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# ECLRT AND SUE Natural Transit Partners

**S**ubway or LRT... While the battle raged on between the various layers of government about the Eglinton Crosstown LRT (ECLRT) project one thing was clear—subsurface utility engineering (SUE) mapping services were going to be a key aspect towards the success of the project.

The ECLRT project is one of the largest major infrastructure projects in the province and around the country. It is designed to improve commuter

transportation across an EW corridor along Eglinton Avenue. The project started as a TTC initiative and is now being run as a Metrolinx project. The current plan calls for combination of both below grade tunnels and at grade lines, along with numerous stations—see [www.thecrosstown.ca](http://www.thecrosstown.ca) for more information.

From early stages of the project the TTC/Metrolinx recognized that although this was a major transportation project it was also an equally large utility infrastructure project. Based on the successes they achieved on other projects, such as the TTC Union Station 2nd Platform expansion project, they decided early on that a comprehensive SUE mapping investigation would be completed during the preliminary design stage of the project that would assist with the overall design and

coordination of the project. ECLRT is not the only major transit project using SUE to help manage utility items. The Ottawa LRT, Edmonton LRT, York VIVA BRT, Durham Hwy 2 BRT are other large profile transit projects gaining success by using SUE.

## Methodology Used for the Project

The first stage in the process was the collection of records information from all utilities within the project areas. Requests were sent to all utility companies to provide records information, including the City of Toronto. A special trip was made to the City of Toronto vault to review record drawings for the area. All information was compiled and used to provide with data for field staff.

The next stage was the actual collection of field data. There are a number of different mapping technologies that can be used for mapping utilities. Three of the more prominent techniques were used for this project—electromagnetic pipe and cable locate equipment; ground penetrating radar; and CCTV cameras with sondes. The various technologies were used to mark out the horizontal location of utilities on the ground. The marks were then surveyed and based on the professional engineer's judgment of the field data and records information the horizontal location was placed onto the Microstation drawing.

Confined-space entry techniques were used to gather invert and chamber dimension data at key locations. There are several large diameter trunk sewers running through the project area that will act as a critical control for the overall depth and location of the new tunnels.

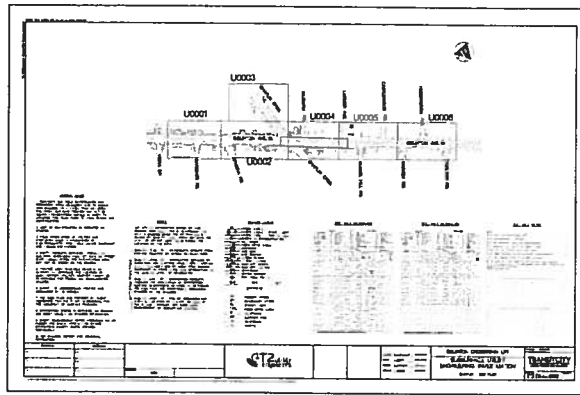


Vacuum excavation was used to gather critical horizontal and vertical information at key conflict locations. The majority of these initial locations corresponded with the location of stations, where open pits will be required to allow the structures to come up to surface, hence impacting almost all existing utilities in the area.

All the field data was collected and compiled on the drawing. This allowed the professional engineer a thorough review of the field data and records information to assign quality levels to the data and make sure that the utility data as shown is the best representation of what is in the field. Following final review and quality checks the drawing and report and signed off and stamped by the professional engineer.

### Lessons Learned

The ECLRT project was a large and complex utility mapping and



coordination assignment. Although the initial phase of mapping is completed, additional mapping is still being done to improve the quality level of the data in key areas and to expand to areas not included in the original investigation. There were some lessons learned as part of this assignment that could be brought forward on future projects.

**Schedule** - The earlier you get started the better! For large projects utility information is one of the first things designer are looking to tackle. The sooner that the accurate data can be collected in the field the better.

Consideration could be given to moving the up the mapping phase possibly to the EA stages of the project.

### Traffic/Pedestrian Management

- Eglinton Road is one of the busiest corridors in Toronto. It was essential to ensure the smooth and safe flow of both vehicular and pedestrian traffic during the mapping investigation. To accommodate this a large portion of the work, particularly the invert and test hole work was done at night to minimize any disruption.

**Schedules** - This project like many other large infrastructure projects has a very tight schedule. Because of the large amount of time needed to coordinate utility relocations and protection strategies the utility drawings were needed as quickly as possible. To handle this challenge the TTC split the mapping contract into east and west with two different SUE firms.

**Abandoned Plant** - Eglinton is a complex mature utility corridor. There was numerous abandoned plant identified within the project limits. The major challenge was that some of the

abandoned plant had been removed and other sections were buried in place. Scanning techniques were used with both the cable locate equipment in power and induction modes, as well as with the GPR in attempt to find the location of any abandoned plant. A thorough review of all available records was also key.

#### **Abandoned Construction Shoring**

– The City of Toronto identified an area east of the Allen where old construction shoring was buried in the roadway. The orientation of the steel piles made it challenging to determine the location of the shoring piles. GPR was used successfully to scan the area and identify the location of the piles and outline the extents of the shoring.

#### **Additional Opportunities**

As the project moves into the construction phase there are several opportunities to take advantages of some of the new advances within the Utility industry. Hopefully Metrolinx and other agencies will look at these opportunities as they move forward.

**CSA S250** – The CSAS250 standard was published in September 2011. Contained within it are excellent guidelines for mapping new infrastructure and assigning accuracy levels to the drawings which are produced. With all the plant that will be relocated and exposed as part of this project there is an opportunity for the city have an extremely accurate reliable map of the utility infrastructure within the Eglinton road corridor following completion of the project. Hopefully the city

and Metrolinx take advantage of the opportunity at hand.

#### **Management of Construction**

**Locates** – Passing of Bill 8 will require all utility owners to be members of Ontario One call. This will greatly simplify the locate process in Ontario which will be a benefit to the project. In addition to that there are opportunities for the contractors and Utilities on this project to work collectively regarding the collection and refreshment of utility locates for the project. A similar process was used with great success on the recent Bank Street reconstruction project in the City of Ottawa.

#### **Concluding Thoughts**

All infrastructure projects, whether it is a school, a new watermain, road reconstruction, or a major transit

project like the ECLRT project can benefit from the sound engineering principals followed by the SUE mapping process. The goal is always to reduce the risk of issues rising on the project that relate to utilities. Having this quality information has been proven to save time and money and provide for a safer work environment. Hopefully the trend continues on future transit projects and other infrastructure projects throughout Ontario and Canada. ■

*Lawrence Arcand is president of T2 Utility Engineers Inc (T2ue). T2ue provide SUE mapping services on the west half of the ECLRT project, as well as at many of the stations. T2ue also provided utility coordination and design services for the west launch area at East Beaver Creek.*