Hampshire, and Wisconsin. *Findings:* Responsibilities such as management and training of first responders (e.g. fire, police, emergency medical services) are frequently shared with other governments, but rarely delegated to private for-profit entities. Municipalities are more likely to use contracts with other governments, relative to their larger counterparts. While municipalities frequently work together to produce services, they do not seem to cooperate in the development and management of outside contracts. It was concluded that small municipalities may benefit by expanding from collaboration in the production of services to collaboration in the management of external contracts, if by sharing information with other municipalities.	• **Background** • **Background:** Theory and Related Terms • **ICSS for Rural Communities:** Benefits • **ICSS for Rural Communities:** Challenges
Commonwealth of Massachusetts. (2008). *Inter-municipal agreements: a best practise.* Retrieved from http://www.mass.gov/treasury/docs/mwpat/inthenews/intermunicipal-agreement.pdf	**This article focuses on inter-municipal agreements (IMA) within a water infrastructure context, and concentrates on formal written contracts as a type of IMA.** A background on inter-municipal agreements is provided, challenges and benefits of these agreements, and a core framework to be followed to implement an inter-municipal agreement. The specific steps of the framework is then described in more detail: (1) inter municipal cooperation	• **Background** • **ICSS in Ontario:** Barriers • **ICSS in Ontario:** Best Practises • **ICSS for Rural**

	assessment; (2) IMA framework; (3) IMA district representation; (4) agreement negotiations – facilities capacity considerations; (5) agreement negotiations – capital cost considerations; (6) agreement negotiations – operating and maintenance; and (7) negotiating other items. The article also provides a checklist of terms and conditions for an IMA presented by the Massachusetts Department of Revenue at a previous municipal law seminar. It was noted that this checklist is typically used for all IMA's in Massachusetts, and recognizes the checklist as a best management practice.	**Communities:** Challenges
Spicer, Z., & Found, A. (2016). *Thinking regionally: how to improve service delivery in Canada's Cities.* Retrieved from https://www.cdhowe.org/sites/default/files/attachments/research_papers/mixed/Commentary_458_0.pdf	**This paper focuses on intermunicipal cooperation in metropolitan Canada and discusses the opportunities for efficiencies that municipalities could attain through greater cooperation.** The article makes a good point to say that without sufficient information of regional and service-coordination issues and their consideration, it is likely that municipalities will continue to favour strict in-house approaches to service delivery, rather than intermunicipal cooperation as an alternative. The article also uses examples from the MFOA (2012) article of cost savings in Ontario municipalities. It is outlined why Canada has been lacking in intermunicipal cooperation for a number of reasons: lack of knowledge about intermunicipal agreements; amalgamation angst; provincial focus on consolidation; and naturally competitive local politics. Lastly, recommendations for meaningful cooperation among Canada's municipalities are given. *Major finding:* Canadian municipalities use intermunicipal contracting sparingly, especially when compared to the U.S.	• **Background** • **Background:** What has led to the Interest for ICSS (Canadian Context) • **ICSS in Ontario:** Barriers • **ICSS in Ontario:** Best Practises • **ICSS for Rural Communities:** Benefits
Arnold, B.A. (2015). Institutional collective action in Ontario's fire service: Conducive and inhibiting factors of local collaboration of fire safety inspections and enforcement. Unpublished master's thesis, The University of Western Ontario, London, Ontario. Retrieved from http://localgovernment.uwo.ca/resources/docs/research_papers/2015/Arnold,%20Brian%20-%202015.pdf	**This master's report focuses on the factors that encourage and hinder voluntary collaboration for fire prevention activities within Ontario's fire service.** *Methodology:* A cross-sectional study and analysis. Sources of data were: secondary data from the Municipal Fire Protection Profiles (MFPP)/Northern Fire Protection Profiles (NFPP) and Municipal Analysis and Retrieval System (MARS) databases; primary data from an online survey of fire chiefs; and qualitative case study interviews. The paper notes that while there exists some academic literature on voluntary collaborations amongst fire departments, literature is lacking regarding activities beyond emergency response, particularly fire prevention. A jurisdictional scan of collective action revealed three examples of alternative service delivery arrangements outside the traditional emergency response realm: shared fire inspector position for Middlesex County; a shared training officer in Wellington County; and the voluntary consolidation of Newmarket and Aurora fire departments into the Central York Fire services. *Findings:* Factors that promote voluntary fire	• **Background** • **Background:** What has led to the Interest for ICSS (Canadian Context) • **ICSS in Ontario:** Barriers • **ICSS in Ontario:** Best Practises • **ICSS for Rural Communities:** Benefits

	prevention collaborations include: close similarity between communities, strong relationships with a high degree of trust among fire chiefs, the recognition of the increased efficacy of fire prevention activities and possible cost avoidance; and a perception that CAOs and councils are receptive to working with their neighbouring municipalities. Barriers included: transaction costs associated with negotiating the rules to govern the agreement, fairly dividing the benefits, ensuring an equitable distribution of costs, and monitoring and enforcing the terms of the agreement. These are challenging to resolve, but not immovable barriers to overcome. Benefits of collaboration were generally perceived equally positive, no matter the education level. It was also seen to be true, primarily for full time fire departments, that if the workplace was unionized, firefighters would oppose collaboration. Fire chiefs also do not appear to feel threatened by the possibility of entering collaborative arrangements with out fire departments.	
Conteh, C. (2012). Public management in an age of complexity: regional economic development in Canada. *International Journal of Public Sector management, 25*(6), 464-472.	**This article focuses on analyzing the opportunities and challenges of public policy governance in industrialized democracies brought by the emergent global economic integration over the past two decades.** The implications of this transition suggests the need for horizontal collaboration and coordination between policy stakeholders – both domestic and international) as well as among agencies across various levels of government. *Methodology:* A content analysis of policy and program documents relating to regional economic development in Canada, as well as interviews of 15 public officials directly involved in policy administration. *Findings:* global economic integration is creating new opportunities and threats for nations. Additionally, there is the increasing significance of geographical proximity within domestic borders in the creation of dynamic knowledge clusters. The endogenous nature of dynamic clusters is more conducive to community-based adaptation with bottom-up approaches of policy governance. Thus, empowering municipalities and regional councils to identify and pursue new opportunities and confront the challenges of economic adaptation could further enhance transitions towards collaborative policy governance.	• **Background** • **Background:** What has led to the Interest for ICSS (Canadian Context) • **ICSS in Ontario:** Barriers • **ICSS for Rural Communities:** Benefits
Farmer, J. (2008). *The institutional collective action and special purpose governments: Special district formation and regional governance*. PhD thesis. Florida State University, Tallahassee, Florida.	**This thesis research focuses on regional special districts, arguing that they provide the voluntary mechanism needed to address regional needs while maintaining some measure of self-governance.** As such, the research discusses when and how local governments create these regional special districts, investigates barriers to institutional collective action, and provides a deeper understanding of how institutional creation can be an option when barriers to voluntary cooperation exist. Also important to note is that this	• **Background** • **Background:** Theory and Related Terms • **Background:** What has led to the Interest for ICSS (Canadian Context) • **ICSS in Ontario:** Barriers

	study focuses on fire, library, and hospital districts. Barriers listed involved transaction costs, economic costs, and political costs. Additionally, it was found that because rural governments may have similar needs that are similar with the needs of other rural governments, providing an opportunity for collaboration. Similarly, spending patterns and willingness to spend on certain services may be similar among communities that reside within neighbouring areas. The study concludes by listing some lessons learned: (1) A regional need must exist in order for multi-jurisdictional special districts to come forth; (2) Group size and geographic location played important roles in the formation of special districts; (3) Homogeneity plays a role – regarding community attributes, implications of community commonalities.	• **ICSS in Ontario:** Best Practises • **ICSS for Rural Communities:** Benefits
Feiock, R.C. (2007). Rational choice and regional governance. *Journal of Urban Affairs*, *29*(1), 47-63.	**This article focuses on the interests that motivate interlocal collaboration, arguing that voluntary agreements emerge from a political contracting process in which benefits outweigh the transaction costs of negotiating an agreement.** Motivations for cooperation were identified as being: collective benefits (economies of scale, positive externalities such as storm water management); and selective benefits (professional standing and employment opportunities of city managers are improved). Transaction costs (negotiating, monitoring, and enforcing agreements) in interlocal cooperation are also discussed. Notably, cooperative actions are expected to increase when benefits to potential collaborators are high and the transaction costs are low. To minimize these costs, the following is recommended: information on the preferences of all participants over possible outcomes and their resources must be common knowledge; all parties must be able to agree to a division of their mutual gains; there must be low costs associated with monitoring and enforcing the agreement; and bargaining agents must well represent the interests of their constituents. Additionally, in order for actors to cooperate, they need to be able to identify opportunities for mutual gain and have good information on who may be a good potential partner. The article also identifies geographic location as being one of the most important contextual factors, and political institutions are linked to the success of interlocal cooperation because they shape the available information and structure of incentives faced by government officials. The article finishes by stating that service cooperation provides mechanisms for exchange of commitments, resources, and trust that can reinforce cooperative norms.	• **Background** • **ICSS in Ontario:** Barriers • **ICSS for Rural Communities:** Benefits
Morton, L.W., Yu-Che, C., & Morse, R.S. (2008). Small town civic structure and interlocal collaboration for	**This article focuses on the mechanisms of civic structure and interlocal collaboration and their potential to solve issues of providing high-quality services in the face of declining resources and increasing needs –**	• **Background** • **ICSS in Ontario:** Barriers • **Background:** What has led to

public services. *City & Community, 7*(1), 45-60.	**particularly in small and rural towns.** Implications and their applications for community leaders, elected officials, and city department staff are offered. It was found that civic structure is positively and strongly associated with perceived quality of small town public services. However, although many rural municipalities have entered into service agreements with other local governments, this approach is not significantly associated with citizen ratings of overall service quality. Rather, citizens appear to prefer their local government directly providing services – notably, policing – rather than entering into interlocal agreements, suggesting that municipalities need to carefully assess which services are most appropriately shared between governments to achieve cost savings and that support a sense of community. This article is useful because it discusses interlocal collaboration within the context of small and rural municipalities, which is within the context of our current research.	the Interest for ICSS (Canadian Context) • **ICSS for Rural Communities:** Benefits • **ICSS for Rural Communities:** Challenges
Lackey, S.B., Freshwater, D., & Rupashinga, A. (2002). Factors influencing local cooperation in rural areas: evidence rom the Tennesse Valley. *Economic Development Quarterly, 16*(2), 138-154.	**This article focuses on the factors that influence local cooperation in rural areas, given how obvious the benefits of cooperation are.** *Methodology:* A literature, regression model and key informant interviews, using the Tennessee Valley as a case study. *Findings:* While there is considerable collaboration already occurring in the Tennessee Valley Authority region, factors such as lack of strong advocates for cooperative projects, suspicion of neighbouring communities, and differentials in available resources, impeded collaboration. However, financial inducements, opportunities for officials to interact, and the presence of a neutral facilitator, are supporting factors that can increase the amount of collaboration.	• **Background:** What has led to the Interest for ICSS (Canadian Context) • **ICSS in Ontario:** Barriers • **ICSS in Ontario:** Best Practises • **ICSS for Rural Communities:** Benefits • **ICSS for Rural Communities:** Challenges
Service Nova Scotia. (2006). Intermunicipal agreements best practises guide. In *Handbook on Intermunicipal Partnership and Cooperation for Municipal Government* (Section 2.3.1.). Retrieved from http://www.novascotia.ca/dma/pdf/mun-local-government-resource-handbook-2-3-1.pdf	**This book section focuses on the best practises within intermunicipal agreements.** The section includes discussion around trends in municipal service delivery and structures, dispute resolution, current thinking in market-driven economic development, and applications for e-government. Principles are also listed that should be followed for successful inter-municipal partnerships. This section is useful for information regarding best practises, and background information.	• **Background** • **ICSS in Ontario:** Best Practises
Ortiz-Guerrero, C.E. (2013). The new regionalism. Policy implications for rural regions. *Cuademos de Desarrollo Rural, 10*(70), 47-67.	**This article focuses on what new regionalism is, and how its features can be applied to rural territories and highlight implications of NR for the development of territorial development policies and strategies.** The article describes a definition they have adopted of "region" to be applied in their	• **Background:** What has Led to the Interest for ICSS • **Background:** Theory and Related Terms

	work. Rural regions are also described as being diverse, complex, multidimensional, and are typically characterized by having high production and servicing costs with a limited range of public and private services. Theoretical underpinnings of NR are discussed in addition to core characteristics, and its criticism. Then, implications of NR for rural regions are described (e.g. Promotion of collective action and social networks to enhance rural governance systems). The article concludes by saying that researchers and policy makers should consider the potential role NR can have in processes of development in rural regions.	• **ICSS for Rural Communities:** Benefits • **ICSS for Rural Communities:** Challenges
Transportation Research Board. (2008). *Potential impacts of climate change on U.S. transportation.* Retrieved from http://onlinepubs.trb.org/onlinepubs/sr/sr290.pdf	**This report focuses on the impacts of climate change for U.S. transportation infrastructure and operations.** Although it is written in an American context, certain elements can be applied for Canadian research. Under adaptation options to mitigate the transportation sectors contribution to GHG emissions, a small section on "New organization arrangements" is described, which mentions cross-jurisdictional cooperation and multistate emergency response agreements. Under the section, it was highlighted that current institutional arrangements for transportation planning and operations were not organized to address climate change and may not be adequate for the purpose, due to the fact that transportation infrastructure (e.g. railroads, trucking, etc.) are largely private enterprises with varying levels of federal participation. It is recommended that incentives incorporated in federal and state legislation should be considered as a means of addressing and mitigating the impacts of CC through regional and multistate efforts. The report uses the example that flood insurance rate maps (FIRMS) or their own maps could be used to identify geographic areas vulnerable to CC and craft policies for restricting transportation investments and limiting insurance in these locations. Other research needs and recommendations were identified (e.g. developing a mechanism for sharing best practises to address potential impacts of CC).	• **Background:** How it applies to asset management planning and infrastructure --- • **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets* • **CC, Infrastructure, and AMP:** Incorporating climate change within asset management • **Best Practices and Recommendations**
Breen, S.P., Minnes, S., & Vodden, K. (2015). *A regional approach to drinking water management: NL-BC comparative water systems study.* Retrieved from https://www.mun.ca/harriscentre/reports/arf/2013/Breen_Water_13_14_Final.pdf	**This report focuses on drinking water management, using the regional scale and implementing best practices related to regional development, regional resilience, new regionalism, water management, and sustainable infrastructure.** Two rural case study regions in Canada were used, where drinking water was highlighted as being a key issue. *Methodology:* A comparative case study approach to gather, synthesize, and compare data between two rural regions. A literature review was conducted, along with content analysis related to drinking water, and focus groups/key informant interviews. *Findings:* Common local challenges between the two regions	• **Background:** What has Led to the Interest for ICSS • **Background:** Theory and Related Terms • **Background:** How it applies to asset management planning and infrastructure • **ICSS for Rural Communities:** Benefits

	were: engineering issues; data management; infrastructure issues, and capacity issues, particularly human and financial. Perceptions surrounding drinking water and health, chlorinated water, use of untreated water sources (e.g. roadside springs), and lack of strategic coordination between local and provincial level actors were also identified. *Conclusions:* There is a need for flexibility, consideration of place, and mechanisms for adaptive governance. Additionally, there is a need for future research into making more succinct and encompassing guidebooks on how regional approaches can assist in place specific drinking water management; priority must be placed on bottom-up regional development.	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; *Rural infrastructure challenges* • **Best Practices and Recommendations**
Municipal Capacity Development Program. (2013). *Interconnections: Sustaining Saskatchewan's future.* Retrieved from http://municipalcapacity.ca/+pub/document/interconnections-newsletter/Interconnections%20January%2031-13.pdf	**This newsletter focuses on providing information on succession planning, transitioning from informal to formal regional planning and regional cooperation within a Saskatchewan context.** The article makes some good connections between the need for sound asset and infrastructure management due to development growth in municipalities and how regional cooperation can be useful in that regard. This information can be connected to how climate change will also be impacting infrastructure, thus requiring the advantages of regional cooperation. One of the resources the article points out that municipalities can share are human resources, and notes that especially in rural communities, this can be useful to battle staffing shortages and capacity issues.	• **Background:** How it applies to asset management planning and infrastructure • **ICSS for Rural Communities:** Benefits
Caruson, K., & MacManus, S.A. (2008). Disaster vulnerabilities: how strong a push toward regionalism and intergovernmental cooperation? *The American Review of Public Administration, 38*(3), 286-306.	**This article aims to provide a better understanding of the conditions and incentives that prompt localities to invest in regionalism, using Florida as a case study.** *Methodology:* survey questions to evaluate the relationship between six categories of local vulnerabilities (financial, infrastructural, population attributes, housing conditions, contamination targets, and geography). *Findings:* Some vulnerabilities are more closely tied to appraisals of regionalisms' effectiveness such as those involving population attributes and physical infrastructure. When the amount of vulnerabilities increase, regions are more likely to report that regionalism is an effective approach to encourage greater intergovernmental cooperation and better disaster preparedness. This article is useful as evidence to demonstrate the place regionalism has in emergency management, especially in the sense that hazards do not generally confine themselves to jurisdictional boundaries.	• **Background:** How it applies to asset management planning and infrastructure • **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets*
KPMG. (2013). *Sharing municipal services in Ontario: case studies and implications for Ontario*	**This report focuses on shared service arrangements in Ontario, highlighting benefits, risks and processes used by other municipalities to be successful in collaborative service delivery to residents.** *Methodology:*	• **Background** • **Background:** What has led to the Interest for ICSS

municipalities. Retrieved from http://www.carlingtownship.ca/media/Shared_service_case_studies.pdf	Municipal case studies and an analysis of available information. *Concluding Considerations (smaller communities):* Shared services arrangements (SSA) can allow smaller communities to deliver services attain service levels or realize cost savings that may not otherwise be possible. Look first to neighbours for potential opportunities and/or consider larger municipalities for enhancing capacity and capabilities. A common concern is the view that shared service arrangements is the first (or last) step towards amalgamation; however, numerous smaller communities have been successful at maintaining their independence while partnering with other municipalities. Municipalities should be prepared to address concerns over decreased levels of customer service (e.g. implement formal agreements) or perception that costs will increase etc. (e.g. provide regular reporting to councils on outcomes, benefits and costs of SSA). Certain services may not be favourable to sharing due to geographical location; yet, most types of municipal services are already included in some form of sharing arrangement somewhere in the Province.	• **Background:** How it applies to asset management planning and infrastructure • **ICSS in Ontario:** Barriers
Towns Task Force. (2014). *Regional service delivery cost sharing guide.* Retrieved from _____.	**This file focuses on considerations and best practises for entering into a shared service agreement between two or more municipal units.** A workflow diagram is provided to guide the reader through the process, providing brief overviews and also linking to additional resources. A cost sharing excel template is also provided, to assist with the financial aspects of sharing municipal services. The document lists the advantages of sharing municipal services (i.e. potential to increase cost effectiveness and improve/maintain service delivery standards). As the tool is within the context of Nova Scotia, types of services in the province are also described. The file lists some of the differing complexities of shared service agreements (i.e. easily shared, potentially shared, to complex shared services) as well as examples for each. Types of agreements are shared (i.e. handshake arrangements to joint arrangements) and examples of each. Then, key elements of shared service arrangements are listed in addition to listing a resource for best practises (*Best Practises Guide to Inter-Municipal Agreements*, Service Nova Scotia and Municipal Relations (2006)). Lastly, spillover benefits, principles of cost sharing, cost sharing alternatives are described. This resource is beneficial to provide further background information, as well as to identify further sources to be of us in this environmental scan.	• **Background** • **Background:** What has led to the Interest for ICSS • **ICSS in Ontario:** Best Practises • **ICSS for Rural Communities:** Benefits
Municipal Finance Officers' Association of Ontario (2014b). *Shared Services in Ontario's Local Public Sector:*	**This guide aims to first raise awareness about service sharing principles, practices, governance structures and agreements in the context of Ontario's local public sector. Secondly, it aims to promote the growth of**	• **Background** • **Background:** What has led to the Interest for ICSS

Localizing Accountability. Retrieved from http://www.perthcounty.ca/fileBin/library/general/pdfs/2014-03-20_Perth_Service_Delivery-AppC.pdf	**service sharing by assembling practical resources to help municipalities share services more effectively.** The guide provides background information on shared services, how to use them, and lists general best practises for developing a shared service arrangement. Common objections to service sharing are also listed, with suggested responses on how to overcome some of the challenges. Notably, this guide states that isolated communities (i.e. rural) can share internal functions (e.g. information technology), staff, information services, landfill and economic development services.	• **Background:** How it applies to asset management planning and infrastructure • **ICSS in Ontario:** Best Practises • **ICSS for Rural Communities:** Benefits • **ICSS for Rural Communities:** Challenges
Municipal Capacity Development Program. (2015). A guide to municipal cooperation: succeeding in regional partnerships. Retrieved from http://municipalcapacity.ca/municipal- resources/guides 67.	**This guide aims to provide information, resources, and tools to municipalities in order to begin to continue effective working relationships with other municipalities.** The guide lists benefits, potential opportunities, potential barriers, and methods to overcome those barriers regarding municipal cooperation. The guide also describes some characteristics that assist in determining initial municipal stakeholders that benefit, influence or be affected by the process (e.g. geographical location, social, etc.). Recommendations for success are listed (e.g. start simple), and recommend written agreements to clearly state the responsibilities of and arrangements between stakeholders. "Building Sustainable Communities in Saskatchewan" is described as a case study, and the guide finally lists questions as examples to gauge inter-municipal cooperation in the appendices.	• **Background** • **Background:** How it applies to asset management planning and infrastructure • **ICSS in Ontario:** Barriers • **ICSS in Ontario:** Best Practises
Bel, G., & Warner, M.E. (2015a). Inter-municipal cooperation and costs: expectations and evidence. *Public Administration, 93*(1), 52-67.	**This article focuses on cost savings involved with inter-municipal cooperation.** The article mentions that rural areas may be more reluctant to choose privatization of service delivery because transaction costs do not compensate potential efficiency gains on a small scale. This statement may strengthen the argument for inter-municipal cooperation in rural municipalities. The article discusses some of the origins of sharing services amongst municipalities and that it is particularly intense in small communities. However, systematic evidence on the relationship between inter-municipal cooperation and costs is contradictory and scarce. The article lists some of the benefits to address externalities as well as some of the risks involved, especially when there are differences in demographic makeup, geographic location, and ideology of participating communities. The article concludes with some best practises, such as thorough study design, ongoing monitoring, background research, and having the available expertise.	• **Background** • **Background:** How it applies to asset management planning and infrastructure • **ICSS in Ontario:** Best Practises • **ICSS for Rural Communities:** Challenges
Corradini, F., Polzonetti, A., & Riganelli, O. (2009). Shared services for supporting online public service	**This article focuses on the utilization of a shared services environment to support rural authorities to deliver digital public services.** The paper discusses background and motivations behind this approach; a proposed	• **Background** • **ICSS for Rural Communities:** Challenges

delivery in rural areas. *International Journal of Electronic Democracy, 1*(2), 188-202.	shared services center architecture, as well as a business process design for the proposed Shared Services Environment. Although the article discusses shared services within a business/enterprise context, the information provided can be useful for reasoning why rural areas, generally, need shared services.	• **ICSS for Rural Communities:** Benefits
Spicer, Z. (2014). *IMFG perspectives: Linking Regions, Linking Functions.* Retrieved from http://munkschool.utoronto.ca/imfg/uploads/302/1604_no_10_interlocal_final_web.pdf	**This report provides reasoning for forming inter-municipal agreements, describes the different forms these agreements take, as well as discusses the findings of a 2012 survey of Ontario municipalities that examined the nature of shared services arrangements.** Most Ontario municipalities share some services; however, those that do not, tend to be small, rural municipalities that are far from neighbouring communities. Many small rural municipalities are unable to find qualified persons for certain positions, which is one example of how shared services (i.e. sharing municipal official positions) can be of benefit in these communities. It was also found that consistency is lacking across Ontario regions regarding the use of shared service arrangements. Challenges to successful implementation were listed (e.g. turnover in council). The report also mentions some of the limitations of the survey (e.g. data is limited) and subsequently suggests that future work should aim to examine the nature of policy networks municipalities are forming (e.g. with whom are they choosing to partner with). It remains inconclusive whether sharing services saves municipalities money, despite this reason being cited as a factor in why municipalities do cooperate. As such, a clearer understanding of the financial benefits is necessary before entering service agreements; without it, many are opting against cooperation.	• **Background** • **Background:** What has led to the Interest for ICSS • **Background:** Theory and Related Terms • **ICSS for Rural Communities:** Challenges • **ICSS for Rural Communities:** Benefits
Kitchen, H., & Slack, E. (2001). *Providing public services in remote areas.* Retrieved from http://www1.worldbank.org/publicsector/decentralization/March2004Course/Kitchen.pdf	**This paper focuses on a review of the provision of public services in remote areas.** The first section of the paper discusses the characteristics of remote areas (e.g. geographic location and low population density) and brings attention to some of the challenges that local government face. A review of local government expenditures is then reviewed, and how characteristics of these areas may affect the nature and magnitude of expenditures. Subsequently, revenue sources are examined and how size and remoteness of communities may affect them. Lastly, an evaluation of alternative government structures are presented that may be used in remote communities (two-tier, one-tier, inter-municipal agreements, special purpose districts) and the part that senior levels of government play.	• **ICSS for Rural Communities:** Background • **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; *Rural infrastructure challenges*
Lauzon, A., Ragetlie, N., Caldwell, W., & Douglas, D. (2015). Provincial Summaries - Ontario. In M. Breen, G. Lauzon, & M. Ryser (Eds.), *State*	**The focus of this chapter is on the state of rural Ontario.** The chapter outlines some changes and continuities of the rural Ontario population and discusses the aboriginal population, as well as economic opportunities and challenges that rural Ontario faces. Lastly the chapter considers what the	• **ICSS for Rural Communities:** Background

of rural Canada 2015 (pp. 39-44). Brandon: Canadian Rural Revitalization Foundation.	future will hold for rural and remote Ontario. Although the future of rural/remote Ontario is uncertain, creativity and innovation is necessary as well as an increased emphasis on diversifying the rural Ontario economy at both regional and local levels.	• **CC, Infrastructure, and AMP:** Defining infrastructure and its importance; *Rural infrastructure challenges*
Dudas, A.M., Haney, P.J., Morris, M.H., & Russo Jr., P.A. (2009). *Does collaboration beget collaboration?: From cooperation to co-production in township government.* Retrieved from http://localgovinstitute.org/sites/default/files/Does%20Collaboration%20Beget%20Collaboration%20-%20Cooperation%20to%20Co-Production%20in%20Michigan%20Township%20Government.pdf	**This report focuses on a study researching collaborative efforts in Ohio.** The questions asked were: What types of collaboration are going on at the township level especially in rural areas? What factors led township officials to collaborate? And, does the experience of collaboration predispose officials towards additional collaboration? A survey was done using data collected from a survey of elected town officials. The study finished with the following conclusions: there are already significant levels of collaboration taking place across townships of Ohio; collaboration is not a simple concept that should be narrowly defined in the context of informal and formal relationships; and, collaboration moves through a progression that may ultimately lead to co-production. It is recommended that financial incentives be provided to encourage collaboration, informational and educational programs be developed for local officials considering collaboration, and to develop more legal incentives to encourage public/private partnerships. The study also makes a note that a challenge for more rural townships, is that collaborative partners can be sometimes hard to find.	• **Background** • **ICSS in Ontario:** Best Practises • **ICSS for Rural Communities:** Challenges • **ICSS for Rural Communities:** Benefits
Lintz, G. (2016). A conceptual framework for analysing inter-municipal cooperation on the environment. *Regional Studies, 50*(6), 956-970.	**This article presents a conceptual framework for analyzing factors that influence cooperation – explicitly considering the aspects of knowledge, values and power.** The article discusses how different types of environmental problems (local, regional, and global), depending on institutional regulation, are associated with different incentives for different actors in the municipalities influencing the likelihood and kind of inter-municipal cooperation. This idea strengthens a commonly cited phrase: there is no one-size-fits-all approach, especially where neither climate change impacts nor local governments are homogeneous. The author also highlights that while a lot of research has been done on cooperation between neighbouring communities and on environmental policy making/planning at the level of the single city/town, far less research has been done on this cooperation within an environmental context.	• **Background** • **Background:** How it applies to asset management planning and infrastructure • **ICSS for Rural Communities:** Challenges • **ICSS for Rural Communities:** Benefits
Hefetz, A., Warner, M.E., & Vigoda-Gadot, E. (2012). Privatization and intermunicipal contracting: the US	**This article focuses on comparing intermunicipal contracting and privatisation as solutions for public service delivery at the municipal level in the US over the period 1992-2007.** In their conclusion, the authors state	• **Background:** What has led to the Interest for ICSS • **Background:** Theory and

local government experience 1992-2007. *Environment and Planning C: Government and Policy*, *30*(4), 675-692.	that while both solutions represent an alternative to consolidated regional government, they have different benefits when it comes to efficiency, equity, and citizen voice. Intermunicipal cooperation is used in municipalities who give more attention to citizen voice, notably in 1997 and 2997. Intermunicipal contracting also appeared to be income neutral, yet favoured by municipalities with higher poverty – suggesting some positive equity effects with cooperation. Privatization was seen to be favoured in richer communities. However, although intermunicipal contracting is income neutral and favoured by smaller rural and poorer communities, the authors note that it may not be sufficient to resolve coordination problems at either the technical or political level.	Related Terms • **ICSS for Rural Communities:** Challenges • **ICSS for Rural Communities:** Benefits
Kolsut, B. (2016). Inter-municipal cooperation in waste management: The case of Poland. *Quasestiones Geographicae, 35*(2), 91-104.	**This paper focuses on presenting the scale of intermunicipal cooperation in waste management in Poland.** Geographical differences in social and economic phenomena are analyzed, in addition to the concept of Europeanization and theories of economies of scale in the cost of public services. The analysis conducted in this paper does not confirm that economic factors such as economies of scale play a role in implementing inter-municipal waste-management bodies in Poland. Additionally, it was shown that small and poorer municipalities do no cooperate more than medium-sized and large municipalities. Therefore, the authors conclude by saying that it is hard to suggest savings-oriented economic motivation is a basic motivation for intermunicipal cooperation. It should also be noted that cooperation in municipalities was mostly due to changes in the institutional system due to a lack of specified, measurable effects in waste management.	• **Background** • **Background:** How it applies to asset management planning and infrastructure
Rayle, L., & Zegras, C.P. (2013). The emergence of inter-municipal collaboration: Evidence from metropolitan planning in Portugal. *European Planning Studies*, *21*(6), 867-889.	**This article focuses on inter-municipal collaboration around the issues of land-use and mobility in Portugal, aiming to identify the factors and conditions that contribute to the emergence of collaborative relationships.** *Methodology:* 31 individuals were interviewed that represented 21 different organizations including central government agencies, city councils, transport operators, and municipal development entities. It is found that collaboration is facilitated by a combination of positive incentives, flexibility and ambiguity in the institutional system, an external catalyst, existing inter-organizational networks, and specific organizational characteristics – the existence of any one of the these factors is not sufficient. A theoretical framework of intermunicipal collaboration is presented, an overview of the empirical context is provided, and a case study is described and analyzed. Policy implications and directions for future research are discussed. Firstly, the authors conclude by saying that collaboration around transportation and land	• **Background** • **Background:** What has led to the Interest for ICSS • **Background:** Theory and Related Terms • **Background:** How it applies to asset management planning and infrastructure • **ICSS in Ontario:** Barriers • **ICSS for Rural Communities:** Benefits

	use will likely require intervention by higher levels of government to incentivize action. Secondly, at least in Portugal, intermunicipal collaboration will likely be led more by the mobility sector than land-use planning sector. However, advances in one could potentially encourage progress in the other. Comparative studies with other contexts are needed to draw more generalizable conclusions about collaboration. Another question exists that was not covered by this article: does collaboration lead to "better" projects?	
McLean, C., Paget, G., & Wallisser, B. (2006). *Local governance in British Columbia: Local government excellence through collaborative partnerships.* Retrieved from http://www.cscd.gov.bc.ca/lgd/intergov_relations/library/wuf_bc_guide.pdf	**This document focuses on British Columbia's unique system of local governance, which emphasizes accountability, collaboration of local governments, and fiscal independence.** The framework for this local government system recognizes the strength of municipal governments to meet local needs, and that collaborative institutions provide support in areas where local governments can achieve more by acting jointly rather than independently. According to this document, British Columbia's journey of reform towards a system of local government is the most empowering for local governments in Canada. As such, best practices can be learned to inform our research. Key elements are: responsibility, financial independence (ensuring adequate resources exist to meet demands), democratic decision-making, and intergovernmental collaboration (creating capacity for voluntary partnerships).	• **Background** • **Background:** What has led to the Interest for ICSS • **ICSS in Ontario:** Best Practices
Roche, S., & Humeau, J. (1999). GIS development and planning collaboration: A few examples from France. *URISA Journal, 11*(1), 5-14.	**This article focuses on how multi-partner GIS projects can promote inter-municipal cooperation and assist smaller municipalities in handling greater devolved responsibility at a local level.** Although it is an older article, information is provided that continues to be relevant to current research and raises the question: *why are we still promoting inter-municipal cooperation in small municipalities when we already know the benefits, 18 years later?* Similar to more recent literature, this article discusses how pooling financial and human resources through inter-municipal collaboration is beneficial to small municipalities, especially those who want to invest in geomatics. The authors claim that GIS projects in this manner is an opportunity to not only enhance and extend cooperation within an existing inter-municipal structure, but it can also create new structures through the commonality of the project. The article includes several case studies in a French context. One in particular, the "Pays Yonnais", demonstrates that even the most poorest and unpopulated rural areas can participate in a GIS project, with the help of institutional and existing inter-municipal structures. This was a pilot project for rural areas, with an inter-municipal structure of 15 small rural municipalities. This article can help relate GIS and telecommunications	• **Background** • **Background:** What has led to the Interest for ICSS • **Background:** How it applies to asset management planning and infrastructure • **ICSS for Rural Communities**: Background • **ICSS for Rural Communities:** Challenges • **ICSS for Rural Communities:** Benefits

	to infrastructure and how important geomatics are to resiliency.	
Pagliacci, F., Righi, S., Russo, M., Casoni, M., Farinosi, M., Garzillo, C., Guggenheim, M., Lauriola, P., Oppi, B., Pedrazzi, S., Petersen, K., & Villani, M. (2016). *Enhancing the resilience of social infrastructures: issues on agents, artefacts and processes. Proceedings of the 2016 Modena workshop.* Retrieved from http://155.185.68.2/campusone/web_dep/CappPaper/Capp_p147.pdf	**This report focuses on enhancing the resilience of social infrastructures: health services, social services, government, and communication infrastructure.** The paper discusses theoretical perspectives on resilience, case studies, and real experiences on the actions of local government and the role of risk communication. Although the paper does not focus explicitly on inter-municipal service sharing or asset management planning, a key piece of information is shared that may be important for an argument in support for ICSS in rural/remote communities. "Among possible innovations, ICT currently represents the most important one in reshaping and enhancing inter-municipal and inter-service cooperation in order to improve the delivery of services…" (p. 6). As the papers note, this is especially applicable for small municipalities and for wide rural areas. The article also shares useful information regarding the concept of resilience and how better use of ICTs would increase it during natural disasters.	• **Background:** How it applies to asset management planning and infrastructure • **ICSS for Rural Communities**: Background • **ICSS for Rural Communities:** Benefits
Dollery, B., Kortt, M., & Drew, J. (2016). Fostering shared services in local government: A common service model. *Australasian Journal of Regional Studies, 22*(2), 225-243.	**This article focuses on developing a common service model to allow regional, rural and remote local authorities the ability to meet their specific requirements found in Australian local government.** It is argued that voluntary shared service arrangements represent a superior means of securing the benefits of scale and scope in local government. According to the authors, this common service model allows voluntarily participating local authorities to receive the benefits of scale and scope, thereby securing administrative, managerial and technical skills otherwise not available to these rural and remote local authorities.	• **Background** • **ICSS in Ontario:** Best Practices • **ICSS for Rural Communities:** Challenges
Arriola, S.C.J.L., Pangan, A.G., & Romano, H.L. (2015). Inter-local collaboration: A new approach toward the implementation of the Integrated Coastal management (ICM) program of Batangas, Philippines. *Politikon, 27*(1), 149-176.	**This article focuses on inter-local collaboration of Batangas City and 14 coastal communities of Batangas province, following the implementation of the Integrated Coastal Management program.** This collaboration allowed the province to meet their objectives to properly manage, conserve, protect, rehabilitate, and develop its coasts and resources. Although it was found to be successful, several critical factors were not met: mandatory review of binding legal instruments; active involvement of local chief executives; and the monetary contributions of members, timely collection of committed funds, and transparency of financial transitions. The authors suggest future research examining inter-local collaboration toward the implementation of a particular project/program would be beneficial in providing a deeper understanding on the significance of inter-local collaboration as an approach to governance.	• **Background** • **Background:** Theory and Related Terms • **ICSS in Ontario:** Best Practices

Schlecht, S. (2016). *Inter-municipal collaboration on climate change adaptation – the case of Aalborg municipality*. Published Masters thesis, Aalborg University, Aalborg, Denmark.	**This thesis focuses on collaboration on climate change adaptation between neighbouring rural municipalities, using Aalborg municipality as a case study and builds off institutional theory on the premise that institutions determine municipal planning.** As found by this thesis, no active collaboration exists between Aalborg Municipality and other municipalities. In framing the issue, Schlecht discusses how climate change impacts are experienced locally and occur across municipal borders. Since climate change adaption is related to several sectors in a municipality, the opportunity arises for municipalities to collaborate not only within itself, but also amongst neighbouring communities. Additionally, this thesis suggests that inter-municipal collaboration could be a normative driver for the implementation of climate change adaptation. This thesis has use for our research because it focuses on inter-municipal collaboration, specifically within a climate change adaptation context. It has the potential to assist in structuring a research paper, framing the issue, and developing a conceptual framework.	• **Background** • **Background:** What has led to the Interest for ICSS • **Background:** Theory and Related Terms • **Background:** How it applies to asset management planning and infrastructure • **ICSS in Ontario:** Best Practices --- • **CC, Infrastructure, and AMP:** Climate change in municipalities; *How climate change will affect infrastructure assets*

Background Document – A Summarization of Key Themes
Enhancing Ontario's Rural Infrastructure Preparedness: Inter-Community Service Sharing in a Changing Climate

MUNICIPAL ASSET MANAGEMENT PLANNING (AMP):

According to the Ministry of Infrastructure Ontario (2012), asset management planning is "the process of making the best possible decisions regarding the building, operating, maintaining, renewing, replacing and disposing of infrastructure assets." Infrastructure assets, as defined by New Zealand Asset Management Support (NAMS) (2008), are stationary systems (or networks) that serve communities where the whole system is intended to be maintained indefinitely to a specified level of service by continually replacing and renovating its components. These infrastructure assets can include: roads and bridges; wastewater systems; landfills; buildings; culverts; etc. (Saskatchewan Municipal Asset Management, 2008). Primarily, the objective of asset management planning is to manage risk, maximize benefits, and offer satisfactory levels of services in a sustainable manner to the public. It is important to understand infrastructure conditions and characteristics, in addition to the services they aim to provide. The development of a financial plan is required for its implementation (Ministry of Infrastructure Ontario, 2012).

Table ___. Key components of infrastructure asset management (Saskatchewan Municipal Asset Management, 2008):

Life cycle approach	Full life cycle costs of infrastructure assets are considered (capital costs, operating and maintenance, rehabilitation, disposal, etc.)
Cost-effective management strategies	There is a plan for conducting maintenance, rehabilitation, and renewal of infrastructure at the right time to minimize ongoing costs (proactive vs. reactive management).
Defined level of service	The current level of service is defined, and possibly the optimal level of service, that is or should be provided to the community. Indications of how infrastructure performance is or will be measured should be included.
Demand management	Anticipated future changes within the municipality are recognized, including how these may affect the provided services (i.e. population changes, demographic changes, regulation changes, etc.)
Risk management	A plan exists for managing risks associated with providing services, including those that can result from infrastructure failure.
Sustainable use of physical resources	A plan exists for how to ensure services are provided into the future in a sustainable and affordable way.
Continuous improvement	It is understood that asset management is constantly changing and all plans are kept current and accurate to support effective decision-making. Their review and improvement are ongoing.

In a guide for municipal asset management plans provided by the Ministry of Infrastructure Ontario (2012), an asset management plan should have the following sections:

Executive summary

A clear overview of the plan.

Introduction

Explains how the goals of the municipality depend on infrastructure (e.g. improve quality of life). Clarifies the relationship of the AMP to municipal planning and financial documents (e.g. how the plan impacts the budget). Describes to the public the purpose of the AMP (i.e. providing levels of service that meet the municipality's goals). States which infrastructure assets are included in the plan (i.e. roads, bridges, water and waste water systems, and social housing). Identifies how many years the AMP covers and when it will be covered (Min. 10 years and updated regularly). Describes how the AMP was developed (who was involved, what resources used, any limitations). Identifies how the plan will be evaluated and improved through clearly defined actions (actions should be short-term – less than three years).

State of Local Infrastructure

Summarizes in one or more tables:

Asset types	Urban arterial road, rural arterial road, watermains) and quantity/extent (e.g. length in km for linear assets)
Financial accounting valuation and replacement cost valuation	Uses historical costs and depreciation assumptions Accounts for expected inflation, changes in technology and other factors
Asset age distribution and asset age as a proportion of expected useful life	
Asset condition	Proportion in "good", "fair", and "poor" condition Assessed using standard engineering practices E.g. for bridges, based on an analysis of bridge inspection reports

And how/when information regarding characteristics, value, and condition of assets will be updated.

Expected Levels of Service

Defines levels of service through performance measures, targets and timeframes to achieve targets if they are not already being achieved. Discusses any external trends or issues that may affect expected levels of service or the municipality's ability to meet them (e.g. climate change impacts). Shows current performance relative to the targets set out.

Asset Management Strategy

Summarizes:

- Non-infrastructure solutions – actions or policies that can lower costs or extend asset life (e.g. better integrated infrastructure planning and land-use planning, demand management, insurance, process optimization, managed failures, etc.
- Maintenance activities – including regularly scheduled inspection and maintenance, or more significant repair and activities associated with unexpected events
- Renewal/rehabilitation activities – significant repairs designed to extend the life of the asset. E.g. lining of iron watermains can defer the need for replacement
- Replacement activities – activities that are expected to occur once an asset has reached the end of its useful life and renewal/rehabilitation is not longer an option
- Disposal activities – the activities associated with disposing of an asset once it has reached the end of its useful life, or is otherwise no longer needed by the municipality
- Expansion activities (if necessary) – planned activities required to extend services to previously un-serviced areas – or expand services to meet growth demands

Discusses procurement methods. Best practice is to work with other municipalities to pool projects and resources, or considering an AFP model, which takes a lifecycle perspective and builds effective asset management directly into the contract.

Includes an overview of risks associated with the strategy (i.e. how the plan could fail to generate the expected service levels) and any actions that will be taken in response.

Financing Strategy

Shows yearly expenditure forecasts broken down by: non-infrastructure solutions; maintenance activities; renewal/rehabilitation activities; replacement activities; disposal activities; and expansion activities (if necessary).

Provides actual expenditures for these categories from the previous two to three years for comparison purposes

Gives a breakdown of yearly revenues by confirmed source (i.e. loans and senior government grants should not be included unless an agreement has been executed).

Discusses key assumptions and alternative scenarios where appropriate.

Identifies any funding shortfall relative to financial requirements that cannot be eliminated by revising service levels, asset management and/or financing strategies, and discuses the impact of the shortfall and how the impact will be managed.

Why it is important:
Asset management becomes important to municipalities because local government owns most assets. And, many of these assets are old and have been underinvested in – also known as the infrastructure deficit. The infrastructure deficit is one of the largest problems we have faced and continue to face, whereby there is a gap in what is needed and what is available to meet necessitated maintenance, to bring existing infrastructure to adequate levels, or to replace existing infrastructure (Mirza & Haider, 2003; Federation of Canadian Municipalities, 2012). For example, Ontario municipalities have an estimated $60 billion infrastructure deficit – half of which is accounted for by road and bridge assets (ROMA, 2015). There is no single cause. Rather, different combinations and interrelationships influence the infrastructure deficit, including: infrastructure age, institutional restructuring and policy change, financial issues, contextual changes – and most notably - a lack of planning and asset management (Federation of Canadian Municipalities, 2012).

Asset management is beneficial because it helps municipalities establish practices that are able to maintain and operate infrastructure assets in the most effective way in order to provide critical services to the community (Saskatchewan Municipal Asset Management, 2008; Federation of Canadian Municipalities, 2012; Ministry of Infrastructure, 2012). It is the foundation of a municipal infrastructure strategy, it prioritizes needs over wants, it ensures investments are made at the right time to minimize future costs, and it is a prerequisite for future provincial capital funding (Cowin, 2013). Essentially, effective asset management reduces infrastructure risks (Minnes & Vodden, 2014).

Benefits of Effective Asset Management:

- Can maximize the benefits provided by infrastructure (Ministry of Infrastructure Ontario, 2012)
- Affords the opportunity to achieve cost savings by identifying deterioration early on and taking action to rehabilitate or renew the asset (Ministry of Infrastructure Ontario, 2012)
- Informs strategically sound decisions that optimize investments, better manage risk, and take into account the potential impact of other factors such as climate change (Federation of Canadian Municipalities, 2012; Ministry of Infrastructure Ontario, 2012)

Ontario Asset Management Planning
According to the Ministry of Infrastructure Ontario (2012), fewer than 40% of Ontario municipalities had long-term asset management plans in development for their capital assets and ~68% of rural Ontario municipalities did not have an asset management plan in place (Cowin, 2013). However, progress has been made. Following the Ontario government's Municipal Infrastructure Strategy in 2012, municipalities are now required to include asset management plans within infrastructure funding programs (Ministry of Rural Affairs, 2014; Government of Ontario, 2016). An online asset management toolkit called *Building Together: Guide for Municipal Asset Management Plans* was also provided in addition to $12 million in funding in 2012/2013 to assist smaller municipalities develop their plans. In the 2013 Ontario budget, a $100 million *Small, Rural and Northern Municipal Infrastructure Fund* was also included to

support capital and asset management investments in critical infrastructure (Ministry of Rural Affairs, 2014). Compared to the less than 40% of municipalities that had developed asset management plans, as of August 2016, 95% of Ontario municipalities now do (Ministry of Rural Affairs, 2014; El-Dirably, Kinawy, Piryonesi, 2016; Government of Ontario, 2016).

Despite this improvement, El-Dirably et al. (2016) claim that knowledge about asset management is still not substantial enough in Ontario. In their review of approaches used by Ontarian municipalities to develop road asset management plans, the authors' found that a lack of sufficiently trained human resources was the biggest challenge to successful asset management in Ontario. Adequately describing municipal assets was also seen as needing improvement – there was limited assessment of overall infrastructure deterioration of each asset. It should be noted that a sample of 24 municipalities out of a total of over 440 municipalities in Ontario was used. The authors recognized that the sample size might not be completely representative (El-Dirably et al., 2016). El-Dirably et al. (2016) recommend that the provincial government should develop interoperable data standards and common information exchange systems to support effective infrastructure data collection and easier communication. This will pool resources; create a common language; enable comparative analysis and synthesis of infrastructure systems.

Recently, the Federation of Canadian Municipalities has announced a new municipal asset management program to be implemented in Spring 2017, which is funded by the Government of Canada (Federation of Canadian Municipalities, 2017). The Municipal Asset Management Program (MAMP) is a $50-million, five-year program to support Canadian cities and communities to make better-informed decisions regarding infrastructure (e.g. planning and construction of roads). The program is in partnership with municipal, provincial and territorial associations and other key stakeholders that support strengthened municipal asset management practices and is expected to reach approximately 1,000 municipalities across the country in the next five years. According to the Federation of Canadian Municipalities (2017), the program offers: training and workshops on best practices (tailored to the needs of participating municipalities); funding to assist with municipal planning, data management and analysis; and knowledge sharing, by gathering and distributing relevant lessons learned and best practices learned from other Canadian cities' and communities' experiences.

Connecting infrastructure to resilience:
Infrastructure is inherently important to our society, which has been recognized across all types of literature. Within an economic sense, the quality and quantity of infrastructure drives productivity, prosperity, and growth (Breen, 2015). For instance, infrastructure systems such as drinking water pipelines or transportation are necessary for economics to grow and be competitive. Infrastructure allows for the exchange of information, knowledge, and innovation, and creates jobs – all key components of economy. However, infrastructure is associated with high operating costs, lost economic potential, the possibility of rising costs in the future, lost time, and other forgone economic activities (Breen, 2015). Therefore, up-to-date, adequate, and efficient infrastructure is fundamental for the functioning of a modern economy.

Infrastructure also has ties to the quality of life, contributing to citizens' health, safety, security, and well being (e.g. roads, sewers, water supply, telecommunication and transit systems etc.) (Mirza & Haider, 2003; Breen, 2015). Poor design, investment, and maintenance can have severe negative impacts on the surrounding environment, and potential threats to the economy, public health and safety.

With this information, it is evident that infrastructure is connected to the term resilience. A loss of infrastructure means a loss of services for which infrastructure is relied upon, which in turn deters the use of other community strengths that encourage resilience. Infrastructure can also increase resilience (Breen, 2015). It can act as a strategy or tool to reduce environmental impacts, assist in mitigation and adaptation, and can facilitate sustainability.

Asset management and climate change

Critical infrastructure in Canada refers to "processes, systems, facilities, technologies, networks, assets and services essential to the health, safety, security or economic well being of Canadians and the effective functioning of the government." (Public Safety Canada, 2009, p.2). In the face of a changing climate and environmental conditions, and the political and scientific uncertainties that come with it, critical infrastructure is and will become exceedingly vulnerable (Rayner, 2010; Canadian Climate Forum, 2015). Infrastructure assets can be directly impacted by floods, severe storms, and droughts, or can be indirectly affected through lower asset returns and weaker growth (The Economist Intelligence Unit, 2015). Since the asset management planning process involves understanding and managing risk, and climate change is a significant risk, the two become very much related.

Climate-related impacts on infrastructure (Canadian Council of Professional Engineers, 2008; U.S. Department of Transportation Federal Highway Administration, 2009; Boyle, Cunninham, & Dekens, 2013)

Infrastructure impacted	**CC Hazard Vulnerability**	**Service Interrupted**
Public Works		
Dams	Flood, ice jam, drought	Water management, potable water (long-term supply and availability of water)
Reservoirs, potable water intake and delivery structures	Drought (low water levels), heat waves, flood, ice jam, intense cold, algae blooms, intense rain	Drinking water quality/quantity, industrial water supply
Sanitary and storm water systems	Intense rain events, wind, increase in temperatures, drought, flooding, permafrost	Sewage management, water drainage
Land transportation: Bridges, roads (e.g. pavement), railways, airports, and sidewalks	Freeze-thaw cycles, permafrost degradation, ice accretion, wind, heat wave, flood, winter storm, increased soil moisture, ground water, fog, extreme temperature range, hail	Transportation
Emergency management		
Fire, emergency medical services, police, search &	All extreme weather events.	Could impact multiple services

rescue, emergency social services	Where there is less mitigation and preparedness, cost of response of recovery is increased	Potential of cascading impacts across services that also may cross jurisdictional boundaries

Recommendations in asset management planning: Climate change and intermunicipal collaboration

That being said, asset managers require tools that consider climate change impacts on infrastructure assets (Rayner, 2010; Bhamidipati, 2015; The Economist Intelligence Unit, 2015). According to Rayner (2010), vast majority of new infrastructure continues to be designed using historical data – not to mention the existing aging and increasingly expensive infrastructure (Federation of Canadian Municipalities, 2012; Canadian Climate Forum, 2015). In a dynamic and uncertain future climate, use of historical climate data has limited value. Similarly, according to Bhamidipati (2015), much of the literature focusing on asset management and climate change do so with a static framework. Both authors advocate for a framework that is dynamic and considers political and scientific uncertainty. Specifically, Bhamidpati (2015) proposes an agent-based modelling approach to better understand the consequences of long-term plans of asset managers and of user behaviour, to better identify vulnerable areas in a transportation network, and to better estimate the impact from other assets. This approach uses agents to represent assets, asset owners and asset users, while studying their interactions and changing behaviour based on agents' decisions to maintain or use these assets. While approaches such as this are important when planning for uncertainty, other mechanisms on a local level can enhance the asset management process.

For instance, it has been recognized that building partnerships with neighbouring communities can assist in creating successful outcomes (Ministry of Infrastructure, 2012). More specifically, in their report presenting Ontario's asset management, the Municipal Finance Officers' Association of Ontario (2014a) concluded by stating that municipal asset management planning can benefit from shared services including inter-municipal contracting and sharing assessment contracts with municipalities. As previously mentioned, asset management is a prerequisite for receiving provincial capital funding (Cowin, 2013). According to the Alberta Association of Municipal Districts and Counties (2016), inter-municipal collaboration becomes important in ensuring that regional needs are met, which is essential for securing funding in rural municipalities.

Asset management in rural Ontario: Challenges and ways forward

According to Breen (2015), the importance of infrastructure in rural areas and the specific challenges that rural communities face regarding infrastructure is well recognized in the literature. In order to understand these challenges, it is important to discuss the unique position that rural municipalities are in. Rural municipalities are often responsible for large areas with low population densities and deliver municipal services to rural residents that are often different from the services that urban residents receive (Skovron, 2016). Rural municipalities usually have a relatively limited set of asset types and relatively basic infrastructure. Given large areas and infrastructure assets such as road networks, gathering consistent information on infrastructure can be costly, time-consuming, and complex – especially for smaller and rural communities with limited capacities. This poses an issue for asset management planning (AMP), because effective AMP requires reliable information (Skovron, 2016).

Roads and bridges are "the lifeline of rural and northern communities when transporting goods and services across Ontario" (ROMA, 2015 p. 15). Given the estimated infrastructure deficit that Ontario municipalities are facing between what is spent on infrastructure and what is needed for maintenance and growth, rural and northern communities are particularly vulnerable to any extreme weather impacts (e.g. flooding) because they already have limited fiscal and human resources, and small stagnant populations (Douglas, 2003; Breen, 2013; Ministry of Rural Affairs, 2014; ROMA, 2015).

Telecommunication infrastructure such as broadband access is another issue of concern regarding rural communities in particular (Ministry of Rural Affairs, 2014; Breen, 2015; ROMA, 2015). Most communities have this available, yet for many living in rural and northern areas, reliable and high-speed access is an issue. ROMA (2015) points out that because rural communities tend to have low population densities, individual user costs associated with developing and servicing broadband access can be considerable. Benefits of broadband access as noted by ROMA (2015) are as follows:

- Facilitates fast information access for human resources (e.g. training, attracting qualified staff)
- Benefits local businesses to compete in the global economy (e.g. innovation)
- Enhances academic opportunities (e.g. online schooling, distance education)
- Encourages youth and their intellectual capital to remain in rural/remote areas, benefiting the community's economic development

Under these circumstances, academics and organizations alike are pushing to improve rural infrastructure challenges and the asset management planning process. Suggestions include: offer funding that targets small rural communities, and use training, tools, and resources to encourage capacity building (Federation of Canadian Municipalities, 2013; Ministry of Rural Affairs, 2014). Collaboration (i.e. ties between municipalities) has also been identified in the literature as being beneficial to a large extent for rural communities (Breen, 2013; Breen, Minnes, & Vodden, 2015).

The following section summarizes inter-community service sharing (ICSS) and its unique significance to rural/remote communities.

INTER-COMMUNITY SERVICE SHARING (ICSS):

Inter-community service sharing, or commonly referred to as "inter-municipal cooperation" or "inter-local cooperation" within the literature, is the process whereby municipalities collaborate to provide services regionally (Towns Task Force, 2014; Municipal Capacity Development Program, 2015). These services include wastewater, storm water management, road maintenance, infrastructure management, emergency services, administrations/governance, etc. (Municipal Capacity Development Program, 2015). Extensive literature has been conducted regarding this topic especially within an American context, whereas very little has been written about the Canadian context – particularly a rural one. (Feiock, 2007; Spicer 2013a).

The advantages of using ICSS are well documented within the literature and include: enhancing service delivery, increasing quality of life, increased emphasis on cumulative effects, mutual economic benefits, knowledge sharing, controlling externalities, etc.

Theoretical Underpinnings: 3 main sets of theories (Spicer, 2013a; Spicer 2015b)

1. Consolidation and reform perspectives
    - Metropolitan areas are best linked through institutions
    - Favours: annexation and amalgamation

2. Public choice theory
    - Institutional fragmentation within metropolitan areas is function and engage in competition, which inevitably benefits the public
    - Favours: little, if any, institutional change in metropolitan regions

3. New regionalism
    - Use of governance (flexible networks that address regional problems through primarily voluntary means - as opposed to government)
    - Favours: voluntary linkages between jurisdictions, the inclusion of non-governmental actors into regional governance

Generally speaking, all municipalities cooperate in some way. However, the extent and commitment of cooperation varies. In the most basic sense, neighbouring municipalities may partake in informal information sharing between departments or officials (Spicer, 2014). As intensity increases in cooperation, more formal agreements can form. The chart below illustrates how inter-local agreements are typically classified: adaptive or restrictive; and formal or informal.

Types of Inter-local Agreements: (Spicer 2013a, Spicer, 2014; Spicer, 2015b)

Adaptive	• Provide general discretion and flexibility to adjust the agreements to reflect changing circumstances • Easy to adjust • Complement existing services • *Disadvantage*: behavioural uncertainty - one partner may not fulfill its financial or administrative responsibility (potential for service gaps for residents)	*Examples:* • Mutual aid agreements • Memoranda of understanding or agreement • Letters of agreement • Informal agreements *Where:* • Where service gaps do not create a financial hardship, such as snow removal or maintenance • To ensure full serving throughout communities, such as fire services	Formal	• Written down and well-known to participants • Each participant receives a copy • Terms of agreement are clearly spelled out
Restrictive	• Clearly establishes each party's responsibility to fulfill the terms of the agreement (processes, authority, and outcome requirements) • Difficult to adjust • Little room for interpretation • Fixed expiration dates and clear procedures for termination • *Disadvantage:* Higher financial cost and require certain standards to be met	*Examples:* • Contracts • Service agreements • Lease agreements *Where:* • Policy areas with large budgets • For services that are not already provided by a municipality • E.g. Water or water servicing	Informal	• Not written down • Can include staff practices embedded into area governance • Can be difficult to gauge what is included for external observers

Why do municipalities cooperate? (Spicer, 2014)

1. Financial incentives
    - Share the cost of delivering a service
    - Contract services from another municipality to avoid delivering them internally
    - Reduce capital costs associated with an infrastructure project for each municipality
    - Overcome challenges with local capacity
2. Filling service gaps
    - Allow municipalities to deliver a service they would otherwise be unable to alone
    - Overcome geographic isolation and environmental access challenges
3. Controlling externalities
    - Manage the "spill-over" of services into neighbouring communities
    - Better direct growth and development
    - Provide for road and transit links between jurisdictions
    - Monitor shared natural resources
4. Mandated integration
    - Jointly provide a service that requires integration by upper-tier governments

Common Best Practices:

- Build relationships with neighbouring communities – communicate early on (Government Finance Officers Association, 2007)
- Verify there is strong support for change (The Conference Board of Canada, 2005)
- Clearly defined goals and objectives, benefits, and potential barriers (Hepburn et al., 2004; Government Finance Officers Association, 2007; Schraven, Hartmann, & Dewult, 2011;Municipal Finance Officers' Association of Ontario, 2014b)
- Written agreements (Hepburn et al., 2004; Municipal Finance Officers' Association of Ontario, 2014b)
- Keep stakeholders informed throughout all stages (Hepburn et al., 2004; The Conference Board of Canada, 2005 Municipal Finance Officers' Association of Ontario, 2014b)
- Proper training of staff (Hepburn et al., 2004; Government Finance Officers Association, 2007; Schraven et al., 2011)
- Ongoing monitoring (Hepburn et al., 2004; The Conference Board of Canada, 2005; Government Finance Officers Association, 2007; Schraven et al., 2011; Spicer, 2013)
- Long-term review/agreement reassessment (The Conference Board of Canada, 2005; Government Finance Officers Association, 2007)
- Dispute resolution mechanisms (The Conference Board of Canada, 2005; Government Finance Officers Association, 2007; Spicer, 2013; Municipal Finance Officers' Association of Ontario, 2014b; Municipal Capacity Development Program, 2015)
- Make the inter-municipal service agreements readily accessible to the public and examples (AUMA, 2007; Spicer, 2016)

Barriers to inter-municipal cooperation:
According to Municipal Finance Officers' Association of Ontario (2014b), barriers to inter-municipal cooperation can be classified under the following five categories:

Political	Financial	Economic	Administrative	Psychological
- Inexperience and fear of bad publicity/losing political control (AUMA, 2007) - Public perceptions of CC and resource use (Ivey et al., 2004) - Institutional arrangements (Ivey et al., 2004; Crabbe & Robin, 2006) - Community history with neighbouring municipalities (Spicer, 2014) - CC not identified as a top priority (Robinson & Gore, 2005) - Inadequate access regarding programs/policies that can lead to emissions reductions (Robinson & Gore, 2005; Crabbe & Robin, 2006) - Inadequate access regarding potential role municipalities can play and the potential benefits (Robinson & Gore 2005) - Use of historical climate data for present/future projections (Rayner, 2010) - Turnover in Council (Crabbe & Robin, 2006; Spicer, 2014) - Community buy-in (Spicer, 2014)	- Limited human/financial resources (AUMA, 2007) - Limited budget	- Weak legal and financial incentives (Robinson & Gore, 2005; AUMA, 2007; Kulig, Hegney, & Edge, 2010)	- Time (Robinson & Gore, 2005) - Staff training (Robinson & Gore, 2005) - Information and coordination (e.g. identifying opportunities for mutual gain and potential partners) (Spicer, 2014) - Negotiation (Spicer, 2014) - Enforcement/monitoring resources (Spicer, 2014)	- Lack of trust (Crabbe & Robin, 2006; AUMA, 2007; Spicer, 2014; Municipal Capacity Development Program, 2015) - Fear of losing authority (Municipal Capacity Development Program, 2015) - Fear of losing identity (Municipal Capacity Development Program, 2015) - Fear of the unknown (Municipal Capacity Development Program, 2015) - Fear of who will benefit (Municipal Capacity Development Program, 2015)

Characteristics to consider for developing initial municipal stakeholder relationships:

- Geographical location (Municipal Capacity Development Program, 2015; Spicer, 2015a)
    - E.g. Relative closeness of local governments
- Environmental physical attributes (e.g. rivers, lakes, forests, etc.) (Municipal Capacity Development Program, 2015)
- Organizational service districts (Municipal Capacity Development Program, 2015)
- Social factors (Municipal Capacity Development Program, 2015; Spicer, 2015a)
    - E.g. Group size, homogeneity, social capital between localities
- Economic factors (Municipal Capacity Development Program, 2015)
- Political factors (Municipal Capacity Development Program, 2015; Spicer, 2015a)
    - E.g. Political leadership, power asymmetry

Inter-community service sharing in Ontario: Status

As in many other municipalities, those in Ontario are facing increased costs and decreasing revenues due to the offloading of provincial responsibilities, rapid growth, dwindling inter-governmental transfers, regulated caps on tax increase and a rise in citizen expectations towards the municipality (Crabbe & Robin, 2006). According to Douglas (2003), less than one-third of Ontario's rural municipalities have the capacity to undertake local economic development. Likewise, most Ontarian municipalities share some services and do so because of the aforementioned motivations of collaboration (e.g. reduce costs, increase service delivery quality) (Spicer, 2014). In the past, amalgamation has been a popular choice for the improvement of services across local boundaries, leaving inter-municipal agreements less common (Spicer, 2014; 2015a). However, this collaborative culture has been growing (Spicer, 2014; Spicer, 2015a; Schlecht, 2016).

Those Ontarian municipalities that do not tend to share services have been cited in the literature as being small and rural - far from neighbouring communities (Spicer, 2014). Additionally, there is little consistency in the use of shared service arrangements within Ontario. For example, Northern Ontario generally cooperates on infrastructure policy areas, likely attributed to greater geographical distances between communities (Spicer, 2014).

Why rural communities are at an advantage to implement inter-community service sharing:

- According to Spicer (2015a), smaller groups are easier to form and have less issues determining the allotment of benefits and monitoring agreements.
- Rural communities tend to have higher volunteerism rates and social capital; homogeneity of actors aids in reaching cooperative agreements (Spicer, 2015a).
- Intermunicipal cooperation has been shown to be more favoured in smaller rural and poorer communities, suggesting some positive equity effects (Hefetz, Warner, & Vigoda-Gadot (2012).
- Rural communities tend to lack resources for adequate service delivery; sharing services may be a cost effective approach to do so (Kitchen & Slack, 2001; Robinson et al., 2008; Spicer, 2013).
- Assists smaller municipalities looking to manage having lower levels of external funding (Municipal Finance Officers' Association of Ontario (2014b).
- Rural, remote, or indigenous communities also can experience the challenge of attracting and retaining technical skills, capital, and staff (Robinson et al., 2010; Federation of Canadian Municipalities, 2012).

Although inter-municipal cooperation has been seen to be beneficial to rural and remote communities, problems do arise due to weak sanctioning and power dynamics among municipal partners, and issues of coordination problems/boundary crossing due to differences in wealth, demographic makeup, geographic location, etc. (Bel & Warner, 2015).

Literature has been exploring the role geomatics and tools such as GIS can play within intermunicipal arrangements or to potentially improve the process in smaller and more rural communities (Roche & Humeau, 1999; Pagliacci et al., 2016). In the article by Roche & Humeau (1999), it is made evident that GIS has the ability to not only enhance and extend cooperation within an existing intermunicipal arrangement, but it can create new arrangements through the commonality of a GIS project. In a small municipality, the aim of a GIS is to provide the necessary technological skills needed within the framework of joint projects developed by and for all those involved. This is beneficial to participating parties because the same information and geographical references are used to inform decisions, actions, and analyses. Information can be communicated and exchanged in a common language that everyone understands. Through the pooling of financial and human resources, two challenges that many smaller communities face are addressed: the lack of tools and resources and inadequate finances. In one of their case studies ("Pays Yonnais"), it was demonstrated that even the most poorest and unpopulated rural areas could participate through the help of institutional and existing intermunicipal arrangements (Roche & Humea, 1999).

More recently, Pagliacci et al. (2016) points out that information communication technology (ICT), for which GIS and access to broadband can be included in, represents the most important innovation that reshapes and enhances intermunicipal collaboration in order to improve service delivery. This becomes particularly important for smaller communities where neighbouring municipalities

are not in close proximity. Pagliacci et al. (2016) also claim that improved ICTs would increase resilience of social infrastructure (i.e. communications) during natural disasters.

Putting it Together - Significance of inter-community service sharing in an environmental, climate change resilience, infrastructure perspective:

Given this summary, it is clear that a lot of research has been done on cooperation between neighbouring communities, whether it is within a Canadian context or not. Following this idea, Lintz (2016) also recognized the amount of research done on environmental policy-making and planning at the single city/town level. Research on the cooperation of neighbouring communities within the environmental context is far less studied, despite cooperation being acknowledged as being beneficial to communities in proximity (Lintz, 2016).

This is surprising, since authors like Hedensted et al. (2012) argue that increased collaboration and meta-governance is needed to assist municipalities in adaptation measures to protect local infrastructure. Schlecht (2016) goes as far as stating that inter-municipal collaboration could be a normative driver for the implementation of climate change adaptation. Additionally, given previous literature on the infrastructure challenges that rural communities face, the research conducted by Roche and Humeaus (1999) and Pagliacci et al. (2016), demonstrate that improving telecommunications infrastructure goes hand-in-hand with promoting intermunicipal collaboration for public service delivery. Considering this, an opportunity arises to study the use of inter-community cooperation and service sharing within a climate change resiliency perspective and examine how it can be used as a tool to benefit asset management planning in rural Ontario.

Figure ___ demonstrates a potential theoretical framework to be used for this research, which analyzes inter-community collaboration on asset management planning to build more resilient communities. It is structured based on the factors and conditions that promote the formation of cooperative relationships as cited by Rayle & Zegras (2013) and uses the framework adapted from Lintz (2016) and Schlecht (2016), which incorporates the environmental context and climate change impacts.

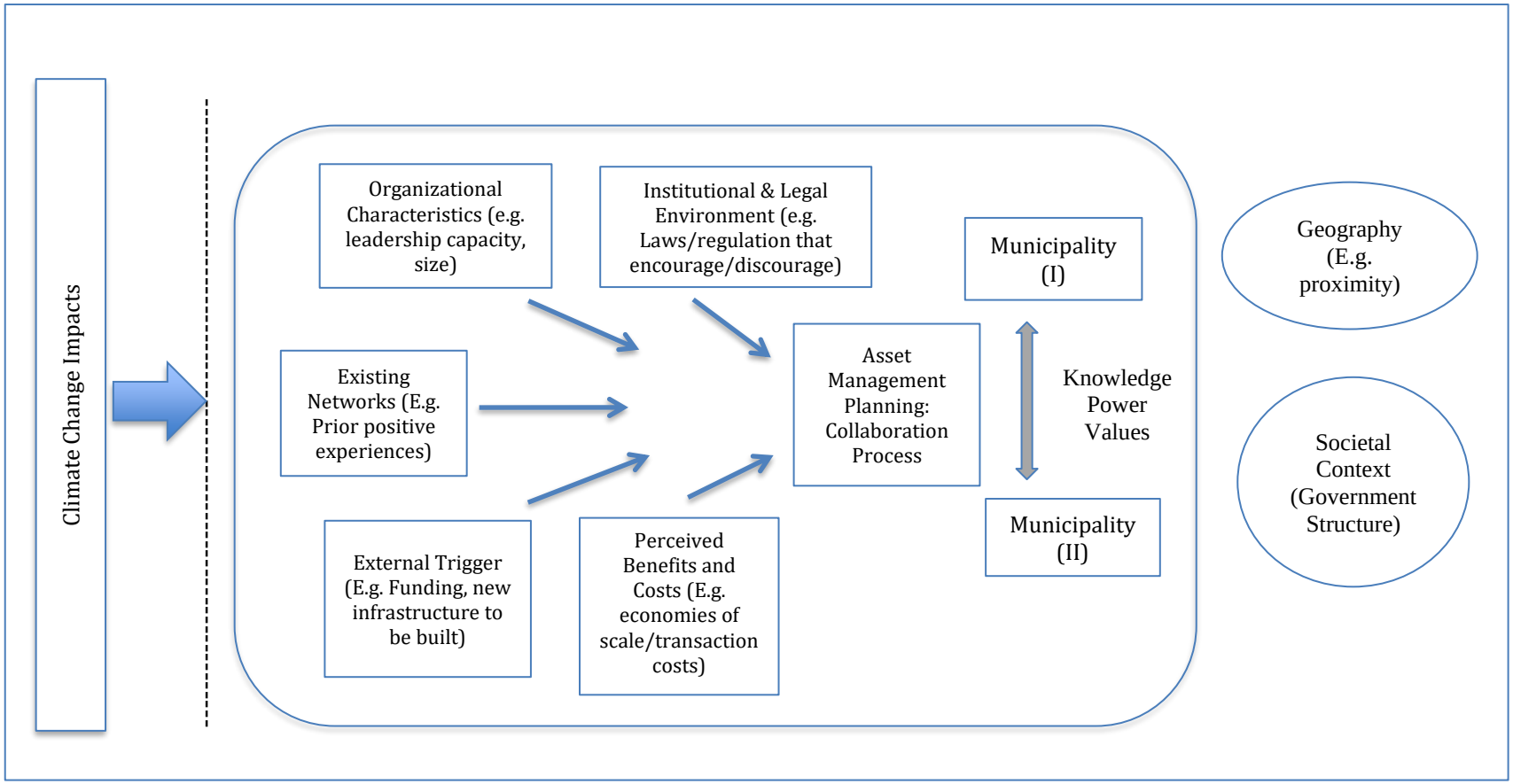

Figure __. Conceptual framework for inter-municipal collaboration of asset management planning, for climate change resilience (based on (Rayle & Zegras, 2013; Lintz, 2016; Schlecht, 2016).

Top Interview Questions:

1. What were/are the service delivery- related challenges that your municipality was/is facing?
2. Do you perform shared services/inter-community cooperation with a neighbouring community? If yes, what services do you share?
    a. If yes, is this a formal contract agreement or an informal arrangement? What are the strengths and weaknesses?
3. When did discussion on collaboration begin and when did the arrangement take effect?
4. Who were the key stakeholders in discussions? Were community members involved in the process?
5. Did you experience any initial obstacles or ongoing challenges in the collaborative effort? If yes, how were they overcome?
6. What critical factors sustained the collaboration?
7. Do you believe that the Government of Ontario provides a sufficient level of support for rural inter-community service sharing?
    a. If yes, what works well?
    b. If no, why not?
8. Did your community have access to other communities' experiences with inter-community service sharing?
9. In your opinion, has sharing services increased your community's' level of preparedness to climate change-related risks on the infrastructure service being shared? How would you characterize the results or impact of the collaborative effort?
10. Will you be working towards additional inter-community service sharing in the near future?
11. Do you have general comments or concerns related to shared services/in-community cooperation that you would like to share?

In summary, the themes that have emerged through this environmental scan are:

- There exists a clear gap in terms of the information and data regarding infrastructure both in terms of quality and quantity (Breen, 2015)
    - This is particularly relevant for rural communities because access and quality to such information informs future decisions and actions
- There exists a gap in terms of a specific rural "state of infrastructure" report/inventory compared to urban reports (Federation of Canadian Municipalities, 2012)
- There exists no single agreed upon definition of infrastructure and its categorization; inventories and assessments will inevitably differ in terms of what kind of infrastructure is included (Breen, 2015)
    - Summarization and comparison of existing literature and data can be challenging
- Little research has been conducted in Canada to date on how climate change could influence various non-climatic factors (e.g. increasing wealth, demographic shifts to coastal areas, etc.) and on the interdependent infrastructure systems (Boyle, Cunningham, & Dekens, 2013)
- Governments are struggling to catch up to infrastructure needs, yet those needs are continually growing as older infrastructure exceeds its service life and with a growing population (Federation of Canadian Municipalities, 2012)
    - Climate change acts as another pressure to replace or upgrade older systems
- Many municipalities lack the internal capacity to asses the state of their infrastructure accurately on their own (Federation of Canadian Municipalities, 2012)
- The smaller the community, the greater the challenges regarding the provision of services and maintaining infrastructure for citizens (Kitchen & Slack, 2001; Lauzon et al., 2015)
- There is significant amount of American and European literature on inter-municipal service (Hefetz et al., 2012; Spicer, 2013; Kosut, 2016)
- There lacks research on inter-municipal service sharing within a Canadian context – especially within a rural one (Feiock, 2007; Spicer, 2013)
- Although the literature states that inter-municipal service sharing is popular among smaller communities (Kitchen & Slack, 2001; Hefetz et al., 2012), the research that does exist on Canadian inter-municipal service sharing is largely within a metropolitan context (Feiock, 2007; Spicer, 2013)
- There is little consistency in the use of shared service arrangements across Ontario regions (IMFG, 2014)
- There is also a lack of literature that provides empirical guidance as to whether the number of interlocal agreements reflect citizens' perception of quality (Morton, Yu-Che, & Morse, 2008)
- There is an obvious recognition in the literature that supports the need for greater understanding and emphasis at the local level on regional solutions (Minnes & Vodden, 2014; Breen, Minnes, Vodden, 2015)
- Although fiscal incentives have been cited as being a large driving factor for cooperation, it is not clear whether inter-municipal cooperation will result in efficiency gains (Bel & Warner, 2015)

There is a need for:

- Further exploration of how local institutions and governance systems may promote the transition towards sustainable communities (Robinson et al., 2008)
- Exploration on what policy makers can do to promote cooperation among more sparsely settled rural communities (Bel & Warner, 2015)
- Establishing why we see so few inter-local agreements in Canada (Spicer, 2013)
- Connecting perceptions of municipal practitioners with the reality of policy; we know why municipalities say they cooperate, but we don't know whether their reasoning is supported by evidence (Spicer, 2014)
- Synthesis and broadcasting of best practises and important lessons learned by communities as they experiment with innovative new strategies for achieving sustainability such as inter-community service sharing (Douglas, 2003; Canadian Council of Professional Engineers, 2008; Robinson et al., 2008; Transportation Research Board, 2008; Gore, 2010; Brodhead, Darling, & Mullin, 2014; Canadian Climate Forum, 2015; Lintz, 2016)
- Distinguishing the differing climate change impacts and risks by region and type of infrastructure/asset for key infrastructure/asset initiatives throughout Canada (Economist Intelligence Unit, 2015; Canadian Climate Forum, 2015)
- Examining the benefits of partnering with neighbouring municipalities for asset management (Ministry of Infrastructure, 2012)

Key Deliverable - Best Practices & Lessons Learned from the Literature
Enhancing Ontario's Rural Infrastructure Preparedness: Inter-Community Service Sharing in a Changing Climate

BEST PRACTICES FOR ASSET MANAGEMENT AND SUSTAINABLE SERVICE DELIVERY (BC Climate Action Toolkit, n.d.)

- Account for all 'assets' that are used to deliver community services
    - Includes natural assets such as water, land and vegetation
- Understanding and managing risk
    - E.g. Climate change must be considered for managing both physical and natural assets, as well as ensuring (or improving_ the level of service delivered)
- Adoption of a holistic and integrated approach, where goals and objectives can be aligned
- Consider life-cycle costs, which include the costs of operating and maintaining infrastructure and supports demand management as well as utilizing/leveraging natural assets to provide community services such as rain/storm management

BEST PRACTICES/ENHANCING ASSET MANAGEMENT PLANNING (Ministry of Infrastructure Ontario, 2012)

- Direction and support
    - Obtain a council resolution that directs staff to develop an asset management plan
    - Designate a project champion within the municipal administration and another on Council
    - Establish a Working Group or Steering Committee to engage the appropriate municipal departments in the process
    - Ensure that engineering, finance and other appropriate representatives are included
- Public engagement
    - Engage the public to help envision what the municipality will look like in the future and the infrastructure needed to support it
    - Assist the engagement process by identifying priority projects and developing costing scenarios
    - Be open to a conversation about prioritization and the difficult choices that sometimes need to be made
- External support and collaboration
    - Consider if advice from external experts would help Council to make better informed decisions on the asset management plan
    - Examine the advantages of potential partnerships with neighbouring municipalities
        - Could be sharing resources and bundling multiple projects into one procurement – or more complex arrangements involving consolidation of infrastructure services
- An open and ongoing process

- Ensure that asset management plans are clear and available to the public
- Monitor and report on the implementation of asset management plans at the Council and staff levels
- View asset management plans as "living" documents that require continuous updates and improvements

BEST PRACTICES: WHAT MUNICIPAL ASSET MANAGEMENT PLANS COULD BENEFIT FROM (Municipal Finance Officers' Association of Ontario, 2014a):

- Hyperlinking to the plans and policies referenced in the asset plan (Official plans, investment policy, etc.) to facilitate cross-referencing
- Including the distribution of assets at various age ranges to develop a higher level perspective on the general state of the municipality's asset base, inform condition assessment priorities and budget projections
- Highlighting the results of public consultation around service levels and willingness to pay given many plans broach level of service in technical, risk mitigation terms
- Adding timeframes for service level adjustments and considering external trends affecting service levels. The cost of moving to target service levels should be articulated in plans
- Tying levels of service to maintenance activities and other measures that minimize lifecycle costs. In some places, the level of service is to perform maintenance, rehabilitation, etc. to extend the life of the asset by 10 years
- Exploring non-infrastructure solutions, maintenance, rehabilitation, replacement, disposal and expansion activities in detail. It is particularly important to look into activities that have figured less prominently in past, such as non-infrastructure strategies and disposal procedures. Recycling and salvaging parts of older assets are other opportunities to reduce capital costs.
- Presenting the basis for prioritizing rehabilitation and replacement investments (i.e. risk, condition, Council priorities, etc.)
- Addressing how new acquisitions, including donated assets, will impact the maintenance budget
- Establishing benchmarks and strategies for increasing revenue (i.e. dedicated capital levy), meeting sinking fund requirements (i.e. using tax and user fee room after a debt retires for capital purposes) and maintaining healthy reserve fund levels (i.e. converting 'reserves' to 'reserve funds' to take advantage of interest and directing the annual operating surplus to reserve funds)
- Looking into shared services and alternative financing and procurement as part of the next plan update. Other revenue tools and cost recovery vehicles to consider include creating municipal services corporations, inter-municipal contracting and storm water management fees. Selling recyclables to processing mills is another option for municipalities that provide recycling services.
- Spelling out the cost, risks and risk management strategies associated with different asset management activities
- Considering debt and excluding unconfirmed grants in the long term financial strategy

- Discussing alternative scenarios to the financial strategy, quantifying financial shortfalls (if any) and how they will be managed.
- Extending the coverage of plans to match the life of the longest lived asset owned by the municipality and to all asset classes to ensure decisions are made knowing the full range of future needs
- Recasting the limitations listed in the municipality's current asset plan as a work plan for updating the plan. Timelines can be added to each focus area and coordinated with other initiatives the municipality has planned, i.e. if the auditor is involved with the tangible capital asset database, updating replacement cost information with insurance values can be paired with the next audit
- Documenting the actual service lives of infrastructure, actual maintenance and rehabilitation spending and condition changes over time
- Highlighting increasing cost pressures, (an evolving legislative and regulatory regime, service demands, growth, shrinking assessment base, etc.) when presenting condition information using general estimates of useful life or age as a proxy for condition given these approaches overstate funding needs and may justify a departure from the budget practices recommended in the plan
- Monitoring the quality of installations and material closely, investing in efforts to minimize soil movement and performing regular maintenance
- Multi-year contracts for condition work, collaborating with engineering departments of colleges and universities and sharing assessment contracts with other municipalities
- Prioritizing renewals based on underground assets and managing assets with the same material or in the same geographic area together
- Reviewing municipal policies in lieu of the new information gathered to complete asset management plans, for example extending the estimated useful lives of assets in asset management policies and reviewing procurement policies and practices
- Conducting a mini asset plan review before each budget cycle begins. Maintaining a revision log at the front end of a plan is a good way to confirm practices are consistent with the update cycle recommended in the plan.

BEST PRACTICES/RECOMMENDATIONS FOR ACTION (Canadian Climate Forum, 2015):

- Effective governance (ensure leadership and collaboration between the federal government, the territories and provinces, municipalities, and First Nations)
    - Predictable long-term and stable funding from governments to address climate change impacts and infrastructure resiliency;
    - Positioning governments to adopt a proactive approach in emergency planning and response through the early identification of climate change impacts that pose a threat to infrastructure;

    - Integration of mitigation and adaptation opportunities into government operations and decision-making to help governments become more effective in managing risks to infrastructure, economies, human health and safety, traditional culture and heritage, and ecosystems; and
    - Capacity building through knowledge sharing involving all levels of government, academia, industry and the international community. To gain a better understanding of the approaches, tools and techniques that address climate change issues and improve infrastructure resiliency
- Knowledge generation (develop a national research and development initiative to ensure past and future research is effectively transferred and knowledge gaps are identified, prioritized and funded)
    - Integrated monitoring;
    - Open and accessible data and modelling; and
    - Capacity building and trading
- Standards, policies, and planning strategies (which take into account the community and infrastructure context, and best available knowledge)
    - Integration of climate change priorities into engineering design of infrastructure projects;
    - Development of codes, standards and policies that inform engineering designs in the early planning of infrastructure projects;
    - Increase the availability of information and resources on climate change risks to infrastructure and adaptation measures to counter those risks; and
    - Differentiate by region and type of infrastructure climate change impacts and risks for key infrastructure initiatives throughout Canada

BEST PRACTICES/RECOMMENDATIONS FOR ALTERNATIVE SERVICE DELIVERY: SHARED SERVICES
(Government Finance Officers Association. (2007):

- Local governments should organize themselves so that relationships can be established, which encourage relationships that promote the identification of prioritized opportunities
    - E.g. Talk with communities who have successfully implemented cooperative initiatives
- Communicate early with neighbouring municipalities to improve the chances for successful implementation
- Conduct a feasibility study to identify costs, benefits, and potential risks of an agreement. Data collection may be necessary for more complex endeavours.
    - Consider goals and objectives, tangible and intangible benefits, potential barriers
- Have agreements that address the following:
    - Liability and legal basis for the relationship

    - Cost allocations (direct and indirect)
    - Financing
    - Governance structure, membership, and protocols
    - Time period covered
    - Dispute resolution and mediation
    - Service level agreements
    - Termination clauses
- Place emphasis on proper training of employees providing the service
    - Establish performance measures/benchmarks and/or milestones related to the particular service
- Ongoing monitoring
    - Agreement on what will constitute regular monitoring frequency, what to monitor, who to measure what is monitored, communicating results, and quality/quantity of work performed
- Long-term review/agreement reassessment

BEST PRACTICES (Municipal Finance Officers' Association of Ontario, 2014b):

- Understand your municipality's objectives in sharing services and approach potential collaborators with an open mind
- Plan a phased approach to rolling out shared services, starting with a narrowly defined pilot project and evaluating the results
- Keep stakeholders informed throughout all stages of setting up arrangements
- Use concise, basic language to explain service sharing and consistently use informal language (e.g. cooperation or collaboration rather than partnership, to describe the arrangement)
- Link service sharing to the municipalities policies and strategic directions
- Ensure all parties are fairly represented in decision making forums; reconcile all participants need to have a voice with organizations contributions
- Accurately represent your organizations capabilities and be forthcoming with all information and costs
- Understand that roles and responsibilities within your organization will change and roles and responsibilities between participants can change
- Manage public and political expectations about the pace of change, including the time horizon for setting up agreements, realizing cost savings and service gains
- Build time to deal with administrative and logistical matters into each stage and build opportunities to tweak the arrangement into written agreements
- Ensure all parties are prepared to devote time to their oversight role and include these time commitments in agreements

- Minimize service disruption during transitions

SUSTAINING AGREEMENTS LONG-TERM (Municipal Finance Officers' Association of Ontario, 2014b):

- Link shared services and service efficiency to municipal plans, vision statements, political priorities and future directions
- Enter agreements with a political understanding that lasting changes and major savings may take a few years to materialize. Although savings can be realized immediately, the perpetual nature of some of the costs that are avoided or reduced through shared services calls for a longer-term time horizon to analyze results.
- Quantify the efficiency gains in financial and service terms. How much has been saved, how have service levels improved and what are the indirect benefits? Qualify other gains anecdotally. A municipality may start sharing to reduce costs, but realize other benefits after project implementation
- Incorporate service sharing arrangements into council orientation sessions
- Focus on why service sharing has been implemented rather than how it works
- Build strong, mutually respectful and mutually beneficial working relationships with staff from other organizations and try to contain issues internally
- Regular performance evaluations of shared employees are critical
- Infuse predictability and adaptability into the arrangement
- Where possible, build on existing agreements or use them to guide new arrangements
- Track costs in terms of inputs and drivers and adjust participants' contributions as needed
- Be on the lookout for new opportunities

Other tips:

- Broach new shared service arrangements as early as possible in the council term.
- If possible, start the discussion after strategic planning; municipal viability or sustainability studies have finished.
- A strengths, weaknesses, opportunities and threats analysis needs assessment or feasibility study can help staff evaluate shared service opportunities.
- Hold a signing ceremony after the agreement has been negotiated.
- Investing time into a communications strategy may be worthwhile.
- Citizen satisfaction surveys can be powerful demonstrations of service improvements

FACTORS FOR SUCCESS (Hepburn et al., 2004):

- Concretely defined goals

- Positive value for money returns
- Partner perceptions of fairness and of agreement terms
- Bivariate analysis with
- The writing of formal agreements
- Close integration of partners
- Partners possessing an adequate measure of control (and an equitable balance of control being held by each partner)
- Matching output and evaluation criteria
- Services provided directly to citizens

BEST PRACTICES (Hepburn et al., 2004):

- Appreciate shared service opportunities
    - At earliest stages of policy setting process
- Information and data
    - Should be generated and placed on a regular basis
- Shared service policy options
    - Should routinely consider the merits of shared service arrangements when generating policy options for addressing inter-municipal opportunities and problems
- Full spectrum consideration
    - Contemplate the full range of prospective shared service approaches with reference to the relative advantages revealed in research findings
- Desirability of comparative research
- Resources to consult
- Matching options and benefits
- Assaying potential partner capacities
- Political context assessment
- Assaying the interorgnaisational climate
- Decision criteria
- Use formal agreements
- Identifying the full extent of common purposes
- Shared service arrangement goals and objectives
- Domain consensus

- Dispute resolution mechanism
- Power balancing
- Integration
- Congruence of service specification and evaluation criteria
- Monitoring
- Leadership
- Evaluation
- Citizen satisfaction surveying
- Training and development
- Further research
- Meta-research challenges

BEST PRACTICES (The Conference Board of Canada, 2005):

- Verify that there is strong support for change
    - Attention must go beyond the announcement of the initiative
    - And also there needs to be recognition that change will not happen immediately
- Ensure there is effective governance at the outset
    - Clarity about who is involved in decision-making, how decisions are made and accountability arrangements to be determined up front
    - Dispute resolution mechanisms
    - Establish service-level agreements, provide assurance that impacts on staff and resources will be addressed, and ensure that there will be minimal disruption to operations
- Allocate sufficient resources to manage change long-term
    - Can result in confusion about roles and hampered service delivery
    - Need to ensure that resources – change expertise and sufficient financial support – are in place to smooth the transition
    - Ongoing attention and nurturing
- Choose the right kind of leadership for the shared service delivery
    - The leader needs to build trust and confidence among sceptic's
- Address resistance head on
    - Challenging questions should not be seen as a negative
    - Active resistance includes unwillingness to transfer staff with the needed skills from departments to the shared service entity; belief that being a part of shared services could be optional; etc.

- Engage key stakeholders in the initiative
    - Success depends on the commitment of all stakeholders
- Ease the transition of staff into new roles
    - Engaging unions should be part of the strategy for created the shared services right from the beginning
        - Provide timely information to affected staff and their representatives
        - Undertake consultations with unions and their members
        - Ensure consultation and information processes are consistent for all audiences and take place throughout the timeframe
- Build trust through service-level agreements
- Build on process improvements
- Continuously review performance against targets
    - Use of surveys, or face-to-face dialogue

BEST PRACTISES/RECOMMENDATIONS (Schraven, Hartmann, & Dewulf, 2011)

- Infrastructure objectives are used to evaluate the situation of infrastructure assets and the evaluation criteria are clearly derived from the objectives
- Infrastructure interventions take the current and future situation of infrastructure assets into account, and decision makers are able to cope with future uncertainties and changing requirements
- Infrastructure interventions result in an infrastructure situation that is consistent with infrastructure objectives
- Infrastructure objectives are continually monitored and evaluated based on the infrastructure interventions applied and on unexpected changes of the infrastructure situation
- Provide training and courses on the topic of improving the effectiveness of decision areas in infrastructure asset management

BEST PRACTICES FOR AN IMA FRAMEWORK (Commonwealth of Massachusetts, 2008)

Best practices: (1) Inter-municipal cooperation assessments (*Determining if any inter-municipal cooperation opportunities exist*)

- Assisting a neighbouring community to address facility needs and/or rehabilitation that can create available capacity by completing needed system improvements or eliminating deficiencies
- Working cooperatively in joint planning level investigations
- Considering offsets or trading of services to meet the needs of nearby communities
- Using regional planning agency staff to serve as facilitators towards intermunicipal cooperation
- Giving regional cooperation serious consideration beyond perfunctory and rudimentary inter-town communications to check out neighbouring towns' needs/concerns

- Including inter-town communications and/or meetings in planning project work scope to give as much credence as possible to regional solutions and mutual aid
- Including citizen representatives and/or non-elected officials as participants

Best practices: (2) IMA's Framework (*Developing the IMA framework – formal contract; joint service agreements; or service(s) exchange arrangements*)

- Determining whether an IMA or regional district approach is preferred, with the user communities working in concert with the owner community on the preferred arrangement
- Coordinating with applicable state agencies and local representatives and state senators to co- sponsor the special act (s), in the event that a regional district approach is preferred
- Developing consensus as to the Section of the MGLs that the IMA or district agreement will be established under

Best practices: (3) IMA/District representation (*To form the district*)

- Deciding if an "owner-user" relationship is appropriate
- Establishing representation when communities decide to be "partners" in the formation of a district
- Deciding on the district governance with the number and qualifications of board members established
- Naming/electing board members should be included in concurrent enabling home rule petitions/legislation

Best practices: (4) Agreement negotiations/facilities capacity allocations (*Negotiating the facilities' capacity allocation*) * the most important

- Establishing reasonable existing and future capacity/supply needs
- Anticipating changes in those capacity/supply needs and provide for re-allocation or preliminary design changes prior to final commitments
- Providing for capacity/supply volumes that serve as a "contingency" for all involved communities without impacting permit approvals due to exaggerated growth factors, if needed

Best practises: (5) Agreement negotiations/capital cost considerations (*Negotiate capital cost considerations*)

- Identifying prior community facility and/or capital contributions and financial and non- financial impacts that are not equivalent across all member communities (Prior community investments in facility construction or equipment that will continue to be used and that are not fully depreciated and collection/transmission facilities that are only used by some member communities are just a few such examples)
- Determining the basis (and payment for) capital cost investments by specific municipalities

- Developing consensus for the applicability, use, and basis for present impacts and commitments, and use of previously committed project assets

Best practices: (6) Agreement negotiations/annual cost considerations – O&M expenses (*Negotiating operation and maintenance expenditures*)

- Developing a detailed chart of accounts for use in developing annual O&M budgets
- Using the chart of accounts for tracking all expenditures
- Determining if different cost allocation bases will be used for fixed costs and flow-variable costs
- Dividing the chart of accounts into flow-variable and fixed cost items
- Prepare a draft/example O&M budget using the chart of accounts, and together with actual capacity allocations and assumed usage provide an attached example to clearly depict how future O&M costs will be distributed
- Tracking actual fixed and flow-variable expenditures quarterly and calculate cost allocations based on actual flows, if appropriate
- If tracking actual fixed and flow-variable expenditures is not a viable option, use budgeted costs adjusted later based on recorded actual quarterly flows/use
- Agreeing on the billing methodology including use of budgeted vs. actual flow/usage
- Providing for "truing up" annual billings at the end of the fiscal year by using actual flows and actual expenditures and adjusting the cost up or down as appropriate
- Including a "miscellaneous" category or contingency account to allow for unexpected large expenditures that could not have been anticipated during the budgeting process
- Considering using a "reserve" account for a safety factor or to build up capital or operating reserves on an annual basis for unexpected equipment repairs, rentals, replacement and/or increased staff needs to deal with extremes in weather and high or low flow or use volumes
- Providing for separate tracking and accounting of services or products that are used by the municipality for its own utilities and for the regional entity
- Separate identifiers or account numbers should be used if possible, or calculated percentages of use should be applied accordingly

Best practices: (7) Negotiating other terms and conditions (*Including length of agreement, budgeting procedures, budgeting and accounting processes, and general terms & conditions*)

- Providing for adequate tracking of staff who are assigned duties both for the regional entity and owner municipality
- When rotating personnel shifts are used in operating pumping stations, metering stations, etc. some of which are regional and some that are local, time and cost allocation or tracking procedures that are acceptable to all parties need to be developed

- Indirect costs assigned to the regional district or shared IMA facilities operations should be a subset of that assigned to the water and/or sewer system
- Formulas or procedures for determining shares of indirect costs assigned to an enterprise fund must be developed and described, possibly using an example calculation in the IMA
- Purchasing of supplies and equipment that are used by both the regional and owner municipality should reflect separate, clearly defined identifiers, possibly even separate invoicing
- End-of-year statements should be made available to "user" municipalities to demonstrate allocation of shared staff, equipment, materials, and services
- Procedures for annual reviews or audits should be included in the IMA or regional district agreement(s)

Checklist:
Terms and Conditions of An Inter-Municipal Agreement Between Towns

I: General Terms:

A. State the names of each participating city and town
B. Identify the effective date and term of agreement II.
C. State the general purpose of the agreement
D. State that costs will be shared
E. State how municipalities may terminate participation (required)
F. State how the agreement may be amended
G. Acknowledge acceptance of liability under agreement
H. Include a severability clause; identify applicable laws
I. Provide addresses for official notices

II: Operations Terms and Conditions

A. Describe services to be provided
B. Identify personnel or department to perform services
C. Establish reporting relationship and successor-ship in shared department
D. Specify where shared services, personnel or department will be located
E. Establish lines of communication among participating municipalities

F. Describe dispute resolution process

III. Finance Terms and Conditions

A. Identify salaries, wages and benefits to be shared
B. Identify operating expenses to be shared
C. Address sharing of capital cost incurred prior to and after agreement date
D. Describe how each participant approves the shared budget
E. Describe how shared costs will be allocated
F. Describe payment methodology
G. Specify insurance and indemnification requirements

IV. Provisions for Financial Safeguards Required by c.40,s.4A

A. The OWNER town must maintain accurate and comprehensive records of services performed, costs incurred, and reimbursements and contributions received
B. The OWNER town must arrange for the performance of annual audits of such records, which audits can be part of the OWNER town's annual, independent audit of its financial statements
C. The OWNER town must ensure that all officers or staff responsible for carrying out terms and conditions of this AGREEMENT shall give appropriate performance bonds
D. The OWNER town must provide the PARTIES with monthly expenditure reports and quarterly revenue reports and any other information reasonably requested by NON- OWNER town to present a complete picture of the financial condition of the shared department, function or position
E. The PARTIES otherwise must comply with all other provisions of M.G.L.c.40,s.4A

V: Signatures
A. Provide lines for signatures, titles, and date of a city mayor and each city councillor, town board of selectmen, elected water and/or sewer commission, and/or district prudential committee.

BEST PRACTICES/RECOMMENDATIONS (Spicer, 2016)

- Recognize the value of intermunicipal cooperation as an alternative rather than a precursor, to consolidation

- Municipalities should intermunicipal service arrangements readily accessible to the public, possibly through their municipal association
- Regardless of a city-region's institutional composition or presence of regional structures, municipal actors should set aside parochial and mistrustful attitudes about municipal servicing, and instead reach out to their regional peers as cooperative partners
- Other provinces should follow British Colombia's lead by encouraging service sharing and collaboration among municipalities and other local governments, including First Nations governments

BEST PRACTICES/FINDINGS (Transportation Research Board, 2008):

- **T**ake on a more proactive approach in addressing past and potential future impacts of climate change
- Incorporate responses to more extreme weather events into routine operations, improving collaboration with emergency managers, recognizing weather and emergency management as integral functions of transportation agency operations, and widely sharing best practises
- Consider how climate change will affect infrastructure (e.g. transportation facilities) 50 years or more into the future
- Design changes required to harden long lived infrastructure in vulnerable locations
- Development of new standards will be time-consuming
- Avoid placing people and infrastructure in highly developed areas, but more stringent land use controls and flood insurance requirements could help curb further development
- Federal planning regulations should require that transportation planners take climate change into account with developing long-range plans, and collaborate with agencies responsible for land use and vice versa so that consequences of infrastructure investment decisions can be more clearly identified
- Better monitoring technologies and new materials to provide alternatives of costly upgrading some infrastructure
    - Sensors for monitoring impacts and new heat resistant paving materials are examples
- More refined data (e.g. better elevation data for floodplain mapping) and improved modelling
- New partnerships and organizational arrangements that better align with climate impacts than do current modal, jurisdictional, and corporate boundaries around which decision-making in the transport sector is structured
- An interagency working group could be created at the federal level, focusing solely on adaptation issues for the transportation sector to help shape existing agency research programs
- Think longer-term, adopt risk-based approaches, and foraging new partnerships and organizational arrangements are some of the greatest challenges

GENERAL BEST PRACTICES (Municipal Finance Officers' Association of Ontario ,2014b):

- Understand your municipality's objectives in sharing services and approach potential collaborators with an open mind

- Plan a phased approach to rolling out shared services, starting with a narrowly defined pilot project and evaluating the results
- Keep stakeholders informed throughout all stages of setting up arrangements
- Use concise, basic language to explain service sharing and consistently use informal language, e.g. cooperation or collaboration rather than partnership, to describe the arrangement
- Link service sharing to the municipality's policies and strategic directions.
- Ensure that all parties are fairly represented in decision-making forums; reconcile all participants' need to have a voice with organizations' contributions
- Accurately represent your organizations' capabilities and be forthcoming with all information and costs
- Understand that roles and responsibilities within your organization will change and roles and responsibilities between participants can change
- Manage public and political expectations about the pace of change, including the time horizon for setting up agreements, realizing cost savings and service gains
- Build time to deal with administrative and logistical matters into each stage and build opportunities to tweak the arrangement into written agreements
- Ensure all parties are prepared to devote time to their oversight role and include these time commitments in agreements.
- Minimize service disruption during transitions.

BEST PRACTICES/FUNDAMENTALS FOR SUCCESS (Municipal Capacity Development Program, 2015)

- Overcoming barriers to working collectively
- Stakeholder identification and group formation
- Formal and informal group development and membership responsibilities
- Communication strategies
- Dispute resolution mechanisms
- Community action and regional planning
- Developing intermunicipal agreements
- Budgets and accounting

BEST PRACTICES/RECOMMENDATIONS (Morton, Yu-Che, & Morse, 2008)

- Interlocal arrangements must also reinforce community ownership in addition to being financially desirable
- Carefully assess which services are most appropriately shared between local governments to achieve cost savings and support a sense of community

Key Deliverable – Sample Interview Questions:

Enhancing Ontario's Rural Infrastructure Preparedness: Inter-Community Service Sharing in a Changing Climate

Municipal Capacity Development Program. (2015).

"Gauging Intermunicipal Cooperation"

1. Does your municipality provide services, under contract or by agreement, to other municipalities? If yes, what services and to which municipality/ies? What are the positive and negative aspects of these arrangements? (e.g. cost effectiveness, etc.)
2. Does your municipality receive services, under contract or by agreement, to other municipalities? If yes, what services and from which municipality/ies? What are the positive and negative aspects of these arrangements?
3. Does your municipality share or provide any of its staff resources to regularly assist another municipality with service delivery functions? If yes, which staffing resources and for what service delivery function(s)? What are the positive and negative aspects of these arrangements?
4. Does your municipality share or make available its equipment or facilities for use in the delivery of services to another municipality? If yes, what equipment or facility/ies and to which municipality/ies? What are the positive and negative aspects of these arrangements?
5. Does your municipality have Intermunicipal arrangements or agreements in place, which provide for the shared delivery of one or more areas of municipal government services? If yes, please expand.
6. Having answered the above questions, please list and elaborate on 3 or more key areas in which you feel that your municipality can:
    a. Expand your current working relationship(s) and/or
    b. Establish a new intermunicipal working relationship

<u>Understanding our area</u>

1. What are the challenges your municipality is facing?
2. How do you propose to address these issues?

<u>Understanding planning in our area</u>

1. Does your municipality have an Official Community Plan? When was it written? Is it still applicable?
2. Does your municipality have Land-Use and Zoning By-laws? When were they written? Are they still valid? Are they enforced?
3. Have you every engaged in planning with another municipality in your area?

4. What are your thoughts on area-wide planning? Positives/Concerns?
5. Would you be willing to look into area-wide planning with your neighbours?
6. If no, what would have to change for you to revisit are-wide planning?

The Alberta Urban Municipalities Association (AUMA). (2007).

"Intermunicipal Cooperation Survey Questions"

1. Does your municipality provide services, under contract or by agreement, to other municipalities?
    a. If yes, do you find these shared service agreements satisfactory?
    b. If no, why not?
    c. Please provide examples and let us know about your experiences
2. Does your municipality receive services, under contract or by agreement, from other municipalities?
    a. If yes, please provide examples and let us know about your experiences
    b. If no, why not?
3. Does your municipality share or make available its equipment or facilitates for use in the delivery of services to another municipality?
    a. If yes, please provide examples and let us know about your experiences
    b. If no, why not?
4. Do you believe that the Government of Alberta provides an appropriate level of support for Inter municipal cooperation?
    a. If yes, what works well?
    b. If no, why not?
5. What factors must be in place for you to consider intermunicipal cooperation?
6. Will you be working towards any more intermunicipal cooperation in the coming months and years?
    a. If yes, in what areas?
    b. If no, why not?
7. What support could AUMA provide you for intermunicipal cooperation?

Lackey, Freshwater, Rapasingha (2002)

<u>Questions concerned with the specifics of cooperative efforts:</u>

Have you cooperated with another local government in the last few years (joint provision of service, pool- ing of financial resources, joint lobbying for funding, etc.)? Which governments? Any governments across state borders?

- What were the key issues of the collaborative efforts?
- Can you give a brief description of a recent collaboration (from beginning to end)? What was the nature of the agreement (interlocal agreement, formal contact, or informal handshake)?
- In what ways have you cooperated (information sharing, problem solving)? What was the primary objective of the collaboration?
- Were the past cooperative efforts successful? How did you measure success?
- Why was the cooperative effort either successful or not?
- What was the organizational structure of the cooperative program? Was there a project supervisor? Who was held accountable for all the necessary actions of the group effort? How was such person chosen?
- How did the project get initiated? Who was primarily responsible for initiating the effort? Were there any major events that helped jump-start the cooperative effort? Was a third-party organization involved (i.e. development district, chamber of commerce?)

- What were some of the initial obstacles? How were they overcome?
- Were there any political or legal constraints that needed to be overcome?
- What were some of your concerns in the infancy of the cooperation?
- What were the goals of the project? Were they put in writing? Was a written action plan developed to reach these goals? Were there any differences in goals between the groups involved?
- What was the degree of planning behind the project? Were there set activities planned tied to resource commitments?
- Did time become a problem?
- Have there been any opportunities to cooperate with neighbouring communities that have not been followed up on? Why were these opportunities not followed up on? Is there a past working relationship with these communities? Is there a significant difference between these communities and yours (economic, political, and demographic)?

<u>The following questions are about local government cooperation in general:</u>

- Do you feel that you are in competition with any of your neighbouring communities? If so, does this feeling of competition limit the opportunities for cooperation?
- Do you have the opportunity to interact with officials from other communities? If so, where? Are these helpful in building relationships?

- Do you have a close working relationship with an agency with a regional focus? Are they active in promoting local government cooperation?
- Can you identify any state or federal policies that could be conducive to local government cooperation? Is there any political demand from your constituents for cooperative arrangements with neighbouring governments?
- Do you have access to a professional planner or economic development specialist? Where are they located? What are the vital factors in cooperative efforts? Are there any essential skills?
- What are some of the key obstacles to cooperation?

Case Study Interview Questions (Arnold, 2015):

1. When did discussions on collaboration begin and when did the agreement take effect?
2. Why pursue collaboration at that particular time?
3. Who championed discussions on collaboration?
4. Who were the key stakeholders in discussions?
5. What were the perceived benefits of collaboration?
6. What were the barriers that had to be overcome?
7. How were the collective action barriers overcome?
8. What critical factors sustain the collaboration?
9. How is the collaboration governed?
10. How would you characterize the results or impact of the collaborative effort?
11. Are there any ongoing challenges or sustainability issues?
12. What outcome measures, if any, are used to evaluate program performance?
13. Other question(s) to add based on the conversation of the interview…

Selected questions from survey – climate change adaption measures in municipalities (Hedensted Lund et al., 2012):

1. To what degree do you lack knowledge about the following?
    a. Consequences of climate change to different sectors
2. Do you cooperate with other municipalities about climate adaptation?
3. Have you, within the last 3 years done the following?
    a. Involved citizens in the effort for climate adaptation
    b. Informed citizens and companies about what they can do themselves to adapt to future climate
    c. Experienced that citizens have shown interest in climate changes and possibilities of climate adaptation
    d. Involved the business community in the effort for climate adaptation

4. How have you involved the citizens of the municipality in the effort for climate adaptation?
    a. Public meeting
    b. The municipality website
    c. Hearing
    d. Written material
    e. Other
5. To what degree do you experience the following?
    a. Barriers in the existing legislation that prevents appropriate climate adaptation

Dudas et al. (2009). Questions from a formal structured telephone survey of elected town officials:

1. What types of local collaboration have you personally experienced as a township official?
    a. Can you identify any options that encouraged or incentivized you to collaborate with other local governments?
    b. Can you identify any options that discouraged you to collaborate with local governments?
2. What changes to the local tax structure would encourage your township to collaborate more?
3. Through your collaborative efforts, have you identified any alternative service delivery models?
4. Based on your past experiences, are you more likely or less likely to seek out collaboration? Why or why not?

Key Deliverable – Potential Case Studies

McCue, L., MacDonald, R., & Tolentino, L. (2014). Accelerating rural transportation solutions: ten community case studies from Ontario. Retrieved from http://www.ruralontarioinstitute.ca/file.aspx?id=c3296740-5db4-436e-a56a-07e5e0cddf16

(1) Collingwood – Wasaga Beach and Collingwood – Blue Mountains Transit Links

- Pilot partnership between Collingwood and Wasaga Beach with the support from the County of Simcoe
- Launched in November 2013
- Funded through public private partnership among The Towns of Blue Mountains and Collingwood, as well as Blue Mountain Resorts Limited and the Blue Mountain Village Association

(2) Deseronto Transit within areas of Napanee, Belleville, Picton, Bloomfield, Tyendigaga Territory, Tyendinaga Township and Deseronto

- Provide low-cost affordable transportation to meet needs of all individuals in the service area
- Service owned and operated by the Town of Desronto

(3) Saugeen Mobility and Regional Transit (SMART) – Grey and Bruce Counties

- Non-emergency medical, employment and social transportation
- Within the 8 municipalities in the Counties of Bruce and Grey
- Provided for residents with physical and/or mental challenges (including visual and cognitive challenges)

Providing transportation to those with lack of access and/or limited mobility to help meet their economic, social, and health needs.

While collaborations are very important to emerging transportation services, it takes time to foster and implement them, and there is a need for more information about and aid with developing these relationships.

None of the programs have measured greenhouse gas emissions indicators.

- Have not had the resources or time
- Chose to focus on the social, health and economic impacts
- Environmental impacts are harder to quantify

(4) Shared administration in Carling and The Archipelago (IMFG, 2014)

- Share a senior administration team due to the inability to find a qualified persons to replace Carling's Clerk-Administrator
- Costs for Chief Administrative Officer and Treasurer are divided on the basis of time spent in each municipality

(5) Memorandum of Understanding with Townships of Hornepayne, White River, Dubreuilville, Manitouwadge, and Wawa

- Undertake the Northern Information Technology Geomatics Cooperative
- Share related services to each partner
    - E.g. Staffing, seminar workshops/training, local meetings, Internet costs, facility maintenance, etc.

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