

Welcome to the Tunnelling Open House

Eglinton Crosstown West Extension

December 5, 2023

Introducing the WestEnd Connectors project team

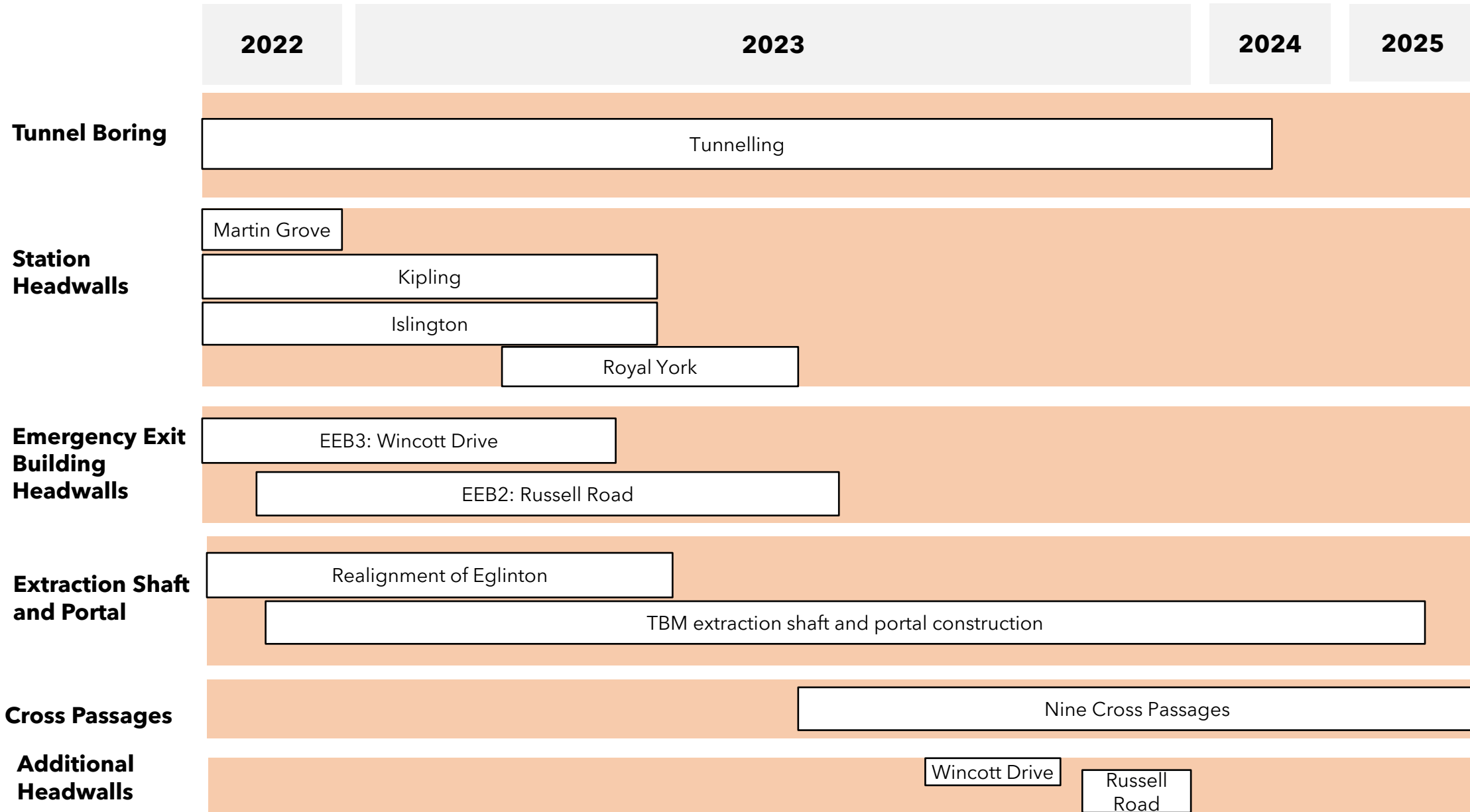
WestEnd Connectors Construction is an integrated general partnership consisting of three Canadian and international leaders in tunnel construction: Dragados Canada Inc., Aecon Infrastructure Management Inc., and Ghella Canada Ltd. Together, the team is delivering and financing tunnelling for the Eglinton Crosstown West Extension project, from Renforth Station to Scarlett Road.

Our team members have extensive experience in Canadian heavy civil and urban infrastructure projects and bring a unique expertise in underground tunnelling works.



Renforth to Scarlett tunnel timeline

Timelines are subject to change.



The inside of a tunnel boring machine

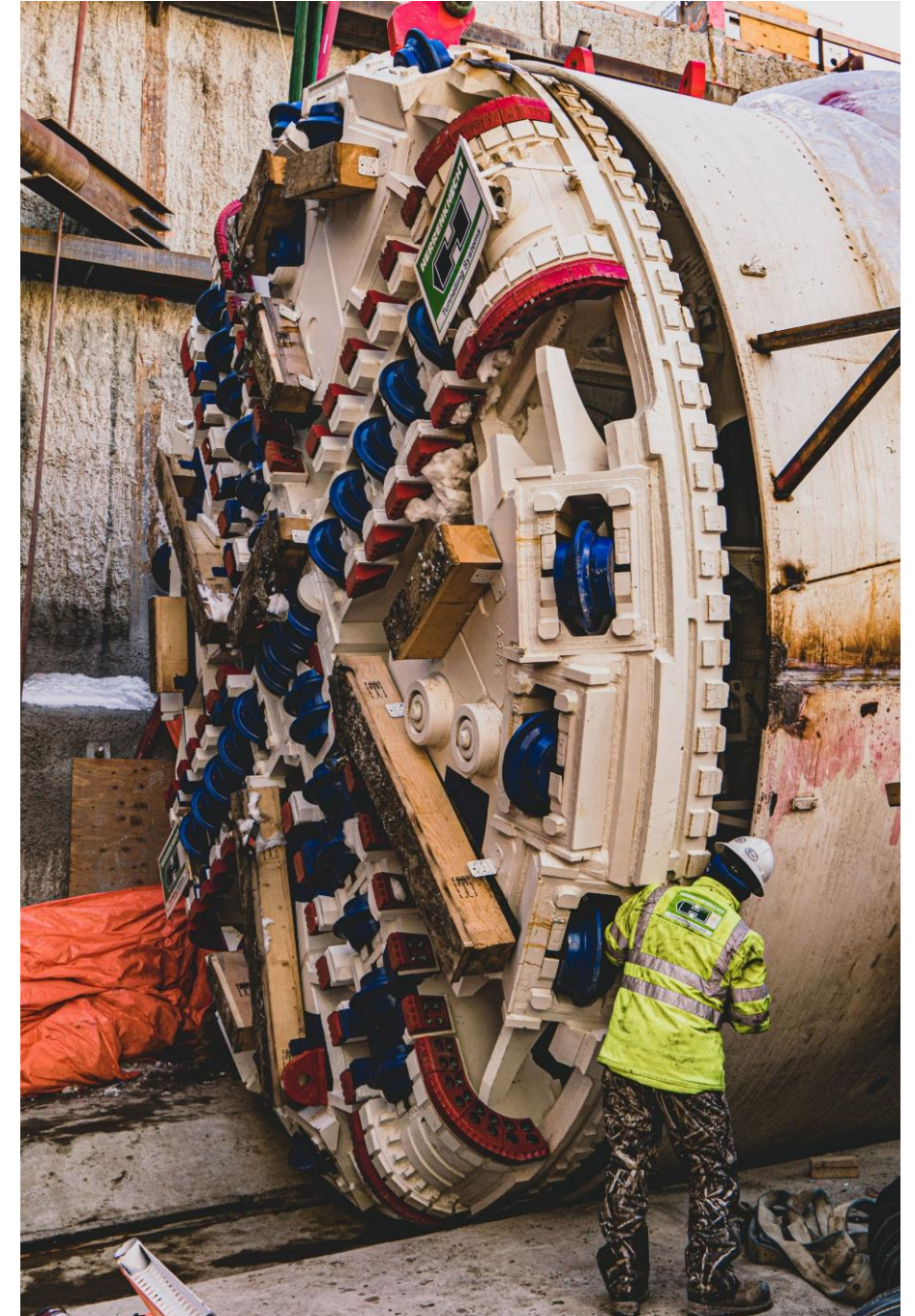


Tunnel boring machine (TBM) fun facts

Did you know?

- Each TBM weighs about 750 tonnes each, which is about five times as heavy as a blue whale.
- TBMs travel on average 10 to 15 metres a day.
- TBMs typically collect around 2,000 tonnes of earth and rock per day as they tunnel.
- It can take between 50 to 120 minutes for a TBM to excavate and install one liner ring.

Multi-service vehicles (MSVs) are used to transport people and equipment from the surface to the TBMs deep inside the tunnel.



TBM update

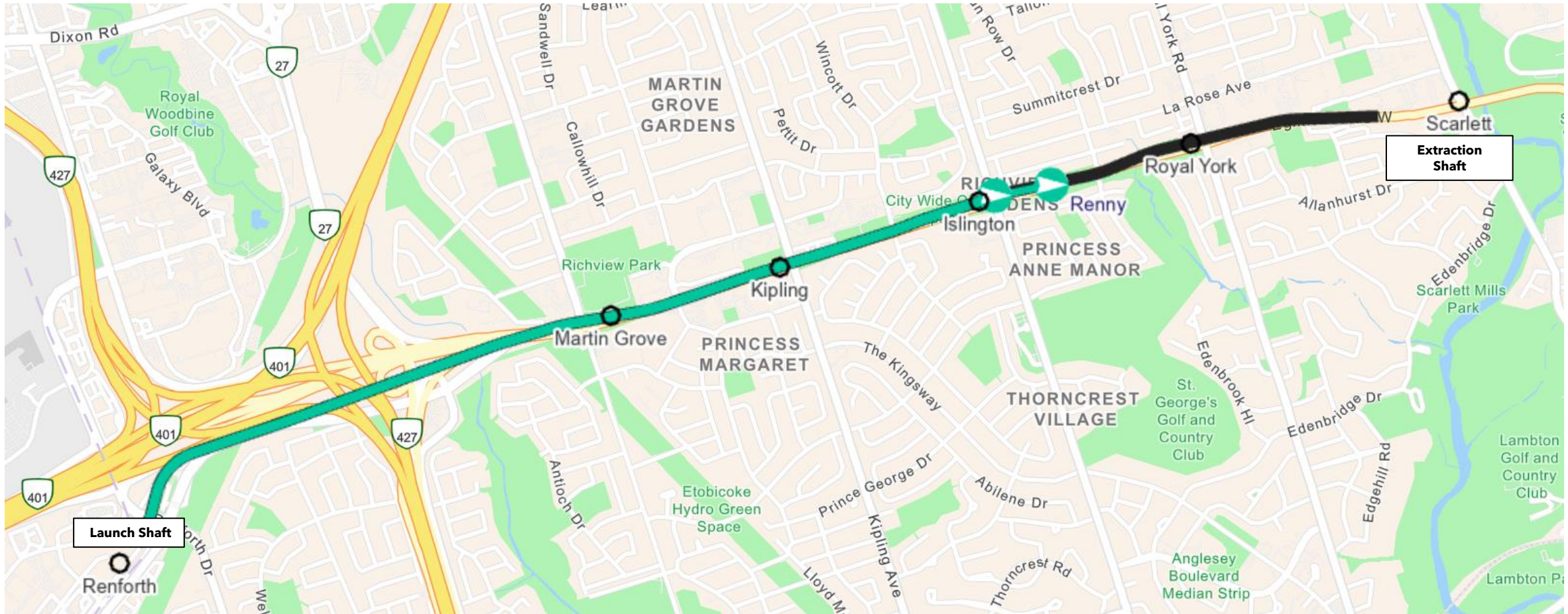
- Both TBMs, Renny and Rexy, will tunnel approximately 6 kilometres along the Eglinton Avenue West Corridor before completing their journey at Scarlett Road in early 2024.
- Renny passed through the first headwall at Martin Grove Road in November 2022 and Rexy passed through the headwall at Martin Grove Road in March 2023.



Tunnelling update

Where are Renny and Rexy, the two tunnel boring machines (TBMs) now?

The TBM Tracker can be found on the project website and is updated regularly.



Last updated on November 17, 2023

What to expect during tunnelling

- Tunnel boring machines (TBMs) work beneath Eglinton Avenue West and operate Monday - Friday with occasional weekend work.
- The launch shaft area at will be an active construction site until tunnelling and related work is complete in 2025.
- Residents and businesses in the area can expect to hear some noise during construction, but disruption will be minimal.
- Additional construction trucks will be present in the area during this work. The trucks/vehicles entering and exiting the site sound similar to the TTC buses and sanitary trucks that frequent the area.



Launch Shaft - Renforth

Did you know?

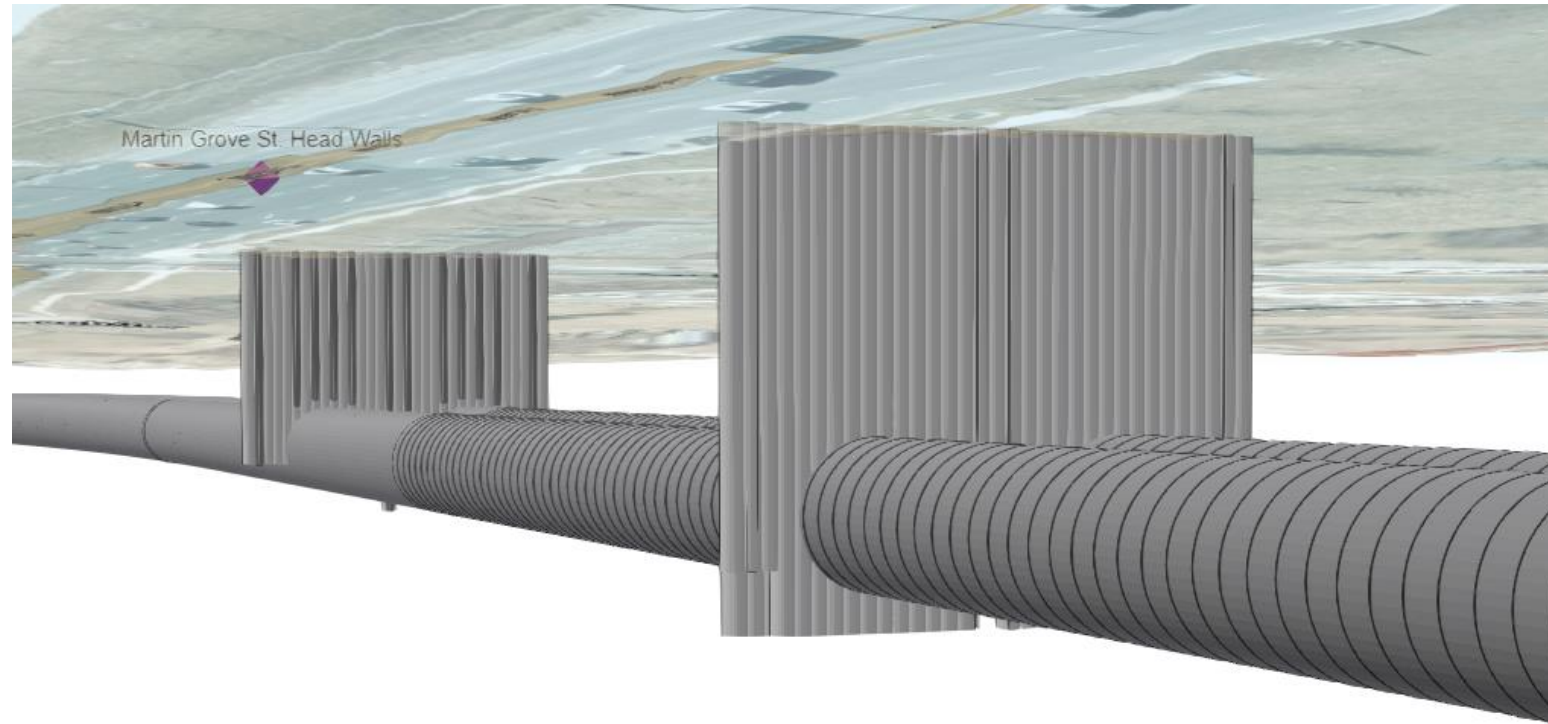
- Our Launch Shaft, where Renny and Remy first began digging, is 80 metres long, 20 metres wide and 17 metres deep, and at about 27,200 cubic metres, has roughly the same volume as 11 Olympic-size swimming pools.
- The conveyor belt that removes the soil and rock from the tunnels can hold up to 500 tonnes of material per hour.
- Tunnel liners are made of reinforced concrete and give the tunnels their structure. We'll use about 7,400 concrete rings to complete the tunnels for the project.



Headwall overview

What are headwalls?

- Headwalls are underground support walls located at the east and west ends of the station location.
- The TBMs bore through the headwalls, therefore crews must build them prior to the TBMs arriving at each site.
- There will be four underground stations (Martin Grove, Kipling, Islington and Royal York) and each require two headwalls to be built.
- There will also be two emergency exit buildings constructed - one between Kipling Ave and Islington Ave, the other between Islington Ave and Royal York Rd.



3D model of two headwalls

Did you know?

- All headwall work for the future stations were completed in July 2023.

Martin Grove headwal



- ✓ Major works completed in October 2022
- ✓ Lanes reopened

- The first TBM, Renny, reached the Martin Grove headwalls in mid-November 2022.
- Rexy passed through in March 2023.

Kipling headwall



✓ Major works completed in April 2023

✓ Lanes reopened

Emergency Exit Building #3 (Wincott Drive)



- ✓ Major works completed in March 2023
- ✓ Lanes reopened

- Emergency Exit Buildings are used to evacuate passengers from tunnels in the event of an emergency at track level during operation.

Additional headwall work at Wincott Drive



- ✓ Major works completed in September 2023
- ✓ Lanes reopened

- Construction crews built an additional headwall at Wincott Drive and Eglinton Avenue West. This additional headwall was constructed for maintenance on the TBMs due to very challenging and unexpected soil conditions.

Islington headwall



✓ Major works completed in April 2023

✓ Lanes reopened

Additional headwall work at Russell Road

October 2023 - December 2023



- Construction crews are building an additional headwall at Russell Road and Eglinton Avenue West. This additional headwall is for maintenance on the TBMs due to very challenging and unexpected soil conditions.
- Remy is approaching this headwall.

Emergency Exit Building #2 (Russell Road)



- ✓ Major works completed in July 2023
- ✓ Lanes reopened

- Renny is approaching Emergency Exit Building #2

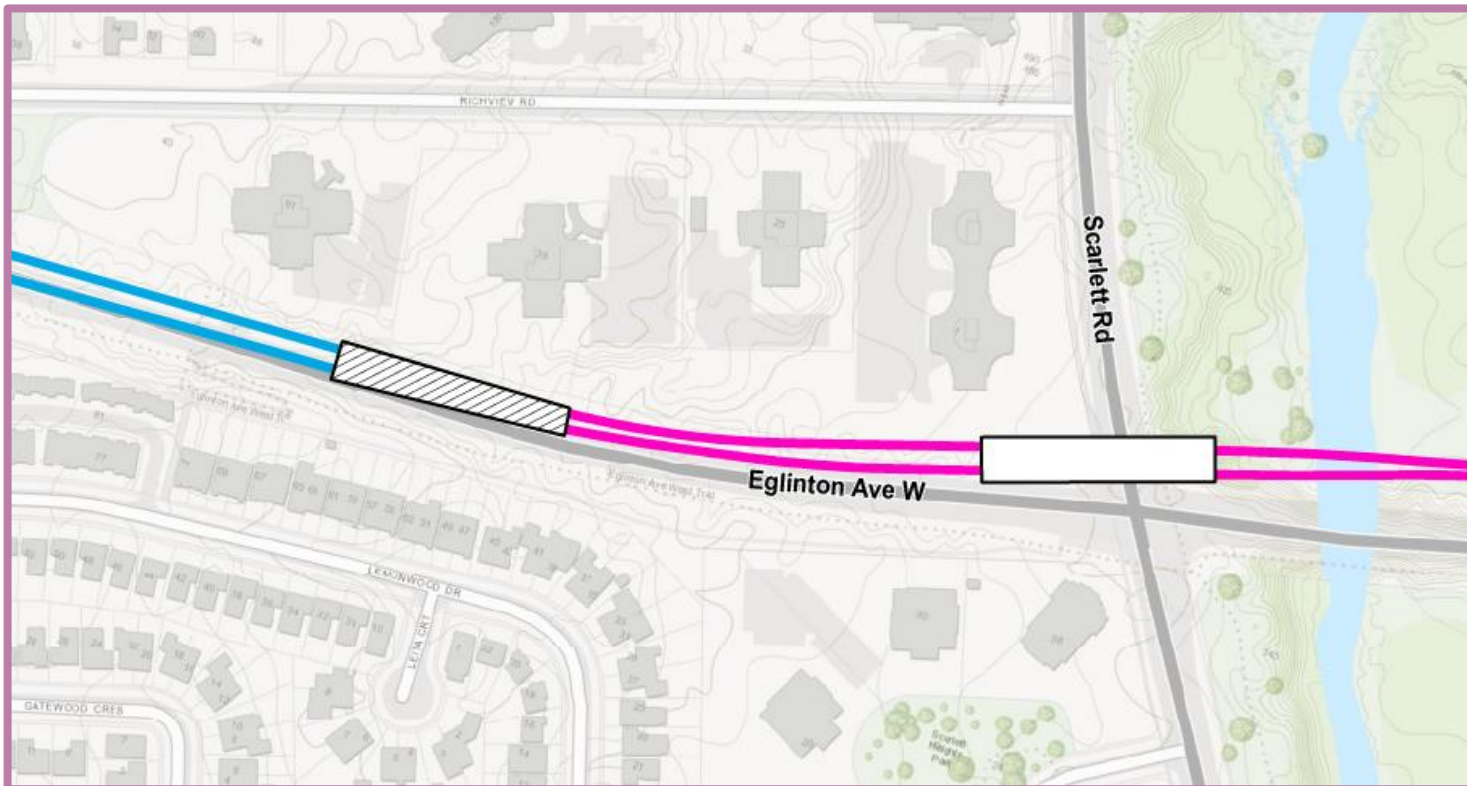
Royal York headwall



✓ Major works completed in May 2023

Extraction shaft and portal

- The TBMs will finish digging west of Scarlett Rd. where they will be dismantled and removed from the ground through an extraction shaft.
- The shaft is also the portal for where the light rail vehicles transition between the tunnel and the elevated guideway.
- Construction for the extraction shaft/portal began in winter 2022. The TBMs are expected to finish tunnelling and be removed in Spring 2024.



Crosstown LRT east portal (2021)

Extraction Shaft (Scarlett Road)



To make room for the extraction shaft and portal (which will be used to remove the tunnel boring machines), Eglinton Avenue West shifted to the south by approximately 10 metres (33 feet) between Scarlett Road and the pedestrian bridge.

The road realignment construction was completed in April 2023, and crews reopened the south side of Eglinton Avenue West and flipped the work zone to the north side to continue working full-time on the extraction shaft.

TBM Breakthrough in Spring 2024

- Renny and Remy are expected to breakthrough at Scarlett Road and Eglinton Avenue West in Spring 2024.

Check out what a TBM breakthrough looks like



Photo Credit: Ghella

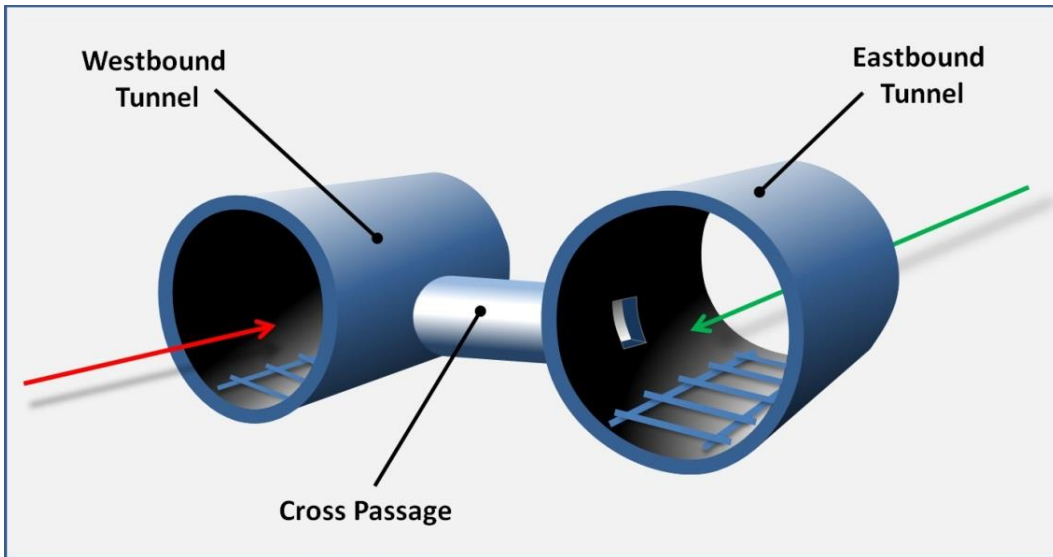
Cross Passage construction

A cross passage (CP) is a small passageway built to connect the eastbound and westbound tunnels for maintenance and/or emergency purposes.

This scope of the project will have 9 cross passages along the Eglinton Avenue West corridor.

Work for the first cross passage at Renforth, "CP-10" started on May 15 - slightly ahead of schedule.

While many other projects build cross passages after the TBMs complete their digging, our team's methods, equipment, and expertise allow us to build them during TBM operation.



All alignments and stations are conceptual and subject to change.

Cross Passage construction progress

CP-10

✓ **100 % completed**

Work started in May 2023

CP-9

✓ **100 % completed**

Work started in June 2023

CP-8

✓ **100 % completed**

Work started in July 2023

CP-7

✓ **100 % completed**

Work started in August 2023

Brokk Machine

A Brokk machine is used to excavate the cross passages.

- **Safety** - The Brokk is remote controlled. The operator can control the machine from 5 to 8 metres away.
- **Environmental** - The Brokk is electric-powered, so there is no pollution or smoke in the tunnel.
- **Productivity** - The Brokk is more powerful and compact compared to a standard excavator of the same power.
- **Multi-tools** - The Brokk has multiple tools that can be used as a: breaker, bucket, roadheader, etc.

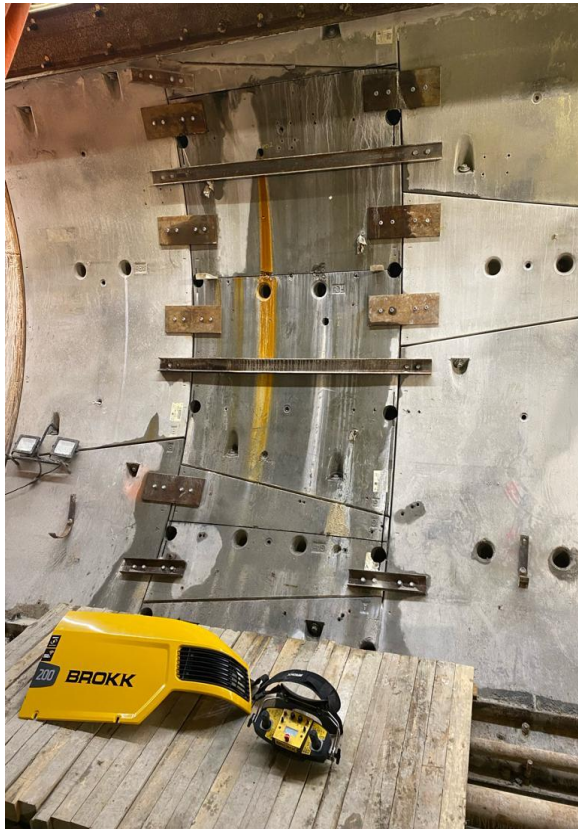


Photo Credit: Yusuf Soliman, Tunnel / Geotechnical Engineer from Dr. G. Sauer & Partners Corp

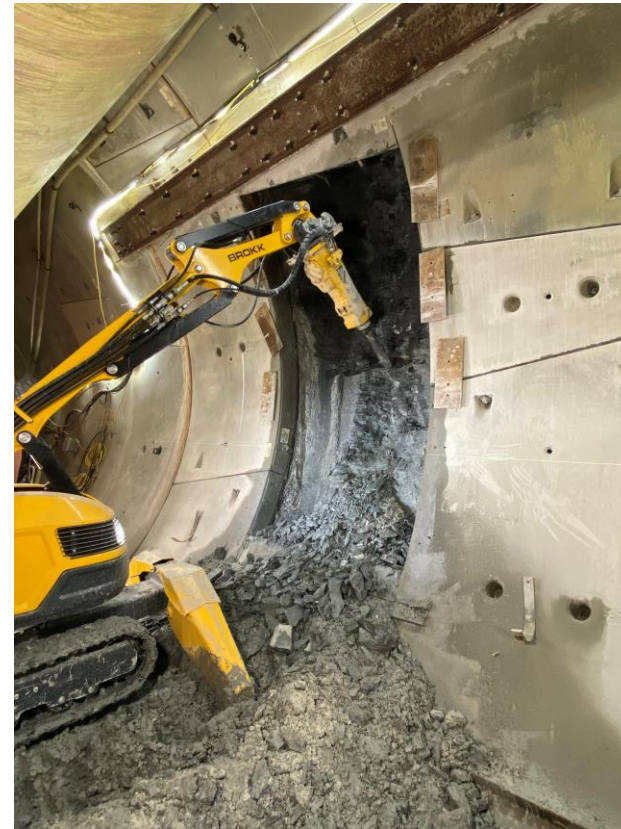
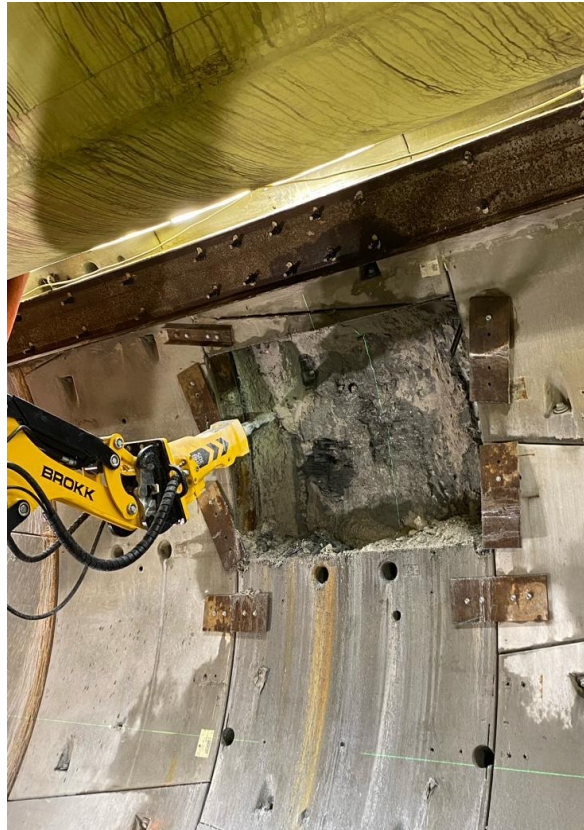
Did you know?

This photo won the Tunnelling Association of Canada (TAC) Canadian Photo of the Year Award!

Cross Passage construction process



Preparatory Works



Excavation and Primary Lining

Cross Passage construction process



Final Lining Completed

Monitoring noise and vibration

- Noise, air and vibration monitors have been installed on the properties of residences, offices and commercial buildings in the vicinity of the construction as per the Noise, Vibration and Air Quality Management Plans. This equipment helps us measure and minimize noise and vibration throughout the project term to prioritize safety and well-being.
- The project team receives noise, air, and vibration monitor alerts in real time located along the project extent.

This is not a camera!

This is a total station, an automatic monitoring system that reads slope measurements and surface movements at specific points. As the TBMs tunnel across Eglinton Avenue West, the project team can read the data collected by these instruments to see if they have caused any surface or ground impacts as they pass.



Noise monitor



Air quality monitor



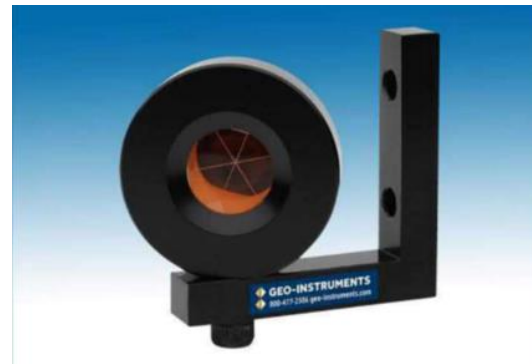
Vibration monitor



Geotechnical Instrumentation Monitoring Points Instruments



Installed in the ground, these short white cylindrical posts are Surface Monitoring Points that monitor any ground movement along the tunnel alignment as the TBMs pass through.

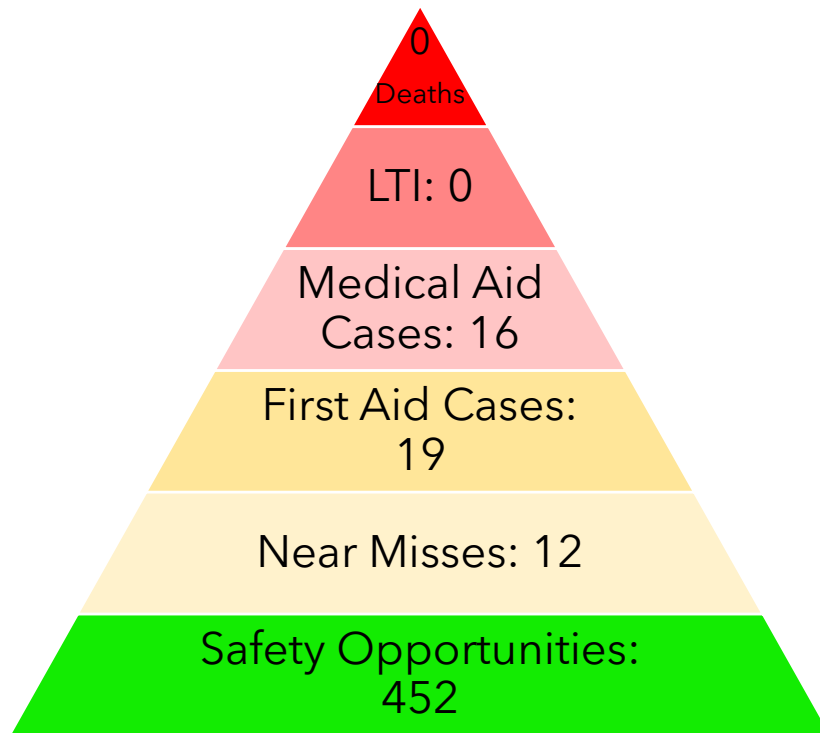


The L-Bar Mini Prism is a compact and versatile optical target used with automated total stations to monitor potential ground movement and the structures on it. Suitable for a wide range of applications, the L-Bar Mini Prism is installed on the exterior building facades.

Together, these instruments operate as a whole.

WestEnd Connectors Safety Milestone

1,000,136 People Hours Lost Time Free
Total Recordable Incident Rate: 3.24



WestEnd Connectors celebrated a major safety milestone recently, as the team marked **one (1) million hours** worked without a Lost Time Injury (LTI). An LTI occurs when a worker must take a leave of absence due to an injury.