THE CORPORATION OF THE CITY OF COURTENAY

BRIEFING NOTE TO COUNCIL

To: Council **File No.:** 5335-20

From: Chief Administrative Officer **Date:** July 25, 2022

Subject: 5th Street Bridge Rehabilitation - Project Closeout

PURPOSE:

The purpose of this briefing note is to provide Council a close out summary of the 5th Street Bridge Rehabilitation Project including an overview of the project scope, finalized project costs as well as a summary of communications and traffic impacts.

BACKGROUND:

The 5th Street Bridge plays an important role in the entire Comox Valley transportation network serving 20,000 vehicles, 650 pedestrians and 500 cyclists each day. Originally constructed in 1960, the 72-metre steel truss bridge has two vehicle lanes and 1.5 metre sidewalks on both sides of the bridge.

Although the bridge has had regular maintenance over the past decades, as with any major asset, periodic major maintenance and repairs are required throughout its lifespan. The lead-based coating was at the end of its service life. The bridge deck and overlay were also identified as needing repair. Engineers specializing in bridge construction and rehabilitation determined the bridge had not yet reached the end of its useful life, and recommended rehabilitation as the most cost-effective and efficient solution.

PROJECT SUMMARY:

The 5th Street Bridge is an important transportation connection in the Comox Valley, linking key networks to downtown and beyond. The entire region depends on the 5th Street Bridge as a primary route across the Courtenay River.

To address the condition and safety of the bridge, the scope of the project included:

- Removal of the lead-based coating for the entire bridge structure;
- Recoating of the entire bridge structure including handrails and rub rails;
- Structural repairs to 16 structural beam ends;
- Removal of existing deck overlay;
- Partial and full depth deck repairs;
- Installation of new deck overlay;
- Installation of a cathodic protection system.

This was a complex project with multiple phases. There was an added level of intricacy considering the repairs were made over a sensitive waterway and keeping the bridge open to all modes of traffic throughout the project.

Park Derochie was awarded the project through a competitive procurement process in early 2021 and was the Prime Contractor responsible for the entire site with a team of subcontractors working directly for them.

PROJECT SCOPE/SCHEDULE IMPACTS:

Construction schedules are typically developed by the owner and their project teams, with concept schedules often presented in the early stages of project development. Although they are typically well founded, and appropriate contingencies included, they should be viewed as a work in progress.

On a project with significant impacts to the community, the project team must find balance in presenting a realistic schedule that accounts for sufficient schedule contingency. Ensuring appropriate contingencies are included in project schedules is an important consideration going forward, for future projects.

The project began as scheduled on April 15, 2021 with Park Derochie mobilizing to site. Park Derochie encountered challenges during the project that resulted in large schedule delays. Although Single Lane Alternating Traffic was scheduled to end on October 15, 2021, it did not end until February 17, 2022. This represents an additional four months of Single Lane Alternating Traffic. The causes of this delay are described below.

Scaffolding Design/Installation

Scaffolding was installed on the bridge to support a heavy, plastic containment system that would keep the lead-based coating and abrasive from entering the surrounding marine environment. Park Derochie originally intended to wrap the bridge entirely in one large containment, however, following additional analysis of the bridge and the complex geometry of the bridge scaffolding, they revised the design and associated work plan to instead have three separate containment sections, with paint removal and rehabilitation work to be completed on either end of the bridge, followed by the center. This change was the biggest contributor to the extended project schedule, adding approximately two months to the duration of the project.

Unknown Condition - Stainless steel mesh

A stainless-steel mesh was discovered during demolition of the overlay on the north lane of the bridge in November 2021. This mesh did not cover the entire surface area of the bridge, and was only installed over the beams. Unfortunately, this mesh was not documented in the record drawings, and due to its limited installation area, was not identified in the preliminary investigation (coring). Further investigations determined this mesh was intended as a structural element for the bridge and would need to be replaced after it was removed to rebuild the bridge overlay.

Typically, this would be a relatively straightforward replacement, however a replacement stainless-steel mesh would interfere with the conductivity of the new cathodic protection system, and an alternate non-conductive mesh material would need to be used. Further complicating the issue, the timing of this discovery coincided with the aftermath of the flooding in the interior of B.C. in fall 2021. This disrupted delivery channels for specialty materials and contributed to delays, and the subsequent delay claims by the contractor.

The removal and subsequent reinstall of the mesh were unexpected. The contractor could not account for this work in their baseline schedule which resulted in an additional delay of one month. The discovery of the stainless-steel mesh also impacted the project scope.

South Lane Concrete Condition

During demolition of the south lane overlay, it became apparent that the pre-existing concrete deck had significantly deteriorated. Although some deterioration was expected, the condition of the south lane was much worse than expected, and much worse than the north lane. Although it couldn't be determined conclusively, it's possible that the concrete found in the south lane was original to the initial construction of the bridge in 1960.

Park Derochie had planned for some full-depth deck repairs, however due to the extensive damage, these repairs took three times longer than scheduled, adding an additional month to the schedule.

Cathodic Protection Install

The installation of the wiring for the cathodic protection system took place at the same time as the deck rehabilitation. The installation of the conduit and cabinets, where the wiring terminates, were the final pieces of work to be completed at the end of the project. Contractor error led to a substantial amount of necessary rework which resulted in a 1.5-month delay in substantial completion of the project. Although the schedule impact is significant, it occurred after two-way traffic was returned. Although this delay did not affect the duration of Single Lane Alternating Traffic, it did affect the reopening of the pedestrian underpass on the downtown side.

PROJECT COSTS:

The proposed project costs, and actual project costs are summarized in the table below.

Item	Proposed Cost	Actual Cost	Comments
Construction Costs	$5,472,627	$6,205,719	Change orders, scope additions, delay claims, etc.
Contract Admin/Site Inspection	$772,689	$1,122,430	Resulted from increases to the project schedule
Contingency	$263,466		Contingency was 4% at project start
Liquidated Damages	-	($337,000)	LD's not anticipated at project start.
Project Total	**$6,508,782**	**$6,991,149**	

A contingency is a risk management practice to offset uncertainties and risks. The project commenced with $263,466 in project contingency representing approximately 4% of the overall approved project budget.

Relatively straightforward construction projects in the City typically have project contingency of 10%. For projects with additional complexity or unknowns, a contingency of 15%, or even 20% for challenging retrofits, is much more typical and in line with industry best practice.

Due to the unanticipated conditions and the limited project contingency funds an additional $640,000 was requested to cover the additional project expenses for the rehabilitation of the 5th Street Bridge. On an interim basis the project overage was funded with gas tax grant revenue.

Summing the initially available contingency with the above noted overage, brings the project to 13% over original construction contract value, which is in line with industry best practice for contingency amounts.

Going forward, project teams must find balance in presenting realistic budgets, while including enough contingency to cover project risks. Ensuring project budgets include appropriate contingencies that are aligned with industry best practices will be an important consideration going forward.

The contract with the Contractor includes provisions for liquidated damages to address delays in project completion. Liquidated damages are costs due to the City by the contractor in the case of schedule overruns caused by the contractor. The value of liquidated damages was set at $2,000 per day by the project team early in the design process. The total amount of liquidated damages collected by the City for the duration of the project is approximately $337,000. These damages were collected in the form of credits on the Progress Pays submitted by the contractor, which were used to fund the project during schedule delays.

As shown in the table above, the final costs of the project were $6.99 million. This represents a budget exceedance of approximately $482,000. The unused, remainder of the $640,000 (approximately $158,000) will be returned to the gas tax grant revenue fund.

COMMUNICATIONS AND CONSULTATION:

Throughout the project, proactive, accurate and effective communication efforts were undertaken to keep the public informed, and to allow them to appropriately anticipate and respond to construction updates. Extensive feedback was collected and considered during consultations throughout the project planning phases.

Relationships with a variety of stakeholders and community groups and their integration in the project communications were central to project planning and delivery. Emergency services, School District 71, BC Transit, the business community, and cycling coalition all played a role sharing information.

The bridge project was of very high interest and resulted in high engagement online. Project related social media posts were some of the highest engagement posts over the past year, and the project web page was one of the highest visited pages on the City's website.

Social media comments were predominantly neutral to positive, with many messages expressing appreciation for the work and the updates.

TRAFFIC IMPACTS DURING CONSTRUCTION:

A Traffic Management Strategy (TMS) was developed during the design phase of the project. The TMS was intended to provide an overview of the expected traffic impacts and detour routes to the public and project stakeholders during construction. The TMS was provided to Park Derochie to form the basis of their Traffic Management Plan (TMP).

Rather than closing the bridge fully to traffic, which would have had too great of an impact on the entire transportation network and in particular to downtown businesses, Single Lane Alternating traffic was

chosen which resulted in a longer project duration but allowed for traffic to flow across the bridge at all times.

Proactive communications were effective in helping shift commuting behaviours with many commuters changing their route or expecting minor delays at the crossing. The live cams, in combination with providing regular updates about upcoming impacts, were key to ensuring the travelling public knew what to expect.

The flow of traffic through the TMP routes was observed to work quite well. Although there were minor backups during rush hours in the morning and afternoon, traffic continued to flow through the area. This was considered a success by the project team.

Another goal of the TMS was to avoid having traffic backing up along 5th street in the downtown core. To avoid this, traffic was routed along Anderton Avenue in order to cross the bridge. Without large scale congestion in the downtown core, customers of downtown businesses were able to access these businesses without construction traffic congestion. This was also considered a success by the project team.

SUMMARY

Although the bridge has had regular maintenance over the past decades, as with any major asset, periodic investment and repairs are required throughout its lifespan. This rehabilitation provides another 20 years before additional bridge refurbishment is required. This is a conservative estimate and does not mean that the bridge will have reached the end of its intended lifespan in 20 years.

The 5th Street Bridge is not only an important functional part of our transportation system, but the fresh paint has aesthetically given it new life as a landmark in our downtown.

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