

# Critical Culvert Rehabilitation with Precast Concrete Pipe and Box Structures in British Columbia

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The Langley Concrete Group (LCG) supplied all precast concrete products for the 2017 Culvert Rehabilitation Project for the City of Chilliwack out of their local primary manufacturing facility. The project consisted of replacing seven existing corrugated steel pipe (CSP) and CSP arch culverts with concrete pipe and precast concrete box culverts. Several of the culverts were identified by the city as being “critical replacements” having less than five years of service life remaining.

quickly to enable successful completion of the project by the September 30th deadline. The majority of the culvert replacements were in yellow or red-coded streams which limited the construction window to within the set time-frame of July 1st to September 30th.



*Severely corroded corrugated steel pipe*  
Photos: The Langley Concrete Group of Companies



*Concrete pipe, with a service life of more than 100 years, is now used for Chilliwack's critical infrastructure*

Concrete pipe, with a service life of more than 100 years, is now used for Chilliwack's critical infrastructure. LCG produces dry-cast concrete products that accommodate the accelerated construction method due to high production capabilities and a controlled manufacturing environment for product curing and quality control. LCG delivered precast concrete box structures to the contractor

Chilliwack began its infrastructure study of more than 1,000 of the City's storm drainage culverts in 2014. Galvanized CSP culverts had been used in overwhelming proportions and inspection results demonstrated that this culvert material had a maximum service life of 40 years, with some culverts reaching only 20 years before showing signs of failure due to corrosion. Standing water in CSP culverts causes the material to corrode at the spring line, allowing soil to infiltrate into the pipe and compromise the soil-structure interaction required to support dead and live loads.

Since 2015, the city has used rigid infrastructure including concrete pipe and precast concrete box culverts in the majority of culvert replacements in their rehabilitation program. As the City continues to replace aging infrastructure and upgrade their drainage system to a higher standard, concrete pipe and box culverts will continue to offer a structural solution that is durable, resistant to corrosion, and designed for a service life of 100 years.

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*Chilliwack began specifying concrete pipe and precast concrete box culverts in 2015*

Walter's Bulldozing, a local Chilliwack civil contractor, successfully tendered the project in June 2017. The contractor planned the logistics for removing and reinstalling the seven culverts located within sensitive protected waterways. The City required the contractor to retain a qualified environmental professional (QEP) to ensure that the watercourses and surrounding habitat were protected throughout construction.

In areas of critical habitat, including that of the Oregon Spotted Frog and the Salish Sucker, additional site enhancements were made, including the installation of Coho gravel inside the culverts.

Chilliwack is a growing community in the Fraser Valley. The municipality lies at the base of the Canadian Cascade mountains and is bound by the Fraser and Chilliwack Rivers, both prominent networks for fish migration.

The Langley Concrete Group has extensive experience working with contractors, municipalities and the province in rehabilitating critical infrastructure, especially Chilliwack where LCG's robotic production facility is located. LCG is actively involved with community initiatives and with over 60 employees from the municipality, there was a great sense of pride in producing and providing quality, structural, precast concrete products that can be relied upon for generations.

Project Name:	2017 Culvert Rehabilitation / Tender No. 2017-10
Location:	Various locations in Chilliwack
Project Manager:	Kyle St. Amour, Drainage Technician, City of Chilliwack
Engineering Design Consultants:	McElhanney Consulting Services Ltd. & ISL Engineering and Land Services
Contractors:	Walter's Bulldozing