Dinosaur Capital of the World uses Pipe bursting to replace Water Main

Drumheller, AB is a town of approximately 8,200 people, with agriculture, energy and tourism as its economic base. Located in the heart of the Badlands, Drumheller Valley has an interesting history which spans back some 70 million years to a time when the area was very different looking than it is today. The land was flat and the climate was tropic, providing the needed habitat for plants and animals alike to flourish. These vast plains crossed by many rivers originating in the Rocky Mountains and spilling into the Bear Paw Sea, were the home of what we today know as the Dinosaur.

The town was incorporated as a village in 1913 and became a city in 1930. Significant growth of the downtown occurred during the two decades following the First World War with the development of the local coal industry. It became known as the "Wonder Town of the West - the Fastest Growing Town in Canada". At this time, the town developed its infrastructure to meet the growing demands of its residents. Today, many of the cast iron water mains installed during these high growth periods have exceeded their life expectancy and are in need of replacement.

Drumheller is in the midst of a five-year cast iron waterline replacement program. The town selected an innovator trenchless replacement method known as pipe bursting to replace the cast iron waterlines. Al Kendrick, Drumheller Director of Infrastructure Services comments "Unlike the old methods of open cut, pipe bursting reduces overall project costs, minimizes excavation and has a minimal impact on the community."

120 meters of new 200mm HDPE enters the launch pit to replace an existing 150mm Cast Iron water main.

Murphy Pipeline crews employ pipe bursting to install a new 200mm HDPE water main.

The history of pipe bursting dates back to the 1970's, when British Gas in the U.K. began the research, development and implementation of many of the trenchless technologies that are in use today. They did so out of necessity to replace and rehabilitate their aging distribution system with the criteria of cutting costs and increasing efficiency. The two most well known methods, which now carry a history in excessive of over 30 years, are pipe bursting and Swagelining. Both methods have seen tremendous growth in North America to replace pressure pipelines such as water and force mains. The pipe bursting method has been credited as the only trenchless method in which increasing the size of the main is possible, while still following the existing utility path.

The process of pipe bursting is one of the most cost-effective methods of replacing pipes or upsizing them to meet increased demand. A typical day of bursting operations can include replacing between 100 to 200 meters.

Project Overview

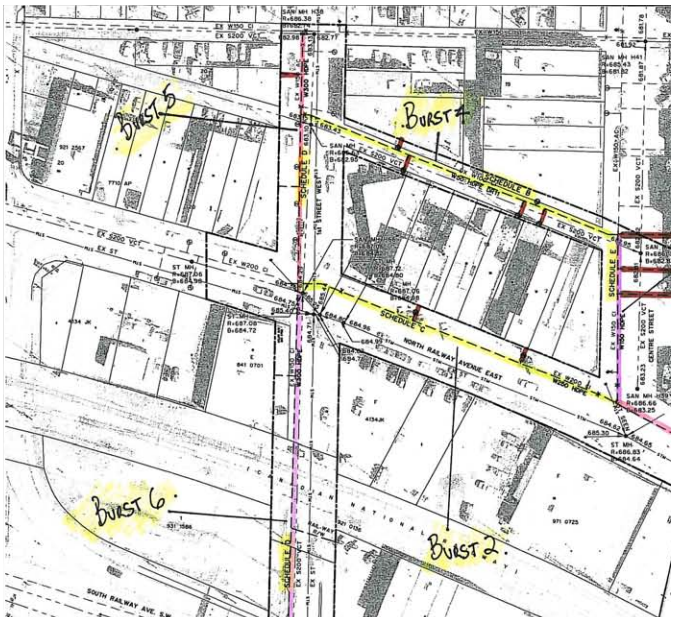
For the 2009 cast iron waterline replacement program, engineering firm MPE Engineering Ltd., with offices throughout southern Alberta, were the consulting engineer for the project and included

project engineers Mark Steffler and Steve Dudar. "The success of static pipe bursting is due in large part to the existing utility path being followed. By using the existing alignment, easement issues, environmental factors and utility relocates are eliminated. This will speed project delivery and can prove cost effective as design costs are reduced", comments Steffler. Burst details of the 2009 project included replacing:

- 106m of existing 50mm CI with 50mm HDPE
- 100m of existing 150mm CI with 250mm HDPE
- 85m of existing 150mm CI with 300mm HDPE
- 200m of existing 200mm CI with 250mm HDPE
- 107m of existing 300mm CI with 300mm HDPE

The project generally had 5 to 7 service connections per burst as the project was located in downtown areas and a mature neighborhood.

Murphy Pipeline Contractors/Muzechka was called in to assist with the feasibility study and design work in preparation for the project. They also completed the construction portion of work. The company has a history rich in trenchless technology as key personnel have worked extensively with static pipe bursting and Swagelining projects across North America, including many tracing their roots back to British Gas when the technology was first developed. The company currently has over 300,000 meters of experience replacing water main with the process of pre-chlorinated pipe bursting.



Murphy Pipeline pipe bursting schematics plan for the downtown portion of the work.

Murphy Pipelines first step was to develop the burst program. The plan typically involves replacing a block of water main at a time, generally 100 to 200 meters per burst. To further minimize excavation, launch and receive pits are strategically located at valve and hydrant locations. The number of service connections also plays a role in determining the length of the burst. "As the majority of our projects are in mature residential neighborhoods, we need to ensure our service crews can handle the amount of service connections on each burst. If lot lines are 15 meters apart, we will reduce our burst distance down to 100 meters. When lot lines are further apart, we can get more aggressive with our burst distances."

The pipe bursting process reduced excavation by 85% compared to open cut.

After the bursting schematics and pre-planning steps were complete, the construction portion of work began as a staging area was selected, located away from the burst locations to minimize the impact of the project on the community. 12 meter sections of HDPE were butt fused together to form a continuous length of pipe to correspond with the burst distances of 100 to 200 meters.

When using the pre-chlorination method, all AWWA guidelines are followed as each pipe section is pressure tested and bacteriologically disinfected in the staging area prior to installation. Two consecutive days of samples, taken 24 hours apart are drawn from the lines and tested for bacteriological clearance. Once a line has received passing tests results, it is now ready for bursting operations.

"The results have been good. The cost savings to the city by using this technique were significant. When you have the ability to increase pipe diameter, and still reduce the environmental and social impact to the community, pipe bursting may be the best option available. Just like the dinosaur saw its demise, the days of allowing an open cut contractor to tear up and be in the same street for weeks are coming to an end." - Al Kendrick

Murphy Pipelines typical day of bursting operations:

- **7:00 a.m.** Launch and receive pits, including service connections are excavated.
- **8:00 a.m.** Main is decommissioned and bursting equipment is set in place.
- **9:00 a.m.** Rods are shuttled through the existing pipe.
- **10:20 a.m.** The blade set, expander, tracing wire and new HDPE pipe are attached to the rods which have reached the launch pit.
- **10:40 a.m.** After the tooling and new pipe are attached to the rod string, the pull back process begins.
- **12:00 p.m.** New pipe is installed as the expander and new HDPE reach the receive pit.
- **12:00 to 4:00 p.m.** Crews make all service connections to the main.
- **4:00 p.m.** Lastly, the pits are backfilled and restored. Customers will only see a crew in front of their home for one day as tomorrow the crews repeat the bursting process for the next 100 to 200 meter section of replacement.