

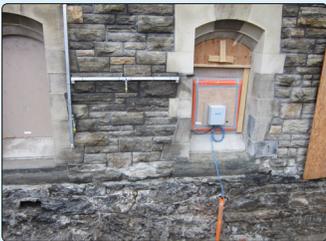
Parliament Hill, West Block, Ottawa, Ontario



• Automated data acquisition system for telemetry



• In-place inclinometer and inclined multiple-point borehole extensometer underneath the McKenzie Tower



• Horizontal and vertical tilt beams and in-place inclinometer on the inner courtyard



• Reference point for differential settlement measurement system



• View of the worksite at Parliament Hill's West Block

The year 2017 marks the 150th anniversary of Confederation. Amidst the preparations for the celebrations, several infrastructure projects have been undertaken in Ottawa, including the rehabilitation of the Parliament Hill Buildings. The project is a major overhaul intended to modernize the West Block, the Centre Block and the East Block while maintaining their heritage look. Given that the Parliament Hill Buildings are over 150 years old, the goals in modernizing them are both structural and aesthetic. GKM Consultants' instrumentation services were entrusted with the long-term monitoring of the West Block.

The main work that was carried out included demolishing the building's interior, building new infrastructure, replacing masonry and copper roofing, and backfilling the tunnel running under the McKenzie Tower. Any one of these steps could have compromised the building's structural integrity.

GKM Consultants provided, installed and monitored many instruments such as convergence meters and settlement measurement systems. These highly sensitive systems, with an accuracy within 1 mm, allow immediate adjustments of ongoing work when used in combination with our remote data management system.

Posing an even greater challenge, the interior of the north wing was excavated down to 15 metres for the construction of new floors. In tandem with this operation, the inner courtyard was excavated to the same depth to build new floors and an agora. For this

purpose and to upgrade to today's seismic standards, the foundations were reinforced. This type of underpinning excavation and reinforcement work increases the risk of differential structural movements of the walls and foundations. It was therefore crucial to measure any tilt of the walls or foundations, which was done using tilt beams. In addition, extensometer chains and in-place inclinometer chains were installed at the edge of walls and foundations to monitor their behaviour in real-time and prevent any soil movement.

GKM Consultants designed the online real-time data management system with the goal of improving worker safety. This web server allows engineers to access their data in real-time and track the immediate effects of ongoing work. As well, this service manages alarms that send out emails to the engineers in charge should any instrument measure values be beyond safe ranges.

GKM Consultants' expertise, in both the choice of instruments and the management of their data played a key part in the successful renovation of the Parliament Hill Buildings. GKM Consultants is proud to have been associated with this major project to preserve our national heritage.