

CONNECTING COMMUNITY:

Pipe repair in the air

When an air valve broke on a pipe connecting the River Road area of Richmond to Mitchell Island, it triggered a repair process involving multiple organizations, innovative solutions and extensive safety measures.

Why? Because the watermain pipe runs under the Knight Street bridge, more than six storeys (or 26.5 metres) above the Fraser River.

When City of Richmond staff were made aware of a leak under the bridge, they went to the area immediately and found water pouring out into the river. Water is chlorinated to keep it safe for drinking, but it is not permitted in natural water sources like the river. To stop the chlorinated water from running into the river, a Water Services crew quickly throttled down the water pressure to minimize the flow of water going through the damaged pipe. The City continued to provide a reliable water supply to Mitchell Island using a secondary pipe, as the City has two pipes in place to ensure there is backup in place for a secure water supply.

“We acted quickly to mitigate the environmental concerns from the chlorinated water leaking into the river as an interim measure,” says Bryan Shepherd, Manager, Water Services, Engineering & Public Works for the City of Richmond. “But we also knew that the complexity of the work under the bridge would take time to plan and complete due to a variety of challenges present. This also meant it would require a team effort.”

Continued on next page



Right from the planning stages, the pipe repair in the air project exemplified the City's core values by focusing on the power of teams who share a common goal. Everyone involved demonstrated concern for each other while building on their individual and collective knowledge.

OBTAINING ACCESS AND SAFETY PLANNING

The first challenge was how to gain access to damaged pipe. TransLink owns the Knight Street Bridge, so the City required permission from TransLink to perform any repairs. In addition, the pipe needing repair was only accessible through a vertical ladder on one of the piers and a series of suspended catwalk systems under the bridge. These areas required up-to-date safety certifications.

Making repairs up in the air also required extensive safety measures. The City's Occupational Health and Safety (OHS) team members, Anastasia Riabkova and David Richards, coordinated with TransLink to confirm that the required annual inspections of the ladder and catwalk lifelines certifications were up to date. Next, they developed a plan for a safe working procedure. The inspections and safety plan were required prior to start of work to ensure the equipment would protect workers from a fatal fall and keep everyone safe on the job site.

The safe work procedure was also a key step for the City to obtain an Indemnity Inspection Agreement with TransLink, which allowed the City to access the horizontal and vertical lifelines and perform necessary maintenance and repair work.

The Indemnity Inspection Agreement also required the City to provide a High Angle Rescue Agreement. Kevin Gray, Deputy Fire Chief, Richmond Fire Rescue worked together with Riabkova and Richards to create the High Angle Rescue Agreement. The City's legal team then reviewed and finalized the Indemnity Inspection Agreement.

"Chief Gray and his team went above and beyond to support this repair project," says Shepherd. "They offered to provide the Public Works crew with a pre-entry inspection, on-site rescue support, and a means to transport materials from the ground to the catwalk using ropes. Richmond Fire Rescue crews also leveraged this repair project to practice their high angle training."

APPLYING INNOVATION AND TRAINING

While City staff worked together to complete the agreement with TransLink and establish safety measures, the Water Services crew wanted a better look at the damage to assess what caused the leak and what would be needed for repairs. Fortunately, the City has staff who are trained to fly drones so they could apply innovative technology to make their task easier. After getting approval from the Vancouver Port Authority, a pilot flew a drone to assess the damaged area and confirmed that a broken air valve was the source of the leak.

Continued on next page

With the source of the leak confirmed, the Water Services crew could start planning the repair. Not surprisingly, the first big challenge that needed to be addressed was the height and ensuring the safety of the crew who would be under the bridge.

The Occupational Health and Safety team, Richmond Water Services and Richmond Fire Rescue worked together to ensure that workers performing this task had all the necessary fall protection training, fall protection equipment and a fall plan.

Murray Barstow, Water Services Supervisor for the City, organized a team that was trained in fall protection, ticketed with utility repair and comfortable with working 26.5 metres up in the air. As well, certified firefighters would work with the repair crew, both up on the bridge and on the ground.

“We needed to use Water Services staff as they are trained and ticketed for our utility, but we also asked for volunteers. They would be working close to 100 feet in the air, so you can’t just assign a task like this,” says Shepherd. “The two people who volunteered were already trained and certified in fall arrest, they already had harnesses that were fit to them, and they were not afraid of heights.”

SHARING THE SPACE WITH THE LOCAL WILDLIFE

Another challenge that the City encountered was the presence of peregrine falcons in the area.

“When we were assessing the damage, a falcon was dive-bombing the drone so we knew the birds were in the area, and it was close to nesting season when we would be doing the work,” says Shepherd. “There were also concerns that the falcons may attack our crews, so we needed to bring on someone with expertise in this area.”

An environmental consultant was brought onto the project to ensure the safety of both the birds and the workers.



REPAIRS IN THE AIR

After two months of planning, getting required approvals, ensuring all safety measures were in place and taking steps to protect the falcons, the repairs could finally proceed safely and in compliance with all provincial and federal regulations.

Water Services staff, Colin Hutchinson and Ken Laboucane, performed the repair work on the bridge while two Fire Rescue staff stayed on the catwalk on standby in case rescue was needed. They replaced the air valve, which is about the size of a basketball, installed a shut-off valve and replaced about four feet of pipe where the air valve was located. This took about four hours to complete.

Eight Fire Rescue staff remained on the ground to assist further in the event of an emergency and helped raise and lower equipment using a rope pulley system.

The environmental consultant used binoculars to observe the behaviour of the birds. During the repair work, the falcons began to fly around and make noise to indicate they were concerned and unhappy with the presence of workers.

Continued on next page



Work was halted for 30 minutes to allow for the falcons to calm down and prevent provoking an attack on the workers. The environmental consultant assessed whether the falcons were being adversely impacted and if the job site needed to be shut down. Fortunately, after the 30 minutes had passed, the falcons were calm and perched on a nearby tree.

“It’s exciting work. It’s challenging. It’s scary. And after completion it’s rewarding,” says Shepherd, who, having done work under the bridge in the past, would know. “I think there’s a lot of adrenaline. When everyone gets back down safely, it’s a huge sense of accomplishment.”

While the aerial adventure portion of the work was completed, additional work was still needed before the water could be turned back on. The Water Services crew injected about 40 litres of high concentration chlorine into the water running through the 450 mm pipe and let it sit for 24 hours to disinfect the pipe before water could be turned back on.

“We take continuous measurements until its dark purple on the litmus paper to show a high concentration of the chlorine, and then we let it sit so it can eat up any bacteria, dirt or other contaminants that may have entered the pipe,” says Shepherd.

When the chlorine was released from the pipe, the crew ran it through vitamin C pucks, which dissipates the chlorine so it could safely be released into a gravel lot. Next, they did water quality testing. After about three days, the results were in, and the water quality test came back clear, so they turned the water back on.

The City takes over 2,000 samples each year to test the water to ensure the water quality is good.

“Our job is to supply water to Richmond residents, regardless of the height or how hard the work is,” notes Shepherd. “Our crews enjoy their work, and are thrilled to provide the Richmond community with clean water.”

Thanks to collaboration, training, and innovation, the repairs to the watermain were completed safely and the pipe connecting two communities in Richmond is again secure and fully operational.

“I’m proud of the crew’s accomplishment and the collaboration of the different parties involved,” adds Shepherd. “It seemed like they had fun. I went to school with Darren Rowley, a Company Officer and Lieutenant with Fire Rescue, and I know he was very proud of his team too. Overall, it was a really good repair, and this is one we’ll talk about for years.”

