

Case Study

Real-Time Subsurface Data Empowers Safe Excavation



multiview
Insight, not hindsight®

REAL-TIME SUBSURFACE DATA empowers safe excavation

CHALLENGE

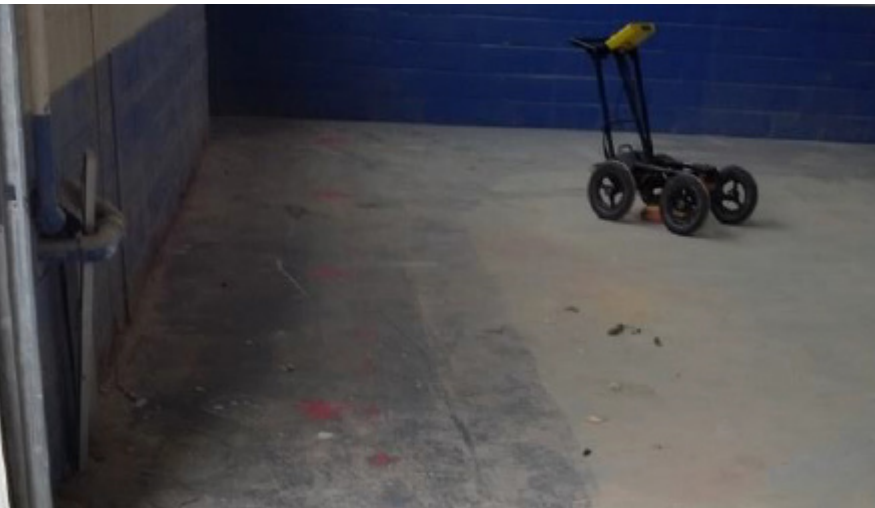
Harrington & Associates, a construction management company based out of Richmond Hill, was carrying out renovations at an industrial warehouse in North York and needed to ensure that no buried utility services existed where excavation and sawing was planned. The contractor also had to determine the locations of existing plumbing for new tie ins. In response, Harrington & Associates retained multiVIEW Locates (multiVIEW) to carry out concrete scanning using Ground Penetrating Radar (GPR). The survey was comprised of three areas measuring approximately 1072 square meters. The main objective of the survey was to accurately map the location and depth of existing drain lines in the project area.

SOLUTION

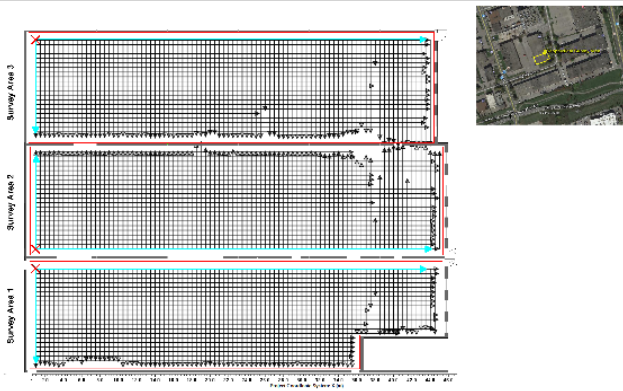
Using commercial measuring tape and line of site positioning, multiVIEW established survey grids with parallel and cross lines at 0.50 meter intervals. The concrete structure scan was then completed using Ground Penetrating Radar (GPR) survey techniques over the project area. The GPR signal was transmitted into the subsurface and reflected by buried objects and contrasting features which were then recorded by GPR instrumentation. This allowed subsurface information to be interpreted in real-time.

Anomalies beneath the surface were identified by examining subsurface electromagnetic reflection characteristics. GPR data was then interpreted by comparing characteristics of the acquired profiles to example results owned by multiVIEW from in-house tests and historic field surveys.

The inferred location of all GPR features and interpreted anomalous zones were documented and transferred to digital drawings. GPR reflections indicating features at a depth greater than 0.20 meters below the concrete slab(s) were analyzed and identified as utilities. Samples of GPR profile images for both X and Y lines were provided to offer a reference on data quality and buried feature identification.

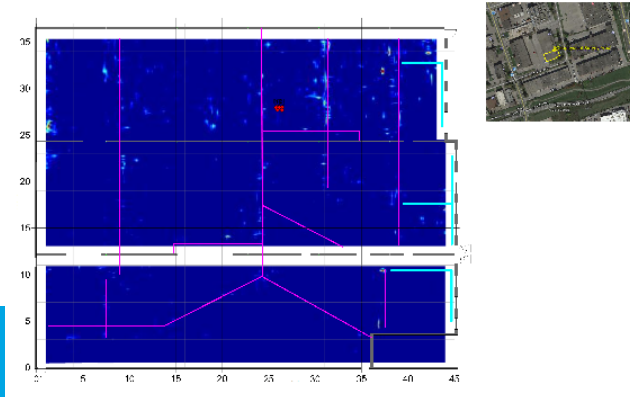


Unlike X-Ray, GPR transmits harmless electromagnetic waves into the structure and analyzes the reflected energy to create a profile of subsurface features. It can assess slab thickness and detect anomalies deep below the surface that indicate the presence of utilities and other features. No clearance area is required and it can be performed during regular business hours. Construction works can then continue immediately following the scan.



The general position and reference stations of the GPR survey grids. Starting with the reference position, grids were installed with parallel and cross lines at 0.50 meter intervals.

Depth contour maps are used to illustrate the depth of the utilities from the surface of the concrete slab to the top of the utility throughout the entire survey area.

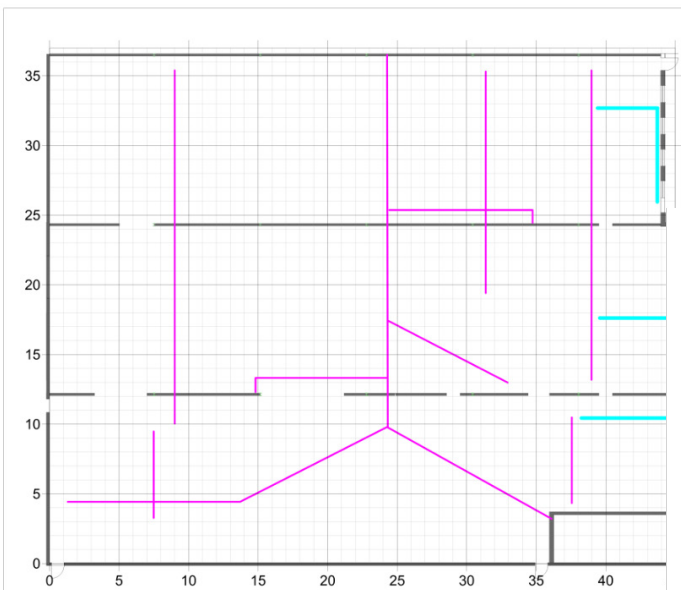


RESULTS

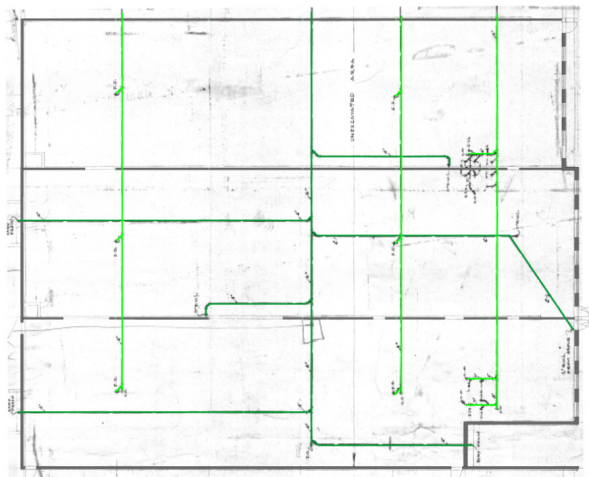
Compilation plan maps revealed electromagnetic responses below the concrete slab which were interpreted as utility lines within the project survey area, at a depth of approximately 0.1 – 0.3 meters. GPR survey results were also presented in plan map images based on signal amplitude and cross-sectional views (distance versus depth). For the accessible portions of the survey area, GPR reflections in the linear pattern beneath the concrete slab indicated the presence of utilities in X and Y directions, which were illustrated as pink lines in the provided maps.

GPR features identified as large metallic piping beneath the concrete slab were determined to be HVAC ducts and were illustrated with light blue lines on the maps. Furthermore, drain lines indicated on the record data provided by Harrington & Associates were overlaid on the survey area and colour-coded based on the drain line type. The client was also provided with raw GPR data profile images to illustrate the findings.

Depth contour maps were created to illustrate the depth of the utilities from the surface of the suspended slab to the top of the utility throughout the entire survey area. Detailed interpretation results were made available digitally and compilation plan maps were provided along with a summary report. multiVIEW recommended that the results of the survey be correlated to the reference grid stations presented on the digital maps when physically locating the interpreted responses over the project site for intrusive testing, excavation or rehabilitation activities.



Drain lines indicated on the record data provided by Harrington & Associates are overlaid on the survey area and colour-coded based on the drain line type.



GPR reflections in the linear pattern beneath the concrete slab indicate the presence of utilities in X and Y directions which are illustrated as pink lines in the provided maps. HVAC ducts are illustrated with light blue lines on the maps.

multiVIEW Locates Inc. is a professional services firm that specializes in Utility Locating, Concrete Scanning, Hydro Excavation, CCTV Camera Sewer Inspection and Subsurface Utility Engineering. For almost 30 years, we've collected, analyzed, prepared and delivered subsurface data to empower thousands of construction, geotechnical, engineering, and environmental projects.

Operating out of multiple office locations across Ontario including Mississauga, Ottawa, Kitchener and London, we partner with customers to mitigate risk and cut project costs. We continuously invest in the latest technology and techniques in addition to staff training. Through a unique approach to resourcing, we offer fast, flexible response times and self-performance capabilities, largely eliminating the need to work with subcontractors. All projects and processes are carried out in accordance with our dedication to Safety, Quality and Customer Excellence.

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