

## Integrating Aesthetic Design and Structural Engineering on a Signature Bridge

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### Abstract

The new Walterdale Bridge offers Edmonton a unique opportunity to create a striking new entrance into the downtown. The mandate of the Walterdale Bridge Replacement project for a functional signature bridge offers the opportunity to create a public place on the North Saskatchewan River.

The aesthetic goals of the structure played heavily into the structural systems chosen, which ultimately had a substantial impact on the overall structural design. This paper will explore how key aesthetic features were explored and influenced the structural design of the bridge and how that vision was maintained and protected through the construction phase, with focus on contract requirements for Architecturally Exposed Structural Steel and Architecturally Exposed Concrete.

**Keywords:** Bridges; Steel; Concrete; Cables; Aesthetics; Architecture; Conceptual Design and Realization

### 1 Introduction

Most bridges are constructed to last well over 100 years. They are enjoyed (or in some cases disdained) for generations. A “signature” bridge distinguishes a community from all others around the world. Bridge engineers must take responsibility for the aesthetic impact of their bridges. Bridge engineers should consider appearance equally with functionality (or performance) and cost. Often the assumption is made that one of these criteria must be sacrificed for the other. However, if one chooses to express the structural elements (struts, ribs and piers) through their shape and form one can achieve the greatest aesthetic impact without sacrificing other criteria or necessarily adding cost. This paper

focuses on this ideology as it relates to how the aesthetic goals of the new Walterdale Bridge played heavily into the structural systems chosen.

The new Walterdale Bridge is a gracious, single span arch – a functional, proud structure crossing the North Saskatchewan River where the duality of city and nature are experienced and celebrated at a pivotal location in Edmonton. The approaches to the bridge on the north and south banks not only satisfy mobility requirements but also reinforce the signature quality of the bridge through evocative land form and planting. Pedestrians and bicyclists feel like they can “touch the water” when using the new bridge. It is more than a bridge, it is architecture, it is a public realm and it is art. It is a signature element located in the heart of Edmonton, Alberta, Canada.