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SPRING2018

Region of Peel Rejects Steel Pressure Pipe from Future Contracts

Peel Regional Council revisited the issue of allowing steel pressure pipe at its April 5, 2018 meeting. The meeting included delegations from Technicore Underground Inc., DECAST, the Canadian Concrete Pipe and Precast Association, Forterra Pressure Pipe, the Centre for Advancement of Trenchless Technology, and Northwest Pipe Company.

A comparative study was presented to the Council by R.V. Anderson Associates Limited, who had been retained by the Region of Peel in response to Council direction in October 2017. The directive was to report back with additional analysis on failure rates and a comparison of lifespan, and additional information regarding the environmental impact of Concrete Pressure Pipe (CPP) and Steel Pipe (SP) for large diameter water transmission mains.

The study considered the following for both CPP and SP:

- Environmental Impacts
- Failure Rates
- Lifespan
- Pressure ranges and transient pressure changes
- External Loading
- Corrosion
- Condition assessment and rehabilitation technologies

Mark Knight, Associate Professor, Department of Civil Engineering, University of Waterloo and Executive Director, Centre for Advancement of Trenchless Technology, advised that Regional Council should be very conservative and use a low risk approach with high consequence pipelines.

Concrete Pressure Pipe Stored by an Ontario Manufacturer

Professor Knight listed the following four considerations, in order of priority when assessing pipes for performance and risk:

1. Pipeline performance
2. Economics - construction and maintenance costs
3. Social costs - failure costs, local jobs, business losses
4. Environmental costs - greenhouse gases, noise, pollution

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Region of Peel Rejects Steel Pressure Pipe from Future Contracts

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Dr. Mark Knight, P.Eng., Executive Director - Centre for Advancement of Trenchless Technologies (CATT)

In response to a question from Councillor Sprovieri, Professor Knight stated that steel pipe may be appropriate based on local areas however it has higher failure rates than concrete pressure pipe.

The Centre for Advancement of Trenchless Technologies (CATT) was established in 1994 to help municipalities address their buried infrastructure challenges with specific reference to trenchless technologies. CATT is located at the University of Waterloo in Waterloo, Ontario. Geographically, the Centre is positioned to serve Canada and the northern United States. During the last 10 years, CATT has achieved significant recognition as an international leader in trenchless technology education and research.

A salesman with an American steel pipe company was critical of Peel Council for the manner in which it has addressed the pressure pipe issues. He stated, "We've been discussing this for seven years in five minute increments, it's getting absurd." Ward 6 Councillor Ron Starr took exception to these remarks and responded, "You further convinced me that the Region of Peel does have the right policies in place at this present time… I don't like being chastised by someone trying to sell a product to us."

A motion to include steel pipe was proposed, seconded and voted upon by the Region of Peel Council. The motion was defeated, thus Peel Region maintained the current specifications, with concrete pressure pipe for all large diameter watermains. Steel pipe will not be added to the regional specifications.

RISK = Probability of Failure *Consequences of Failure

Large diameter watermains are high risk pipelines, even with a low probability of failure. The CCPPA commends the Regional Municipality of Peel for exercising due diligence on such an important infrastructure matter.

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

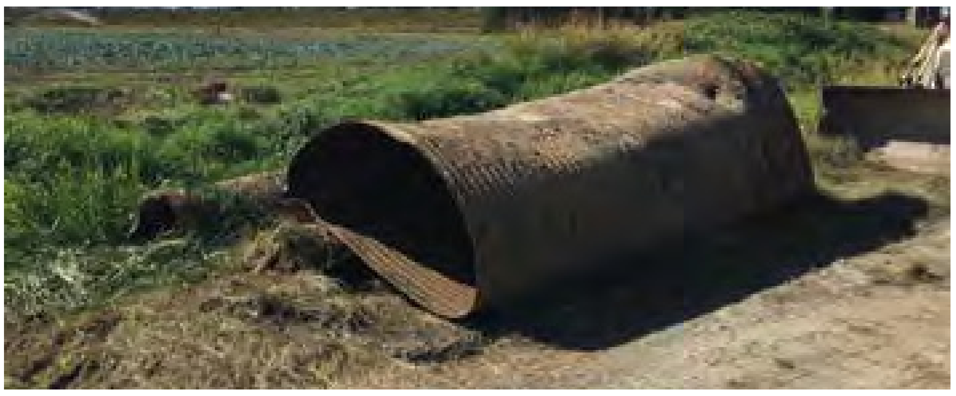
Joel Shimozawa, P. Eng.
Technical Marketing Engineer
The Langley Concrete Group

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.

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 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 timeframe of July 1st to September 30th.

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.



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

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.

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.

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Buried Infrastructure is Risky Business

Every engineer should be keenly aware of the following relationship:

RISK = Probability of Failure *Consequences of Failure

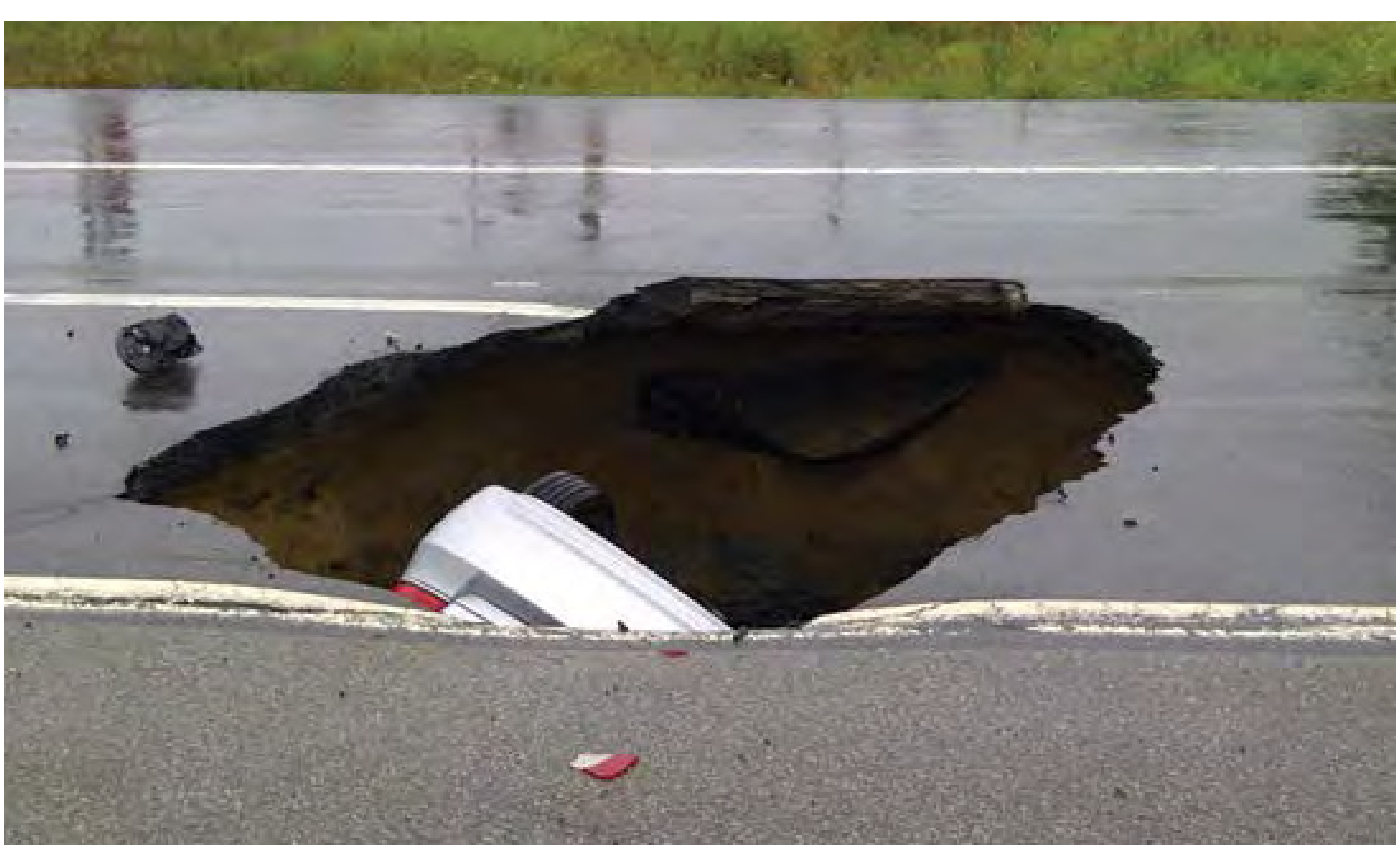
Engineers involved in the design and construction of buried infrastructure should be especially aware of this relationship. Buried infrastructure includes storm sewers, culverts, sanitary sewers and watermains. All of these pipes are expected to perform as both a conduit and a structure. Much attention is always given to the conduit aspect of the design; however, these conduits are also expected to perform as structures throughout their service life. A service life of 75 years is a common expectation for the buried infrastructure that we are building today. A pipeline must continue to function as a conduit and as a structure for all of those 75 years. The consequences of failure include fatalities and injuries, damage to vehicles and property, traffic congestion, detours and delays, environmental impacts and reconstruction costs.

Buried infrastructure by its very nature is out of sight and, because it is out of sight, it is often also out of mind. It can be difficult to realize that there is a problem until it is too late and a catastrophic failure has occurred.

The modes of failure for pipe include:

- Buckling due to poor installation of flexible pipes
- Corrosion
- Combustion of plastic
- Disjointing
- Flotation
- Wash-out
- Abrasion
- UV degradation of plastic pipes
- Chemical attack
- Post-installation construction close to flexible pipe beddings

Reinforced concrete pipe is generally accepted as having a service life of at least 100 years in culvert and drainage applications. Unlike flexible corrugated steel pipe or plastic pipe, rigid reinforced concrete pipe has inherent structural strength and is much less dependent upon the surrounding soil support, known as bedding. Hence, it is very unlikely to fail suddenly due to wash-out or loss of bedding materials.



Car in hole caused by the collapse of a corrugated steel pipe – Highway 174, Ottawa, 2012

The Canadian Concrete Pipe and Precast Association (CCPPA) recognizes that there is a range of applications for various pipe products such as concrete, plastic, steel and fibreglass. CCPPA asserts that not all pipe products should be used in every application. The CCPPA advises engineers to be cautious and diligent when dealing with pipe salesmen, marketing rhetoric and glossy marketing brochures introducing new but unproven pipe products. A salesman's job is to sell pipe and meet his sales target for the month. An engineer's job is to design and construct infrastructure that will last over 75 years.

The following matrix can be used as a guide to assess the level of risk for a specific project:

Probability	Consequence: Insignificant	Minor	Significant	Major	Catastrophic
Almost Certain	Moderate	High	High	Extreme	Extreme
Likely	Moderate	Moderate	High	Extreme	Extreme
Possible	Low	Moderate	Moderate	High	Extreme
Unlikely	Low	Low	Moderate	High	High
Rare	Low	Low	Low	Moderate	High

Once the engineer has evaluated the level of risk, the engineer can then respond to that risk in a number of ways. There are four generally accepted responses to RISK:

AVOIDANCE: Specifications are written to disallow certain products for certain applications. In some provinces in Canada, only concrete pipe is allowed under highways with the highest traffic counts and under other key transportation arteries.

TRANSFERENCE: The risk is transferred to a party who is more capable of handling the risk such as a contractor or a supplier. Examples of transference are asking the contractor to submit design calculations for the pipe that are sealed by a professional engineer, and supplying a trench detail, also sealed by the professional engineer.

MITIGATION: This lessens the impact of a specific risk for a particular pipe product. Many municipalities in Canada limit the size of plastic pipes to 600mm maximum diameter.

ACCEPTANCE: The recognition of a specific risk by the engineer and a decision NOT to take action to deal with that risk. The engineer needs to ensure that a comprehensive design is completed and construction of the project is done strictly in accordance with the specifications.

Engineers involved in the design or construction of buried infrastructure should always be sensitive to the risks associated with the project and should conduct a risk assessment as appropriate. They should not be swayed by sales rhetoric and sales pitches, glossy marketing brochures and apparent lowest initial cost.

Steel Reinforced Polyethylene Pipe

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Steel reinforced polyethylene (SRPE) pipe is the latest product that has entered the already overcrowded flexible plastic drainage and sewer pipe market with manufacturers claiming to address several concerns that have plagued traditional profile wall high density polyethylene (HDPE) pipe. The marketers of SRPE pipe claim that this new product combines the high strength of helically wound steel ribs surrounded by HDPE, however after a thorough evaluation, design engineers may discover that SRPE will not provide a significant improvement over conventional HDPE pipe and may actually be cause for new concerns.

Properties of HDPE and SRPE Pipe

The design of SRPE pipe should include an extensive review of the material properties of its two main components, HDPE and steel, and their compatibility with each other. The long-term behaviour of viscoelastic materials like HDPE is very different from elastic materials like steel. Due to stress relaxation, the tensile strength and modulus of elasticity of HDPE decrease significantly as shown in Table 1, therefore a design engineer must understand how and when to use short term and long term HDPE material properties. Conversely for steel, which is typically needed for its tensile strength, exhibits a linear stress-strain relationship up to a yield point when it becomes permanently deformed and elongates under tension until it reaches failure. The amount of elongation and how suddenly the steel fractures depends on its chemical composition and ductility, therefore test data and Mill Certificates should be reviewed by those with a competency in steel material properties.

TABLE 1 - HDPE Short- and Long-Term Modulus and Tensile Strength

	Initial		75-Year	
Product	**Tensile Strength, F_u (ksi)**	**Modulus of Elasticity, E (ksi)**	**Tensile Strength, F_u (ksi)**	**Modulus of Elasticity, E (ksi)**
Profile HDPE Pipe	**3.0**	**110.0**	**0.90**	**21.0**

The flammability of HDPE may be an important consideration in areas where drought and wildfires are prevalent, especially under critical roadways with high traffic counts. Any plastic with a Limiting Oxygen Index (LOI) less than the 21% atmospheric oxygen concentration is considered to be flammable. Plastics such as polyethylene and polypropylene both have a LOI of 17% which means it will easily support combustion in the open air.

Material Compatibility

Storm and sanitary sewers are exposed to a range of temperatures such as the low temperature runoff from snow melt to the heated water discharged by household appliances such as laundry machines and dishwashers. For this reason, a critical aspect of a non-homogeneous pipe material is the thermal compatibility of the individual material components. HDPE is significantly more susceptible than steel to expansion and shrinkage from temperature changes so this may be cause for concern for the long-term service life of SRPE pipe due to a loss of bond between the HDPE and steel ribs, material fatigue, and environmental stress cracking after many cycles of temperature fluctuations.

Structural Design Method

A fundamental responsibility for engineers specifying a pipe product is to have an understanding of the applicable structural design method in order to determine the appropriate trench width, backfill material type, and compaction efforts required for specific site conditions. While design methods for reinforced concrete pipe, corrugated steel pipe, and even traditional plastic pipe products have been established through research and development, the structural design method for SRPE is not as well documented. Engineers would expect the SRPE pipe manufacturers to provide clarity on a design method, however various SRPE pipe products are significantly different from each other and manufacturers only publish height of cover tables that mention an ambiguous design method based on both Section 12.7 *Metal Pipe, Pipe Arch, Arch Structures and Steel-Reinforced Thermoplastic Culverts* and Section 12.12 *Thermoplastic Pipes* in the AASHTO LRFD Bridge Design Specifications. This raises a fundamental question about SRPE pipe – is it simply a profile wall HDPE pipe or is it a steel pipe with a plastic coating?

Pipe Deflection

The performance, and the potential for structural failure, of a flexible pipe can be predicted from pipe deflections. If a thermoplastic pipe is designed and installed properly, deflections should be less than 5% of the pipe's base inside diameter. If excessive deflections are permitted, joint leakage might occur which can lead to the weakening of the backfill material and eventual collapse of the plastic pipe.

One manufacturer of SRPE pipe indicates that a minimum pipe stiffness (PS) of 320 kPa is provided for all diameters, which traditional HDPE pipe and another SRPE pipe manufactured to CSA standards were not able to achieve for diameters greater than 900mm. Engineers may be tempted to conclude that in terms of overall pipe deflections, the SRPE pipe with a higher PS will perform better than traditional HDPE pipe. Equations, like the Modified Iowa Formula, used to estimate deflection for a flexible pipe can be expressed in general terms as:

$$\text{Deflection} = \frac{\text{Load}}{\text{Pipe Stiffness} + \text{Soil Stiffness}}$$

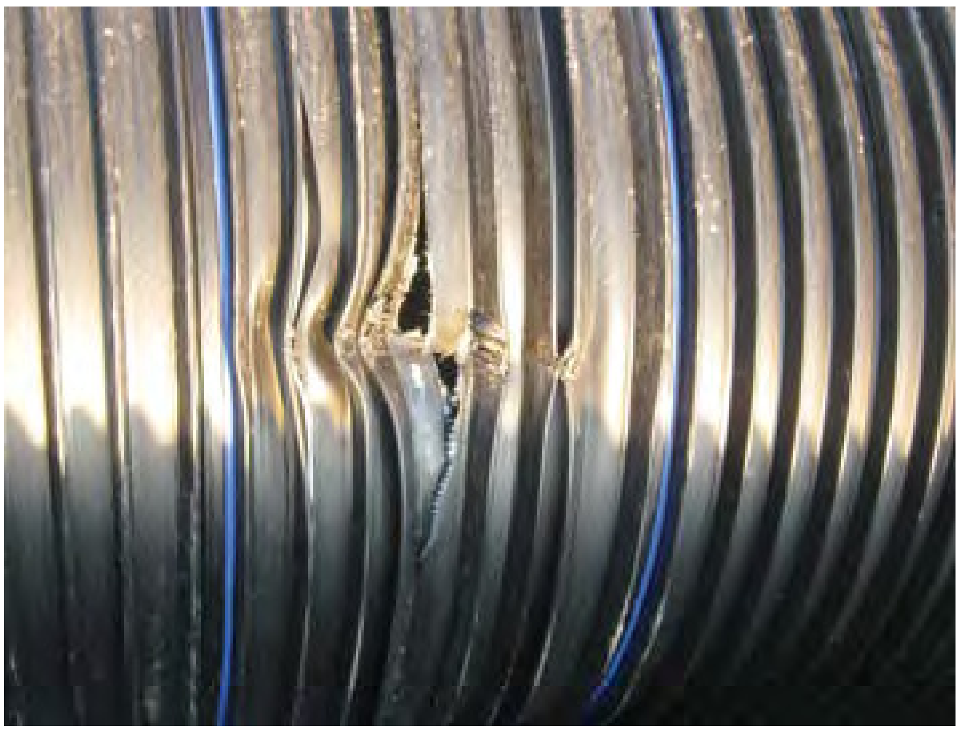
Where the "pipe stiffness" term in the denominator is extremely small compared to the "soil stiffness" term. A proper installation of a plastic pipe in accordance to CSA B182.11 and ASTM D2321 with a well compacted granular material can easily provide a soil stiffness greater than 6,900 kPa while the pipe stiffness of the SRPE pipe is only 320 kPa. This demonstrates that the soil stiffness has the biggest effect on a plastic pipe's structural capacity, while the pipe stiffness contributes very little.

Units for Pipe Stiffness

A fact that may not be obvious to many engineers is that while the units of measure for PS are the same as those for pressure and stress, they are very different quantities. According to ASTM D2412 *Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading*, the PS value is actually pounds-force per inch of length per inch of deflection (lbf/in.-in. or pii) which can also be expressed as psi, but is not the same as pounds-force applied to an area of one square inch. Similarly in SI units, PS is expressed as newtons of force per metre of length per millimetres of deflection, which is dimensionally the same as kilopascals (kPa) but is not equivalent.

Pipe Inspection

Steel reinforced polyethylene (SRPE) pipe is shipped to jobsites across Canada from the state of Utah and from southern Ontario. Inevitably the pipe gets damaged when shipping long distances. Damage includes perforations to the pipe, scratching and damage to the polyethylene coating and damage to the reinforcing ribs. Damage to the polyethylene coating compromises the service life of the pipe and negates all the longevity claims of the manufacturers. Damage to the reinforcing ribs compromises the structural integrity of the pipe. In both cases the owner of the new infrastructure is not getting the product that was paid for and rejection of the damaged pipe is the only option.



Damaged SRPE Pipe on Site – Rejection is the only option

Steel Reinforced Polyethylene Pipe

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Pipe Installation

In addition to adhering to CSA B182.11 and ASTM D2321 for the proper installation of plastic pipe, designers and field inspectors should demand that the suppliers of large diameter plastic pipe provide proper instructions to installation contractors on how to properly use movable trench boxes or shields. Both installation standards specify provisions to avoid trench boxes from disturbing the installed pipe and its soil embedment, which becomes far more difficult with plastic pipe diameters greater than 600mm due to most local health and safety regulations for excavations.

The proper method for field cuts to adjust the SRPE pipe length and field installations of watertight fittings for service connections must also be clearly detailed for the installation contractor.

Post Installation Inspection

As with all buried flexible pipe, both CCTV inspection and ring deflection testing must be mandatory in order to verify that the soil embedment was properly constructed. As discussed, the SRPE pipe design must specify the appropriate trench width, backfill material type, and compaction efforts required to minimize the pipe deflection to less than 5%. The post installation inspection is the only means of verifying that the contractor achieved these design specifications.

Deflection measurements must also become a part of regular routine inspections throughout the service life of the SRPE pipe. The suppliers of SRPE pipe should also provide the materials and training of maintenance personnel required to repair damage to the plastic liner, corrosion of any steel ribs, or any damage to the spiral weld locations.

Critical Culvert Rehabilitation

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

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

Hidden Valley Road Bridge Replacement

Frank Vuk, Project Coordinator,
City of Burlington

Phil Campbell, P.Eng.,
Project Manager, CIMA+

Sammy Wong, P.Eng.,
VP Engineering & Quality
Con Cast Pipe

Con Cast Pipe manufactured and supplied a precast, three-sided box and wingwall units for a rapid bridge replacement project in the fall of 2017. The original bridge, a 1.5m (rise) x 7.3m (span) x 6.7m (platform width) concrete rigid frame bridge structure on spread footings with concrete wingwalls and precast concrete block retaining walls, was constructed in the 1950s over Grindstone Creek on Hidden Valley Road in Burlington, Ontario, immediately north of the tunnel underpass of Highway 403. Hidden Valley Road is a rural two-lane, dead-end roadway with approximately 25 residential properties beyond the bridge structure. A January 2014 inspection report provided a recommendation to replace the existing Hidden Valley Road bridge structure within one to three years. This recommendation was based on the consideration of the structure's age, concrete condition, undermining of the abutments, unstable retaining walls, inadequate railing systems and poor orientation of the structure abutments with the watercourse.

Three-sided precast box units being installed

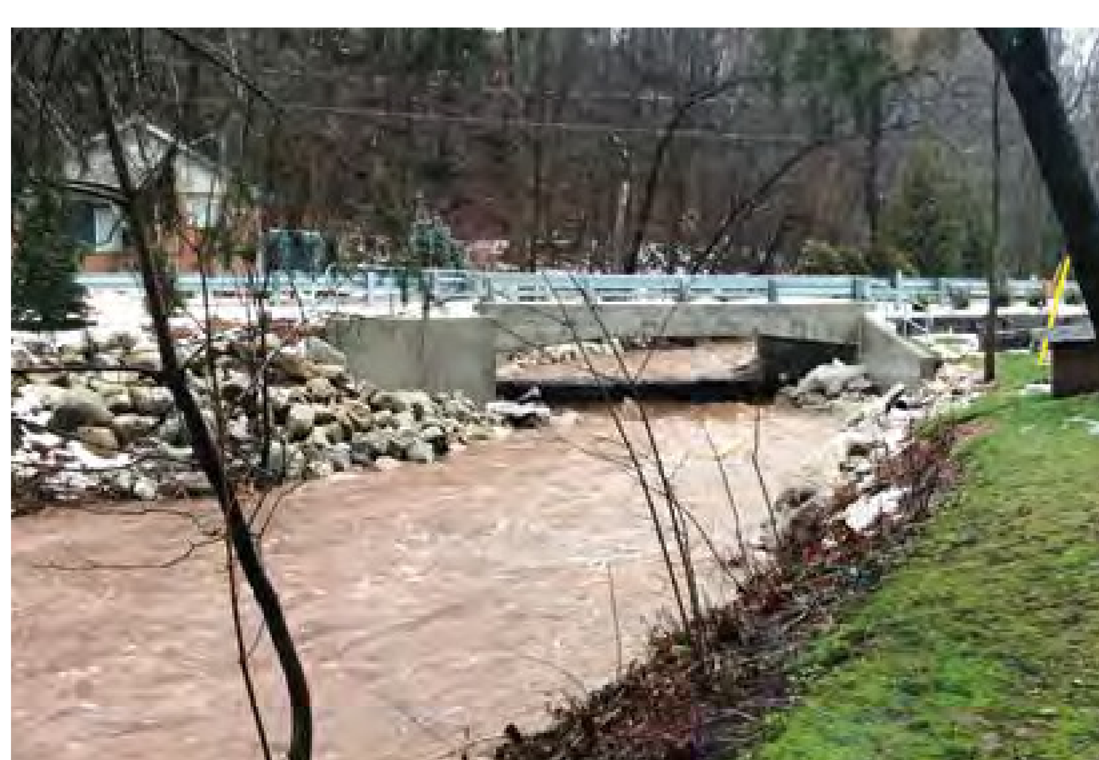
In October 2015, the City of Burlington retained the engineering services of CIMA Canada Inc. to commence a Schedule 'B' Municipal Class Environmental Assessment (EA). The options included: a) a two-phase replacement, b) new alignment of the road/bridge, c) rapid bridge replacement or d) replacement with temporary road/bridge access. Upon consideration of public comments and the specific criteria, option "d" was selected as preferred and progressed to detailed design.

Subsequent to the completion of the EA, CIMA commenced a detailed design of the bridgere placement with a temporary diversion road/bridge. Tendering included the details of a new 2.0m (rise) x 9.1m (span) x 8.0m (platform width) concrete bridge structure, with consideration for many temporary/working constraints associated with the site's unique location and physical properties, natural environment, roadside environment and adjacent properties. Maintaining continuous access for residents, emergency services and other services (i.e. waste collection, mail services etc.) during construction was paramount, understanding that even short duration road closures were not viable. This involved establishing a temporary road alignment and temporary bridge criteria. A 5.0m wide single lane temporary gravel roadway was designed immediately east of the existing bridge and an approved area for the temporary bridge was established to provide suitable separation from the new bridge construction. In consultation with pre-fabricated, modular steel structure suppliers, the criteria for the temporary bridge was established. The temporary roadway and bridge were designed to accommodate fire pumper truck and garbage collection trucks. The temporary single lane width was designed to be controlled by temporary traffic signals at each end of the project site for the duration of construction.

The design process saw a collaboration of many aspects of the engineering and construction community, including a precast concrete and modular bridge supplier to ensure the design was constructible and that scheduling was respectful of the limitations of manufacturing. Coordination with the precast manufacturer was particularly sensitive given the project's expectations for success within the timing window provided. By allowing Lancoa Contracting Inc., the contractor, to develop their own temporary/working schemes, a cost-effective project was delivered on time and on budget.

The manufacturing of the new three-sided box units took place during the summer of 2017 in a certified precast plant at Con Cast Pipe. Unlike typical three-sided boxes, the combination of a skewed end face, special joint details, post tension hardware, and the limitations of lifting and handling points created a uniquely complex situation. The fabrication of these precast units was controlled under CSA A23.4 requirements and successfully carried out by Con Cast Pipe. A tight quality control and assurance process was put in place to ensure the required precision was achieved during the installation.

In conclusion, the completion of the project ensures the City of Burlington and the residents on Hidden Valley Road will have a reliable bridge structure in this access-constrained location. With the city's proactive replacement of the existing structure before the end of its useful life, the threat of requiring emergency work has been avoided. This project also showcased the use of precast concrete bridge elements in accelerated bridge construction to minimize the social impact and to provide high quality, sustainable, resilient infrastructure to the public. This project has received the 2018 civil engineering project of the year award from the Hamilton-Halton Engineering Week committee, which is a subcommittee of the Ontario Society of Professional Engineers.



Completed Bridge in Service

Local Area Politicians Tour M CON Pipe and Products Plant

The Canadian Concrete Pipe and Precast Association (CCPPA) hosted an information session and plant tour for local area politicians at the M CON Pipe and Products plant in Ayr, Ontario in April 2018. Politicians from all three levels of government were in attendance, including:

- Marwan Tabbara, Member of Parliament for Kitchener South-Hespeler
- Raj Saini, Member of Parliament for Kitchener Centre
- Sue Foxton, Mayor of the Township of North Dumfries
- Kathryn McGarry, Member of Provincial Parliament for Cambridge and North Dumfries – Minister of Transportation, Ontario

This was the first time that the CCPPA had representatives from the federal and provincial governments together with a local mayor for a tour of a concrete pipe and precast manufacturing facility. It presented an excellent opportunity for all parties to engage and explore common aspirations and challenges, including the importance of infrastructure investments and the risks associated with poorly designed or poorly constructed buried infrastructure.

Marwan Tabbara, Raj Saini, Sue Foxton Kathryn McGarry, and Doug Galloway, President, M CON Pipe and Products

M CON Pipe and Products, Forterra Pipe and Precast and Con Cast Pipe are three concrete pipe companies located in the Cambridge and Guelph areas of Ontario. Collectively, they hire hundreds of people directly and stimulate employment in other local industries such as sand and gravel quarries. Workers are well compensated and these companies make a significant contribution in local taxes to their respective municipalities and to the provincial and federal governments.

CCPPA recognizes that all governments have limited resources and recognize an obligation to taxpayers to maximize value when it invests in infrastructure.

$$\text{Value} = \frac{\text{Performance}}{\text{Cost}}$$

The CCPPA asserts that the performance of all pipes used in drainage and sewer are NOT equal. Too often all the emphasis is on initial costs, while maintenance and replacement costs are not adequately or realistically accounted for.

The CCPPA sincerely thanks these local politicians for taking the time in their busy schedules to meet with our industry.

Strathcona County Mayor and Councillors Tour Lafarge Plant

Lafarge staff with local area politicians

Strathcona County is a municipality in central Alberta, just east of Edmonton. The county is very supportive of local entrepreneurs and each year they visit roughly 20 businesses from various industries to assist with their development needs. In January 2018, seven guests from Strathcona County received a tour of the Edmonton Lafarge Pipe Plant. This included the mayor, the ward councillor, the representative from the chamber of commerce and various other staff from Economic Development & Tourism.

During the tour, guests had the chance to observe production using dry-cast concrete and also learned how the three-edge bearing and hydrostatic tests verify the quality of the products. The group expressed that they were impressed by the tour, noting special appreciation of the use of local and recycled materials to make precast concrete drainage products.

businesspipeline

Concrete Pipe/Drainage Products Producer

Coldstream Concrete Limited
Location: Ilderton, ON
Tel: 519-666-0604
Fax: 519-666-0977
Email: rsbrown@coldstreamconcrete.com
Website: www.coldstreamconcrete.com
Contact: Robert Brown

Con Cast Pipe
Location: Guelph, ON
Tel: 1-800-668-7473
Fax: 519-763-1982
Email: sales@concastpipe.com
Website: www.concastpipe.com
Contact: Brian Wood or Jason Spencer

DECAST Ltd.
Location: Barrie, ON
Tel: 1-800-461-5632
Fax: 705-734-2920
Email: jtully@decastltd.com
Website: www.decastltd.com
Contact: Jim Tully

Forterra Pipe and Precast
Locations: Whitby, Cambridge, Ottawa
Tel: 1-888-888-3222
Fax: 519-621-8233
Email: leo.steffler@forterrabp.com
Website: www.forterrabp.com
Contact: Leo Steffler

Inland Pipe/Ocean Pipe
Locations: Calgary, Edmonton, Regina, Winnipeg, Vancouver
Tel: 1-800-268-0785
Fax: 403-261-6751
Tech Inquiries: Justin Arnott
Email: Justin.Arnott@LehighHanson.com
Website: www.inlandpipe.com

LafargeHolcim
Locations: Calgary, Edmonton, Winnipeg, Saskatoon, Thunder Bay
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Fax: 780-410-3699
Email: amir.azizi@lafargeholcim.com
Website: www.lafargecorp.com
Contact: Amir Azizi

Langley Concrete Group
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Fax: 604-533-8191
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Website: www.langleyconcretegroup.com
Contact: Mark Omelaniec

M-Con Products Inc.
Location: Carp, ON
Tel: 1-800-267-5515
Fax: 613-831-2048
Email: sales@mconproducts.com
Website: www.mconproducts.com
Contact: Carlo Taverna

M-Con Pipe & Products Inc.
Location: Ayr, ON
Tel: 519-632-9112
Fax: 519-632-7440
Email: dgalloway@mconpipe.com
Website: www.mconproducts.com
Contact: Doug Galloway

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Website: www.press-seal.com
Contact: Matt Tomkinson

Trelleborg Pipe Seals
Location: Milford, NH
Tel: 800-262-2180
e-mail: Terry.macdonald@trelleborg.com
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Contact: Terry Macdonald

Reinforcing Steel

Laurel Steel
A Division of Harris Steel ULC
Location: Burlington, Ontario
Tel: 800-265-6811
Fax: 905-634-7888
Email: grant.fraser@laurelsteel.com
website: www.laurelsteel.com
Contact: Grant Fraser

Numesh Inc.
Location: Laval, PQ
Tel: 1-800-363-0847
Fax: 450-663-9049
Email: michel.mongeau@numesh.com
Website: www.numesh.com
Contact: Michel Mongeau

StelCrete Industries Limited
Location: Niagara Falls, ON
Tel: 1-866-924-0837
Fax: 905-735-3955
Email: bhansen@stelcrete.com
Website: www.stelcrete.com
Contact: Bob Hansen

Safety Climbing Equipment

MSU Mississauga Ltd.
Location: Mississauga, ON
Tel: 1-888-220-2213
Fax: 905-823-4947
Email: sales@msumississauga.com
Website: www.msumississauga.com
Contact: Virginia Junkin

Stepcon Industries Inc.
Location: Mississauga, ON
Tel: 1-888-783-7266
Fax: 905-897-6001
Email: stepcon@on.aibn.com
Website: www.stepconindustriesinc.com
Contact: Michael Greer

Precast Manufacturing Equipment and Accessories

HawkeyePedershaab
Location: Mediapolis, IA
Tel: 800-626-1453
e-mail: rbeelman@hawkeyepedershaab.com
website: www.hawkeyepedershaab.com
Contact: Randy Beelman

Mel C. Marshall Industrial Consultants Inc.
Location: Delta, BC
Tel: 604-943-8512
Fax: 604-943-2738
Email: melmarshall@telus.net
Website: www.precastconcretebc.com
Contact: Mel Marshall or Braden Marshall

J D Industrial Sales
Location: Cambridge, ON
Tel: 519-267-4340
Cell: 519-841-2554
Fax: 888-463-7598
Email: drewblack@jdindustrialsales.com
Website: www.jdindustrialsales.com
Contact: Drew Black