



## SMART INFRASTRUCTURE

### **‘Big Lift’ Delays Cause Cascade of Impacts in Metro’s Traffic Network**

#### **Why DalTRAC Did This Study**

The ‘Big Lift’ re-decking began in October 2015. Over the course of 18 months, the ‘Big Lift’ aims to replace the suspension spans of Halifax, Nova Scotia’s Macdonald Bridge while keeping the Bridge open to traffic; the Bridge is closed for construction on selected weekends and from 7 pm to 5:30 am on weekdays.

We anticipated that there would be occasional delays in re-opening the Macdonald Bridge due to weather and construction issues, and that these delays would cause traffic congestion. Our model analyzes the impacts that delays have on the traffic network and can help inform traffic mitigation strategies.

#### **What DalTRAC Recommends**

Halifax Regional Municipality (HRM) and Halifax Harbour Bridges (HHB) should further develop traffic contingency plans. Short-term plans could possibly include, 1) additional upstream traffic diversion where major alternative routes are available (e.g., Portland St. and Highway 111), and 2) more Variable Message Signs (VMAs) to update commuters about sudden delays. For the long-term, HRM could further encourage flex work and ride-sharing to reduce traffic in the network, and Metro Transit could increase ferry service at the Woodside and Alderney Ferry Terminals.

#### **What DalTRAC Found**

DalTRAC has developed a model to predict the impact that delays in re-opening the Macdonald Bridge will have on traffic. One of the variables that our model predicts is average traffic delay. This is the average amount of additional time that vehicles spend on the road due to delays in the Bridge re-opening. We found that average traffic delays increased with each hour the bridge remains closed, peaking after 3-hours at an average traffic delay of 17 minutes.

Delays in re-opening the Macdonald Bridge also impact the average number of vehicles on the road during morning rush hour. Because it takes longer for people to get where they are going, more vehicles end up being on the road at the same time, which increases traffic congestion. Following a 1-hour delay in re-opening the Bridge, the average number of vehicles in the traffic network during the morning rush hour increases by 12%. After a 2- to 3-hour delay, the average number increases by 30%.

Our model also predicts grid-lock. In Dartmouth, certain intersections adjacent to the Macdonald Bridge are always grid-locked during the morning rush hour, however, we found that with delays in the Bridge re-opening more intersections become grid-locked. After a 3-hour delay in the Bridge re-opening, all intersections adjacent to the Macdonald Bridge are completely grid-locked. Idling cars at these gridlocked intersections increase carbon emissions.

Finally, a four-hour delay in re-opening the Macdonald Bridge increases the total amount of time that commuters spend on the road by 1863 hours, a 24% increase over a regular morning when the bridge is open.

For more information on this research, contact MD Jahedul Alam at [jahed.alam@dal.ca](mailto:jahed.alam@dal.ca).





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