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THE REHABILITATION OF A CONCRETE MANHOLE WILL ALLOW THE CITY OF CHÂTEAUGUAY TO EXPAND ITS INDUSTRIAL PARK

Thanks to an economical solution and without excavation, the Saint-Jean-Baptiste pumping station has regained an acceptable daily wastewater flow rate.

Faced with an excessive daily wastewater flow for its St-Jean-Baptiste pumping station, the City of Châteauguay has chosen the epoxy and polyurea spray rehabilitation solution, which offers many benefits. Approached by the City for an estimation of the work required, Soleno Service experts quickly realized that the problem was more likely to come from a concrete manhole located upstream of the station that carried more than 140 m³ (4944 ft³) of extraneous water into the system every day. The manager of the hygiene division of the Environmental health division, Public Works and Engineering department, at the City of Châteauguay then mandated Soleno Service to rehabilitate this concrete manhole located at 42, rue Saint-Jean- Baptiste.

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THE CONTEXT

As the sanitary sewer system aged, it was overwhelming existing sanitary water management infrastructure and strained municipal equipment, such as pumps. Therefore, before thinking about land-use planning through residential or industrial developments, it became necessary to improve the performance of the sanitary sewer network already at full capacity. Located less than two metres from the Saint-Jean-Baptiste pumping station and a bus shelter, near Saint-Jean-Baptiste Boulevard and under the Exo Haut-Saint-Laurent park-and-ride lot, the task of replacing the obsolete concrete manhole was a major challenge.

THE SOLUTION

The concrete manhole to be rehabilitated, 900 mm (36 in) in diameter, had several deficiencies: absence benching and flow at the bottom, degraded and cracked walls and seals and a high groundwater table amplified all the problems. The infrastructure rehabilitation solution using epoxy and polyurea spray was selected as the best solution for the rehabilitation of this 6-meters (19.6-foot) high concrete manhole.

The Soleno Service team prepared the surface to be rehabilitated by first cleaning it extensively to ensure that it was free of any contaminants. Then, the many cracks were filled by injections, and the irregularities in the manhole profile were corrected with Solhydroc brand cementitious products. Soleno Service technicians also created a benching to remedy the bottom flow problem and waterproofed the crowns that were severely eroded and degraded. Once the profiles were restored, a coat of SSR-175 primer and epoxy sealant was applied to ensure good adhesion of the coatings and to counter the degasification phenomenon associated with concrete. Subsequently, the Soleno Service team applied 3.175 mm (125 mils) of SSR-405 epoxy coating using a Graco XP50 multi-component airless spray system. This product does not contain volatile organic compounds (VOCs) and is composed of 100% solids (no shrinkage). Finally, the application of 2.54 mm (100 mils) of SSR-581 flexible polyurea to the last section of the manhole completed this rehabilitation which was done in August 2019. The elongation up to 614% of the SSR-581 restores waterproofing to the structures while maintaining its flexibility, thus allowing to withstand freeze/thaw cycles. To confirm that the work was done properly, a spark test was carried out.



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THE BENEFITS

Using a spraying epoxy and polyurea method for the rehabilitation of underground infrastructures was the ideal solution to solve this particular problem for the City of Châteauguay. Indeed, this rehabilitation made it possible to eliminate the extraneous water that entered the network directly through this defective manhole. It also allowed the pumping station to be more efficient by returning to a normal daily volume of wastewater, allowing the pumps in place to return to a normal operating mode by halving their use, thereby reducing energy costs.

In addition to ensuring a second life for this manhole and restoring its structural capacity, the solution offered by Soleno Service has made it possible to preserve the integrity of the road network, underground infrastructure, landscaping and street furniture. Indeed, unlike a conventional replacement which would have resulted in a major constraining worksite, the epoxy and polyurea spray rehabilitation does not require any excavation, and therefore no risk of damage to the underground infrastructures and public services on site.

In addition, this solution is economical and available at a fraction of the structure's replacement cost (50% less), in addition to reducing the post-installation work usually required after a complete manhole replacement. Carried out in nearly 5 days, this solution considerably reduces the impacts associated with traffic management and allows the site to be returned to its users outside the work hours, thus reducing the impacts on citizens, motorists and public transport users present at this location. During the work, only about ten parking spaces had to be temporarily removed during the work hours in order to create a suitable space for the Soleno Service team and mobile rehabilitation unit.

By eliminating the daily volume of extraneous water of 140 m³ (4944 ft³), the rehabilitation of this manhole allows the City of Châteauguay to go ahead with a residential project of about 100 single-family homes or their equivalent on its territory, a project that was not feasible before the rehabilitation work of Soleno Service.



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