

With ongoing technological advancements, subway operations will undergo monumental changes in the next five years – resulting in the modernization of the subway system.

“We’re breaking new ground and doing things we’ve never done before at the TTC,” says Subway Transportation General Superintendent Bill Crosbie.

The TTC is building a system for the future that will provide greater reliability for customers on the line, and for employees behind the scenes.

By modernizing the system, Subway Transportation will be putting new tools in the hands of its workforce, including:

- A state-of-the-art Transit Control Centre operating on a Microsoft Windows NT environment.
- A computerized radio system with enhanced person-to-person links.
- A simplified signal system with expanded capabilities.
- A new subway line opening in 2002.
- A modern, accessible subway fleet.

With construction of the new Transit Control Centre and Sheppard line underway, the Subway Transportation Department is faced with a challenge. It needs more employees, just as a sizeable portion of its workforce becomes eligible for retirement in the next few years.

“We’re going to need additional people in all job classifications, including Tower Controllers, Assistant Superintendents, Wayside Supervisors, Dispatchers, Route Supervisors and Collector Supervisors. We’re beginning to build that workforce today with an emphasis on giving employees comprehensive training so they can be confident going into a new job with new equipment.”

The department’s immediate mandate will be to train and qualify people to operate both the existing control centre and the new one during a 13-month transition period beginning in the middle of next year, says Crosbie.

“Transit Control was originally a small entity. It developed gradually as the subway system expanded,” says Crosbie. “Now we’re re-creating a large entity with future capacity – and moving into a new building – while continuing to run service for our customers. This is an exciting time to be in Subway Transportation – what’s coming together here is the subway system of the new millennium.”

NEW TRANSIT CONTROL

The question on the minds of many TTC employees is how do you move control centres without impacting service to customers? “You do it in bite-size pieces,” Crosbie says.

The move will begin in June 2001 with Power Control. An entity that operates primarily on its own, Power Control will be incorporated into the main theatre in the new David L. Gunn Building.

Once Power Control has been shifted, the train control function then moves over section by section. For example, a portion of the B-D line (i.e. Kipling to Keele) will be de-activated in the current control centre and be activated in the new one – shifting the responsibility of trains passing through Keele

Station from

the Tower Controller in the old theatre to the Tower Controller in the new one.

“Piece by piece, the old mimic board will go dark for good,” says Crosbie. “We



Piece by piece, Transit Control’s old mimic board will go dark for good.



Room with a view — “These are exciting times”, says Subway Transportation General Superintendent Bill Crosbie.

want to minimize the four-month transition as much as possible, but having said that, we want to ensure the new control systems have been fully tested.”

Since 1968, when the current control centre first became operational, the TTC has added 22 subway stations to the existing system. Add in the five stations on the new Sheppard line and the system will have almost doubled in size in just over 30 years.

Built using 1950s-’60s electro-mechanical technology, the current facility has long passed its design life of 25 years.

The new Transit Control Centre is scheduled to be fully operational by summer 2002.

SUBWAY RADIO SYSTEM

A new communications system became fully operational throughout the subway system at the end of 1999.

The new radio system operates on a system called a “trunk system”, compared to the old “open channel system”.

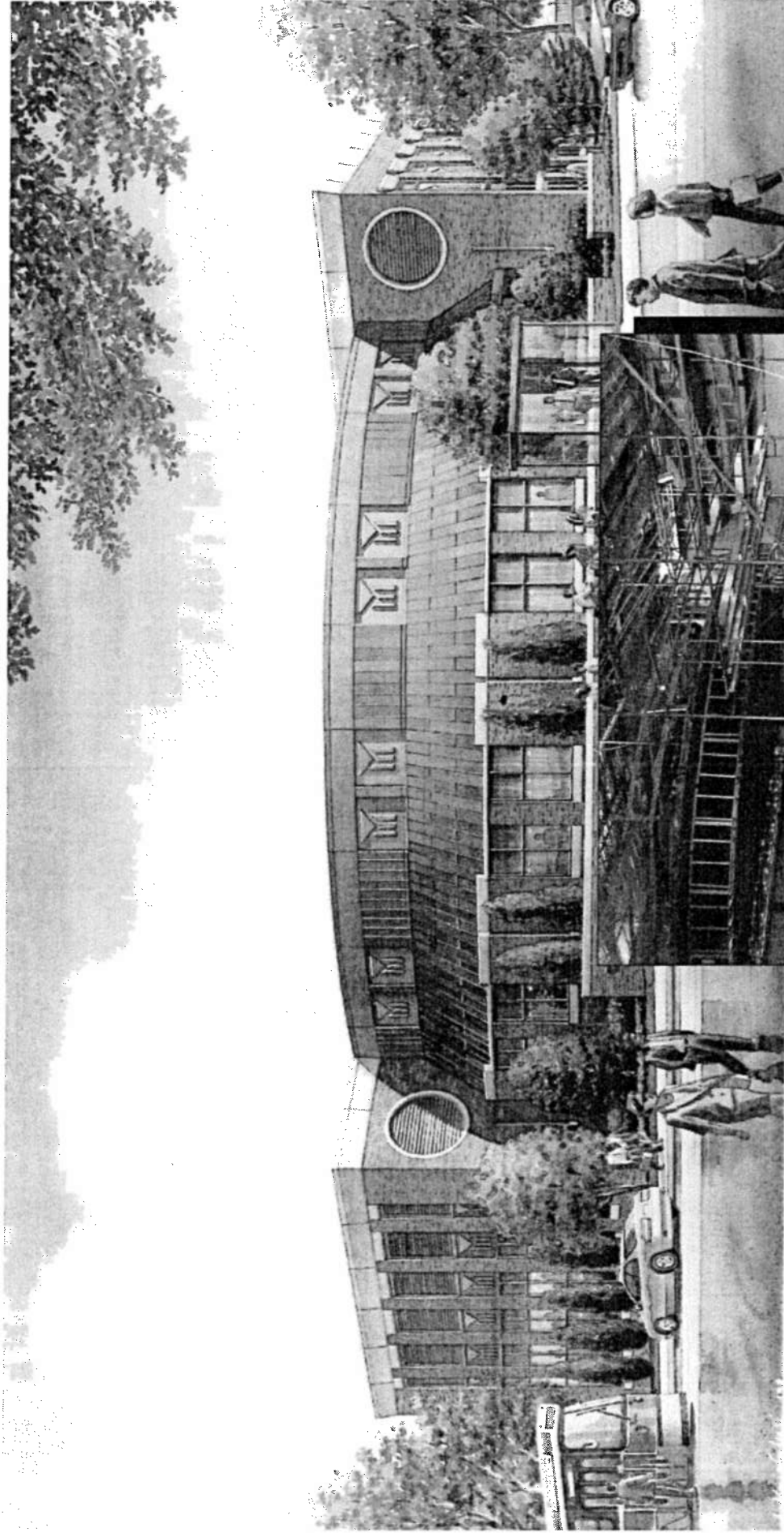
allows for calls to Transit Control answered in priority order and for private conversations, which eliminate excessive “chatter”.

The new system has a number of additional capabilities:

- **Back-feed ability.** If the antenna is damaged or cut, the system receives itself and back feeds the signal within 80 seconds, to minimize loss of radio coverage.

- **Broadcasts three frequencies.** The VHF and UHF bands broadcast TTC surface and maintenance channels in the tunnels. The band also transmits the subway

THE SHAPE OF THINGS TO COME



Artist's concept of the new Transit Control, above. (Inset) Inside the new Transit Control theatre — building a large entity with capacity for the future.

radio signal. The 800 mega-hertz band could be used for a new speed control system.

Mayday call. Operators can, in an extreme or life-threatening situation, open a channel and transmit a message across the entire line.

The new system uses radio frequencies broadcast through a radio cable antenna strung along the entire length of the subway line. It replaces the old Car-To-Wayside system, which transmitted its signal through a third rail.

“What’s unique about our new system is that all three frequencies are carried and amplified by one cable and one amplifier,” says Crosbie. “Nowhere has this been done before. The world is literally watching us complete this project.”

With the exception of the fire department, all emergency response agencies in the city will be on line within the next few months.

Toronto Fire Services is currently experiencing an interference problem with its frequency when re-broadcast adjacent to subway entrances. TTC/contractor radio crews are adjusting the antenna coverage to reduce the interference.

The new radio system proved its worth during last October’s subway disaster simulation. Participating emergency response agencies (police, fire and ambulance), whose radio transmissions would normally be restricted underground, indicated the subway radio system met, and even exceeded, their expectations.

A fibre optics cable was installed at the same time as the radio cable. It will eventually provide a communications highway for such things as real-time crowd monitoring and other video/data transmissions.

SHEPPARD LINE

The new Transit Control and the Sheppard subway line are on an interlocking construction path. The new centre must be up and running before the new line opens.

Track work was recently completed and this year begins the installation of signal components, such as trainstops and switch machines.

“We’re installing reverse-direction signaling on the Sheppard line. This capability was built into the new line in the event that a stretch of track has to be taken out of service,” says Crosbie. “Similar to a railroad, we will be able to run eastbound and westbound trains along a single track using crossovers. This gives your operation more flexibility during track maintenance or emergency situations.”

When Sheppard opens, Subway Operations will turn its attention to upgrading the signaling on the B-D and Y-U-S lines.

GREEN SIGNALS AHEAD

A request for proposal for a new onboard subway speed control system to replace the current wayside (timed signals) speed control has just been released. Suppliers short-listed by the TTC will be providing on-site testing of their signal systems later this year.

The Signals/Electrical/Communications Department is proposing the signal technology, which will take the speed control function away from track side equipment and move it to a computer inside the Operator’s cab, says Crosbie.

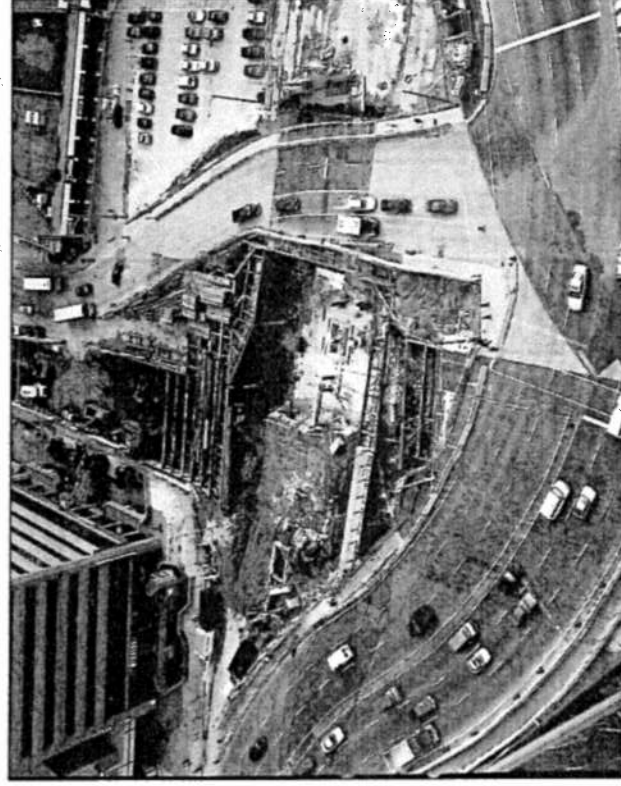
“The way it works is an onboard computer will set a speed limit from one signal to another. Trains will have to be under a designated speed upon reaching that signal. If the speed limit is violated, a warning will automatically activate. If the train doesn’t comply with the speed limit within a certain amount of time, its brakes will automatically be applied.”

As a result, flashing reds and lunar signal aspects will be obsolete — and eventually removed. The new system will retain block/route signals — solely red, yellow or green aspects.

The only time an Operator will see a red signal will be when they’re being held by Transit Control, when another train is ahead or when a signal or switch has malfunctioned. All other times signals will be green or yellow.

The challenge for Subway Operations will be equipping the entire system with the new equipment, and the entire fleet for the line, before the current wayside system can be converted from flashing red and lunar aspects to block/route aspects, Crosbie says.

The new speed control system is scheduled to be fully operational in 2005.



Sheppard/Yonge intersection — looking west at traffic diverting around subway construction.

precious gift

employees joined thousands of other people in lining up at blood donor clinics to help save James.

Focused on the welfare of their son, Ed and Sue MacDonald were later overwhelmed when they learned of the city's response to help James.

"The people in this city are amazing," said Ed from his home in Scarborough. "People of every race, color or creed were rolling up their sleeves to help James. And the nicest thing was, not only did we get the blood we needed, but we were able to fill the blood bank and help other people. I can't express how much we appreciate what people did for us."

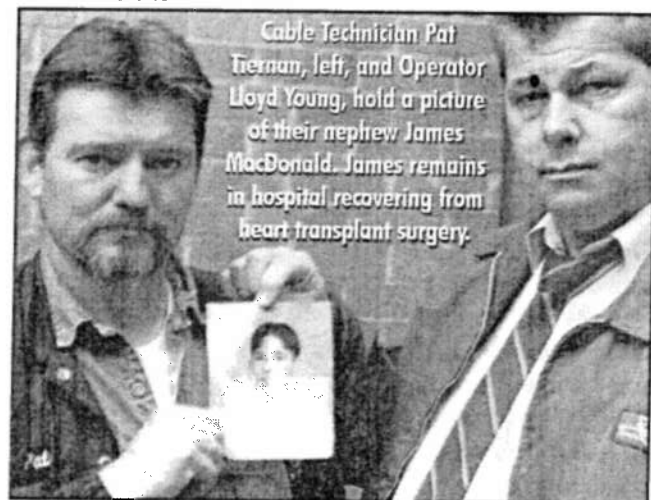
Blood donations sustained James' life long enough to get the heart transplant and the blood products he needed afterwards. James' situation taught the MacDonalds how important it is to donate blood regularly.

"What happened to James was the furthest thing from our minds, but it can happen to anyone," said Sue. "It's scary to think that people may not get the medical

help they need because of a shortage of blood when donating is such an easy thing to do."

Employees are encouraged to give the gift of life at the TTC's Red Cross Blood Donor Clinic at Hillcrest on Thurs., June 25. Employees who donated blood during James' crisis will be able to give again as the required 56-day waiting period will have passed.

For more information about giving blood, call Health Services at ext. 4572.



Cable Technician Pat Ternan, left, and Operator Lloyd Young, hold a picture of their nephew James MacDonald. James remains in hospital recovering from heart transplant surgery.

Coupler

Linking the TTC with employees and their families.

Published 10 times a year for the employees and pensioners of the Toronto Transit Commission.

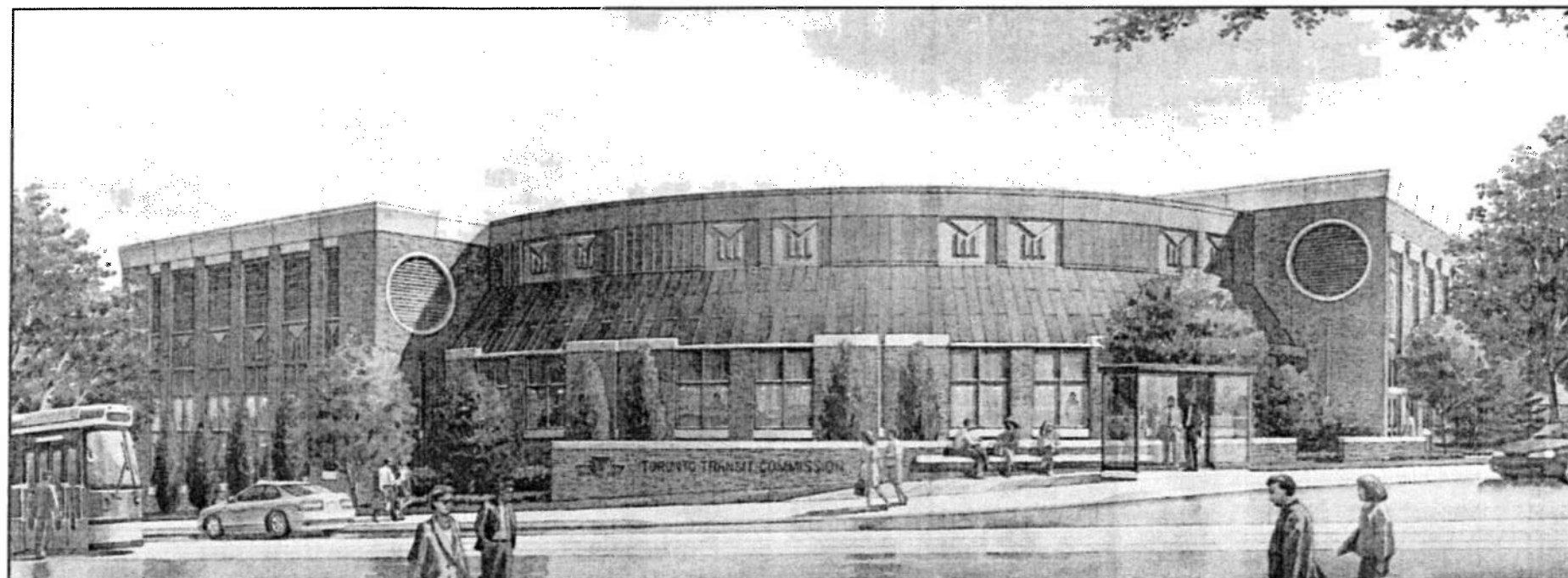
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's double

one million dollars in revenue. MDP subscribers have been incredibly loyal. They really like the program — as both the TTC's market research and MDP's low monthly cancellation rate (less than one per cent of total subscribers in any given month) indicate.

But next to price, the most important factor



View of future Transit Control Centre building on southwest corner at Bathurst and Davenport.

New transit centre design done

The preliminary design of the TTC's new Transit Control Centre is now complete. The state-of-the-art facility, scheduled to be fully operational in 2002, will replace the current — and outdated — Transit Control/Power Control Centre and accommodate system expansion for years to come.

The new three-storey, stand-alone building was designed in keeping with the architectural integrity of the Davenport Garage structure, originally built in 1925, and the surrounding community, says Project Engineering Co-ordinator Rick Thompson.

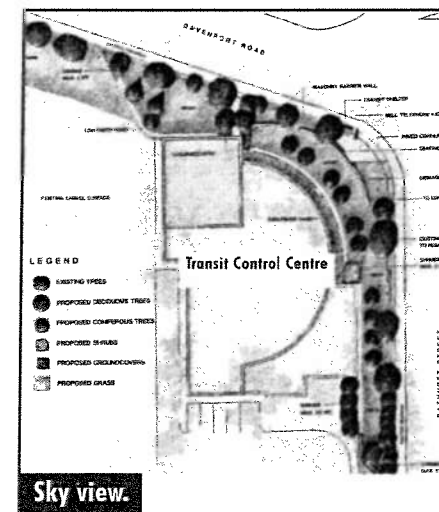
"The 3,800-square-metre facility will be located on the corner of Bathurst and Davenport at Hillcrest. The first floor will house mechanical, electrical and computer equipment. The second floor, aligned with street level, will contain the Transit Control theatre and some office and maintenance facilities. The top floor will have additional mechanical equipment and a

training and visitors area," he says. "Building construction is scheduled to begin one year from now."

The new Transit Control was initially intended to be a fourth-floor addition atop the Inglis Building at Hillcrest. As a result of community opposition to the building height, the plan was changed to a new stand-alone building located on the northeast corner of the property. The top of the Subway Operations Building was also a potential site, but construction would have cost as much as an entirely new building, minus the expansion capabilities.

Transit Control/Power Control monitors all traction power, train control, fire safety, security, communications, ventilation and mechanical systems for all subway/SRT and surface operations.

Since '68, when the current control centre became operational, the TTC has added 22 subway/SRT stations to the existing system. Including the five stations on the new Sheppard line, the system will



have almost doubled in size in 30 years.

Built using '50s and '60s electro-mechanical technology, the current facility has long passed its design life of 25 years.

The new Transit Control Centre was approved by Metropolitan Toronto Council at a cost of \$60 million in '93. The pur-

chase of readily available "off-the-shelf" signal systems and power control equipment has reduced the price tag by more than \$4 million.

"The scope of the project in general is to replace the aging and obsolete electro-mechanical systems with new electronic systems," says Bill Crosbie, General Superintendent of Signals/Electrical/Communications. "That includes the Central Signal System and its Field Code Units; the SCADA system and its Remote Terminal Units; and the Communications and the Emergency Trip system zone equipment."

The transition of the existing control centre to the new control centre for the signal system will begin in late 2001.

During this period, and until the transition is complete in spring 2002, both the existing and new control centres will be staffed. —MD

New divisional stores