



The ability to carefully control the environment where it is built could cause an increase in the use of modular construction in public sector infrastructure.

INFRASTRUCTURE IN THE AGE OF PANDEMICS

How COVID-19 could change the future of Canadian infrastructure.

By Catherine Doyle and Mark Johnson

As the world continues to feel the rippling effects of coronavirus disease (COVID-19), the response to the crisis both in Canada and abroad has made it increasingly clear that the virus will have a lasting impact upon the global infrastructure community. While it is true that many of the lessons learned from COVID-19 may only become apparent months or years down the road, the early response to the crisis has been such that, in the midst of the mass upheaval society has experienced as a result of the virus, several important themes relevant to the infrastructure industry have emerged.

The challenges faced by governments in the wake of COVID-19 suggest that infrastructure around the world will need to adapt to meet the significant stresses on society posed by future epidemics and pandemics. Early indications are that the following areas will be of focus in planning for infrastructure where managing epidemics and pandemics—including through physical distancing—are at the forefront of the public consciousness and understanding:

Importance of broadband and information technology

While as a class of infrastructure investment, beyond the incumbent telecommunications companies, both broadband and IT infrastructure are relative newcomers, in the wake of COVID-19 they will almost certainly become a core element of infrastructure planning, not only in Canada but globally. Canada's recent experience with physical distancing has shown that constructing communications networks with sufficient geographic coverage, resiliency and redundancy is core to keeping a functioning economy during times of crisis. It is also critical to enabling connections with both educational and social networks during periods where citizens are required to maintain isolation from daily activity patterns. While government planning in these areas has been relatively limited to date, the prospect of rural and less dense populations being critically disadvantaged due to a lack of coverage in future epidemics and pandemics

may accelerate government projects already in the planning stages.

Decentralization and divisibility of core services

While recent infrastructure trends have favored the construction of 'super' hospitals, more mass accelerated transit options and other megaprojects, the advent of COVID-19 suggests that there may be hazards that can result when critical infrastructure is designed to amass large numbers of individuals in one place or through one system. While scales of economy have historically favored the centralization of critical services, and while concentrated live/work locations have been a favored urban planning strategy for some time, the COVID-19 pandemic may force infrastructure planners to consider how such strategies can be implemented without sacrificing the ability to physically distance or isolate users should the need so arise.

Risk management and risk allocation

Managing the risks inherent in both the construction and operation of infrastructure

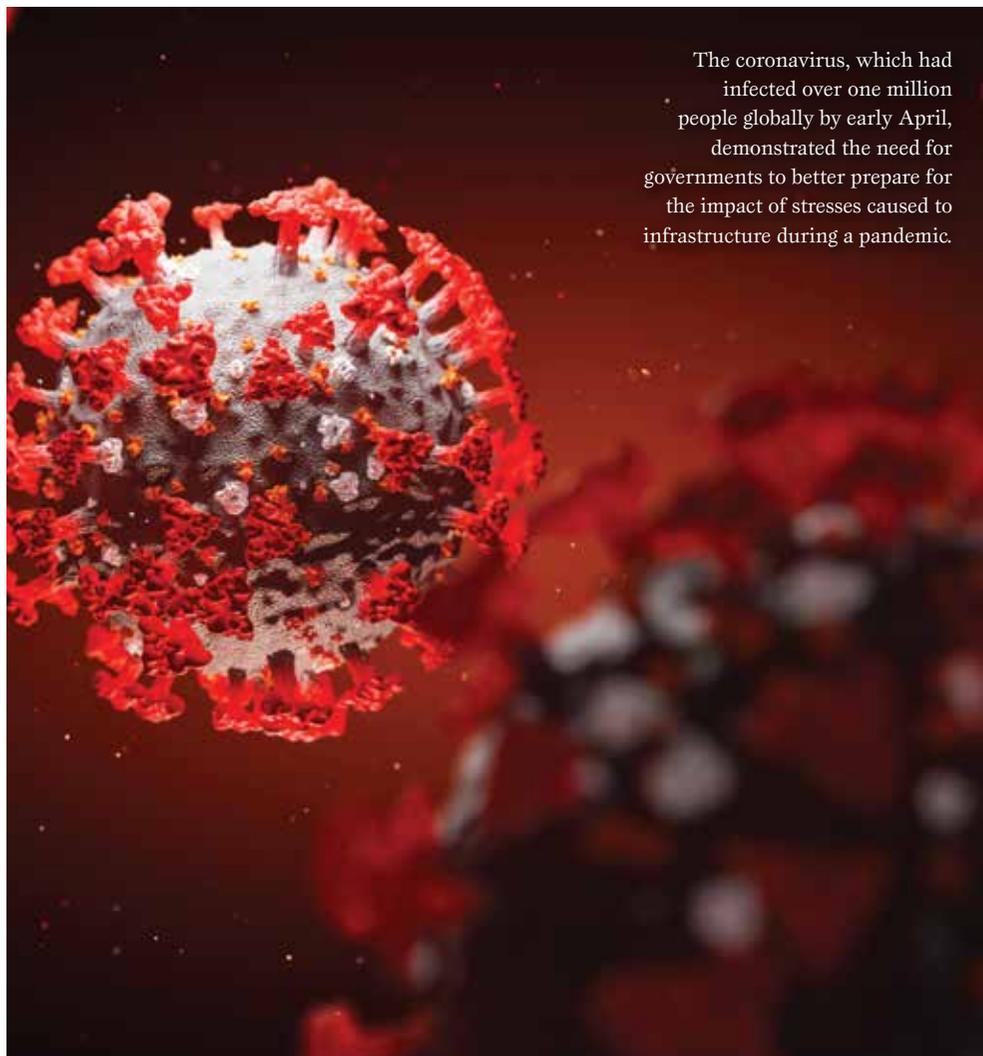
assets during epidemics and pandemics is almost certain to be a near term focus of those involved in the industry. In the face of the current COVID-19 pandemic, infrastructure market participants have in many cases been caught off guard at the lack of specific protection for epidemics or pandemics under existing policies of insurance, construction contracts, services contracts and project agreements. It remains to be seen whether insurance coverage for epidemics or pandemics evolves over time, but in the near-term business may be faced with the fact that the impacts of viruses such as COVID-19 will be excluded from most insurance policies. Accordingly, owners, investors and contractors will all need to pay close attention to future contractual risk allocation for epidemics and pandemics both in the construction and operational term of infrastructure contracts, particularly where epidemics and pandemics could cause delay or inability to meet key performance indicators.

New classes of scientific and medical infrastructure

In the wake of the biological threats posed by COVID-19, the intersection of the medical and infrastructure communities has never been more evident. While traditional bricks and mortar healthcare infrastructure such as hospitals will play a key role in management of all epidemics and pandemics, COVID-19 also highlights an urgent public interest in a thriving and innovative scientific (and associated manufacturing) sector and related distribution channels. While shortages of medical personal protective equipment and sanitation products and devices have featured prominently in the ability of countries, including Canada, to meet the challenges of COVID-19, the timely availability of drugs and vaccines has also propelled the medical industry to the forefront of a public policy discussion on the interface between the scientific community and government. The ability of health care facilities to pivot easily in a crisis, manufacturing facilities to repurpose quickly and supply chains to adapt around them will likely become key elements of their design, licensing and operation.

Modular construction as a differentiator

The move towards modular construction was already gaining steam before COVID-19, but that trend may now accelerate. While the traditional benefits of modular manufacturing remain - off-site manufacturing processes are generally faster and have better quality control than the equivalent building processes on-site - those



The coronavirus, which had infected over one million people globally by early April, demonstrated the need for governments to better prepare for the impact of stresses caused to infrastructure during a pandemic.

benefits take on added importance when responding to epidemics and pandemics. The controlled factory environments in which modular manufacturing occurs permit greater degrees of automation and customization, meaning that they are better suited to managing many of the potential health and safety requirements of epidemics and pandemics. Modular manufacturing is also well suited to repurposing assembly lines quickly, for example to manufacture components for health care facilities.

Evaluating preparedness and flexibility as elements of infrastructure projects

One legacy of COVID-19 may be that readiness and adaptability for future epidemics and pandemics becomes a criteria for future infrastructure investments. This would see infrastructure agencies focus on elements of preparedness and flexibility throughout the infrastructure cycle and ensure that such elements are incorporated into long-term infrastructure planning. In this regard, increased emphasis on modular buildings, decentralized systems and internal redundancies, as well as convertible spaces that can readily be transformed from one use to another may quickly become the norm. While incorporating such elements into a traditional infrastructure plan may be more

costly, that will need to be weighted against the almost certainty that such features will be tested in future pandemics.

It is inevitable that COVID-19 will change the way we think about and plan for infrastructure projects in Canada and around the world. While the global response to the pandemic raises important questions about how both governments and the private sector will execute and manage the risk of taking on traditional infrastructure projects in a future where epidemics and pandemics could be an increasing reality, it will doubtless also be the case that learnings from the response to COVID-19 will impact the nature of future infrastructure itself, whether in terms of technology, housing, healthcare, service delivery or channels of transportation. As a result, COVID-19 will offer challenges to professionals in all aspects of Canada's infrastructure marketplace. 🍁



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