

Tunnel Boring Machines

Backgrounder

Metrolinx is making progress on the Eglinton Crosstown project, and tunnelling for the underground section has begun.

The tunnels are constructed by four large tunnel boring machines (TBMs). These machines work in pairs, with one pair tunnelling the west portion from Black Creek Drive to Yonge Street, and the other pair tunnelling the east portion from Yonge Street to Laird Drive.

With trailer gear, each TBM is about 81m long and weighs 511,000kg. It took dozens of truckloads to move all of the components to the launch shaft where they were assembled on site. The machines were built by Caterpillar, a Toronto company that also built the TBMs for the York-Spadina subway extension. The four TBMs were purchased by Metrolinx in 2010 at a total cost of \$54 million.

It is a tradition to name TBMs that are constructed for a specific project. Metrolinx ran a naming contest and received more than 500 entries. The winners are: Dennis and Lea for the west, representing the Mount Dennis and Leaside neighbourhoods; and Don and Humber for the east, representing the rivers.

Dennis and Lea were launched at Black Creek Drive in Spring 2013. They are drilling eastward, creating tunnels 6.5 m in diameter, at a rate of 10 m a day. TBMs operate 16-20 m below ground.

The earth from the drilling is collected by the TBMs, carried back on a conveyor belt, loaded into rail cars, and transported to a launch shaft at Keelesdale Park. There, the earth is lifted out and stored for later removal. The volume of material to be excavated is enough to fill the Air Canada Centre rink to the height of the CN tower!

Precast concrete liners are placed on the tunnel walls as the TBM drives through. The TBM propels itself forward by pushing on these newly-installed concrete panels.

When Dennis and Lea reach Eglinton West Station, they will be extracted using a shaft located just west of Allen Road. This will allow existing subway service to be maintained throughout construction. The TBMs will be refurbished and reinstalled just east of Allen Road, for the second phase of tunnelling to Yonge Street. After the tunnel excavation is complete, tracks and other utilities will be constructed inside the new tunnels.

The entire Crosstown project is a \$5.3B investment that is a part of the Ontario government's \$8.4B commitment to expand transit in Toronto. When complete, the Crosstown will move Torontonians across the city reliably and comfortably, in half the time as with current options.



A tunnel boring machine (TBM); the grey part is the "cutting head"



Construction workers lower the first piece of the TBM into the shaft



The winning TBM names are unveiled: Dennis, Lea, Don, Humber



A fully assembled TBM, ready to begin tunnelling

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