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EDITED AND REVIEWED BY
Michael Nones,
Polish Academy of Sciences, Poland

*CORRESPONDENCE
Sohom Mandal
✉ sohomiitb@gmail.com

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Editorial: Resiliency of urban systems to water-related disasters

Sohom Mandal[1]*, Abhishek Gaur[2] and Hamidreza Shirkhani[2]

[1]College of Professional Studies, Northeastern University, Toronto, ON, Canada, [2]Construction Research Centre, National Research Council Canada, Ottawa, ON, Canada

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Editorial on the Research Topic
Resiliency of urban systems to water-related disasters

As the world continues to urbanize at an unprecedented pace, cities face mounting challenges, one of which is the increasing frequency and intensity of water-related disasters (Benfield, 2016). The devastating impacts of floods, storm surges, and rising sea levels pose significant threats to urban systems and the wellbeing of their inhabitants. To safeguard the society, economy and environment against these risks, cities must prioritize the development and implementation of resilient strategies.

In the context of urban systems, resiliency can be defined as how the urban system anticipates, absorbs, recovers, and adapts to vulnerabilities due to water-related disasters while maintaining essential functions. Resiliency is crucial for reducing vulnerability and minimizing the long-term impacts of water-related disasters (Hoekstra et al., 2018). It should be noted that there is not yet a unified definition of resilience in the literature, and the above-mentioned definition is an example among concepts and ideas available in the scientific literature related to resilience. Therefore, different research papers may use slightly different definitions.

The significance of resiliency lies in its ability to mitigate vulnerability and mitigate the enduring consequences of water-related calamities. By establishing resilient cities, we can create sustainable and adaptive systems that are better equipped to withstand and recover from these crises. Achieving resilient urban systems involves the integration of several essential components, including robust infrastructure, integrated planning, risk assessment and management, and community engagement. These key pillars collectively contribute to fortifying cities against challenges and fostering their ability to bounce back and thrive in the face of adversity. The papers included in this Research Topic are intended to contribute novel insights to these domains.

Sandink and Binns present an insightful analysis of interconnected factors (e.g., socio-political, environmental, and infrastructure) influencing basement flooding risk. Their review delves into the complexities, investigating both challenges and opportunities tied to the effectiveness of private-side flood mitigation strategies alongside public-side measures. This study offers a set of guidelines for implementing flood mitigation measures aimed at minimizing the risks posed by overland flooding, infiltration, and sewer backup incidents, thereby mitigating potential water damage. The examples and challenges highlighted in this paper, originating from Canada, hold crucial relevance and connections to similar issues encountered on a global scale. This comprehensive research has the potential to serve as a valuable resource for homeowners, enhancing their understanding of flood vulnerability and mitigation. It can contribute to the expansion of knowledge in identifying precise causative

factors behind basement flooding and underscores the imperative to minimize uncertainty surrounding the effectiveness of private-side mitigation strategies.

Pawley et al. explored the implementation of flood management strategies in the Lower Sacramento/North Delta Region, navigating substantial hurdles to establish resilient flood management systems. Their exploration encompasses a range of approaches, spanning social/institutional (non-structural), traditional structural, and ecological-based methods. In this study, Authors summarize four case studies encompassing a structural levee project and three pioneering multi-benefit initiatives, each in its early stages of implementation. Their analysis extends to the formidable barriers, constraints, and obstacles that flood protection projects encounter, along with the collaborative efforts of project proponents to overcome these challenges collectively. They additionally conveyed that the implementation of the Central Valley Flood Protection Plan in 2012 has yielded notable advancements in fortifying flood resilience since 2008.

Hicks et al. presents a comprehensive review to analyze and differentiate between the Cured-in-Place Pipe (CIPP) and Spray Applied Pipe Lining (SAPL) pipeline renewal techniques, supported by references related to these methods in the literature. The approach for selecting relevant articles and papers is meticulously designed to identify crucial elements influencing pipeline renewal. They presented a table evaluating these techniques based on key aspects including environmental factors, mechanical properties, performance, cost considerations, and methodologies. The outcomes indicated that an examination, comparison, and comprehension of recent research in the realm of pipeline renewal will pave the way for enhanced safety, improved operational efficiency, and prolonged pipeline lifespan.

van Duin et al. presents the fundamental tenets of resiliency and uncertainties within urban stormwater management, rooted in the dual drainage concept. Subsequently, it puts forth strategies, including Low Impact Development (LID), aimed at augmenting resiliency in response to urban densification and climate change. The paper furthermore demonstrates the application of this knowledge through a case study. Discussions regarding strategies pertinent to newly developed subdivisions and pre-existing communities, taking into account potential discrepancies across various Canadian regions is provided. Environmental and other considerations relating to resiliency is also addressed, alongside prospects for future research. This study provides useful information which will serve as a valuable resource for both practitioners in drainage and the academic community alike.

The editorial team of the Research Topic on Resiliency of Urban Systems to Water-Related Disasters would like to express their gratitude to all the authors who submitted their scholarly work to this Research Topic. The reviewers' hard work and expert reviews, despite very tight schedules, have dramatically improved the quality of the final papers presented in this Research Topic. Without their contributions, this Research Topic would not have been as timely and successful as it is.

Author contributions

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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