



MICROTUNNELING

IN WESTERN CANADA

ture projects are ongoing, initially made this project a tough sell. Todd Wyman, project manager with the city of St. Albert, explains, "We often talk about ribbon cutting ceremonies for leisure centers and new roads; we don't properly recognize the good work we don't see. Much of the public outreach was about schedule and description, we wanted to make sure the customers who were most impacted were well cared for." More than 700 residents were contacted; many of them in a door-to-door campaign. During the work, the contractor consistently demonstrated their commitment to minimizing the impact of their operations on the community; one shaft was within 30 feet of three houses.

Design

The design was based on borehole information collected from each proposed shaft location and intermittently along each of the tunneling runs. Machibroda Engineering Ltd. of Edmonton was the geotechnical sub-consultant. During the tender period, two additional test pits and two, 4-foot auger holes were excavated by prospective tenderers. Four 20-foot jacking shafts and four 14-foot receiving shafts ranging in depth from 30 to 65 feet were sunk about 800 - 1,000 feet apart. Precast manhole vaults were lowered into the shafts before they were backfilled with a low strength, 75 psi fillcrete product.

The first run was from jacking shaft No. 4 at the east end of the project that went west towards receiving shaft No. 4 or R4. From J3 which was located west of R4, they tunneled in both directions, towards R4 to the east and R3 to the west, leap-frogging their Akerman SL52.5 MTBM from jacking shaft to jacking shaft, while at the same time excavating the shafts just ahead of their tunneling runs. One tunneling run was through massive shale where their production rate dropped to 20-30 feet per 10-hour shift, but for the most part conditions were consistent throughout in clayey sandy silt where they advanced about 50 feet per shift.

The biggest challenge on this job was pipe supply. Michels opted for the polymer concrete because of its strength (17,000 psi), which is well suited for micro-tunneling. As the polymer concrete is almost inert

by Tonia Jurbin ■ Contributing Editor

The growing city of St. Albert, Alberta, Canada, has just wrapped up Phase I of their most ambitious underground infrastructure project ever. To accommodate the growth of this northern city on the outskirts of Edmonton, a new sanitary trunk sewer system is being constructed. The project is budgeted in excess of \$25 million (Cdn) for Phase I, and a \$9.4 million (Cdn) contract that includes a grinding station, three control structures and an interim storage facility with a capacity of roughly 530,000 gallons.

This project is partially funded by a joint federal and provincial infrastructure program and, as other projects of this type in Canada, meeting completion dates is a condition of funding. St. Albert issued an RFP and retained Stantec Consulting Ltd. of Edmonton as the prime consultant.

The topography in this historic yet growing residential neighborhood does not lend itself well to conventional trenching. Using microtunneling, the designers could shorten the alignment by building under an 80-foot hill, an obstacle they would have otherwise had to go around. Additionally, disruption to one of the busiest collector roads in the city, a transit route, three nearby schools and an assisted living institution was minimized. Michels Directional Crossings Co. of Nisku, Alberta, was the successful bidder for this one year project.

Community relations played a large role in this project as a combination of unfamiliar technology and a big price tag, especially when more visible infrastruc-



WESTERN CANADA

it did not require a liner. Pipe supply and transportation was worth \$2 million (Cdn).

Polymer concrete pipe has not been widely used in Canada. Unfortunately for Michels, the North American supplier, Amitech USA of Zachary, LA, had difficulty securing sufficient transportation due to the impact of Hurricanes Katrina and Rita last summer, causing uncertainty in supply.

Pete Rasmussen, project superintendent, recalls, "Our jacking pressures were typically 150 to 200 tons, never exceeding 250 tons while we were mining. When we ran out of pipe and couldn't continue, the ground started to collapse around the pipe and the pressure went up, in this case to 460 tons. We used lubrication throughout, and we managed to get the pressures back down to 200 tons once we got more pipes, but then we ran out of pipe again. At one point we were so stuck that we caused heaving of the highway behind our jacking pit just trying to move the line again. It got to the point where we were down to jacking one pipe a day just to keep things loose and moving when we could have done five."

The completion date was extended by one month with Michels bringing in more crews and working longer shifts to get the project back on track.

More challenges

Another challenge facing most Canadian contractors is the cold weather. To date, however, the winter has been unusually mild, mostly above freezing. Still, in October they pitched a tent that enclosed their operation and by using a combination of propane and waste heat, they kept their compressor, generators, control building, bentonite pumps, cooling water tanks and high pressure jet pumps warm. Sadly, a significant expense and nuisance came from vandalism and theft. About five reportable incidents and other daily acts of minor vandalism plagued this project.

Even though the project was one month behind schedule, it was still deemed a great success. So successful, in fact, that during the last tunneling run, city council granted approval for a 1,080 foot extension from a newly designated shaft J1A to R1. It made sense to add the last required microtunneling run for the project to this first contract as the rest of the project is expected to be built using conventional methods. Wyman explains, "There is other development in the area including a surrounding road project. We were going to do this in the next phase anyway. We were able to show that the



extension would be more beneficial than re-tendering. The savings could be as high as half a million dollars. Since the contractor had fostered such good working relationships, and with crews and equipment still on site, it turned out to be a win-win situation."

FOR MORE INFORMATION

Microtunneling equipment:

Akkerman Inc., (800) 533-0386, akkerman.com