

Design of Historic Canal Bridge Crossing

Scope

The City of Eastview is undergoing a street redevelopment project to relieve traffic congestion in the Eastview downtown core and improve pedestrian and active transit access to downtown parks and businesses. A bridge crossing the historic canal is required as a part of the new extension to Hill Street. The scope of design work performed in the project includes the design of the new bridge and its foundations. A geotechnical analysis is required on the existing retaining wall, adjacent to the historic canal. The bridge is to be designed for a service life of 75 years and will accommodate two lanes of traffic with sufficient width to add a third lane in the future. Developing a detailed Class B cost estimate is also required.

Design Process

Option Analysis

- Prepared Preliminary Design Options
- Steel Plate Girders and Concrete Prestressed Bulb T Girders chosen as primary options for the design.

Loading Analysis

- Dead Load: Concrete Deck, Asphalt wearing surface, Barriers, and Girder's Self Weight.
- Traffic Load as specified by CSA S6:19
- Wind Load as specified by CSA S6:19

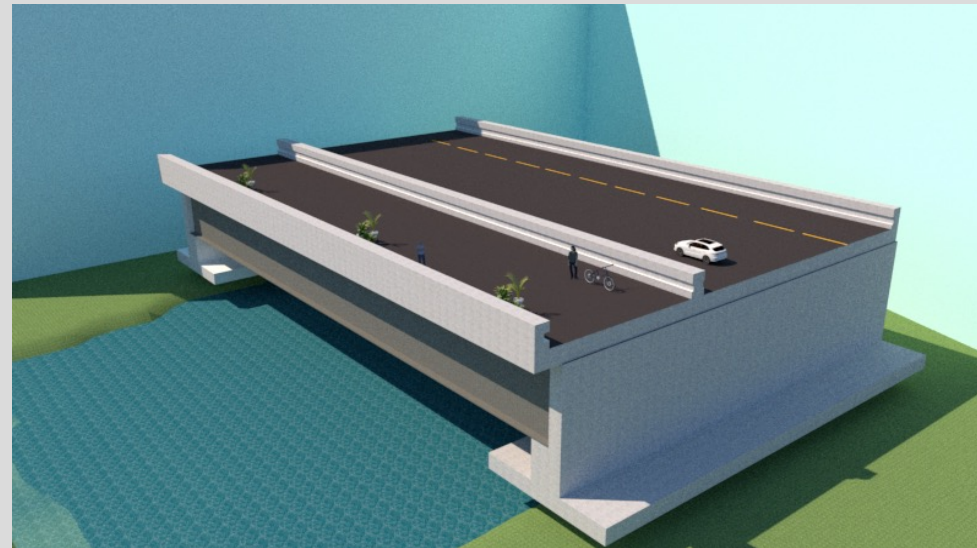
Design of Superstructure

- Selected Final Girder Size.
- Designed Lateral Load Resisting System.
- Designed Reinforcement for Bridge Deck.

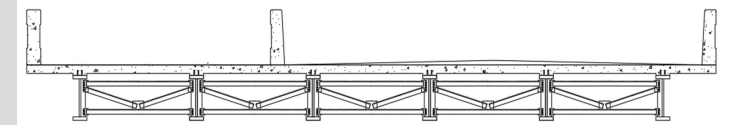
Design of Substructure

- Shallow Foundation Design for one of the Bridge Abutments.
- A Stability Analysis was completed on the Retaining Wall which will serve as the Second Abutment.

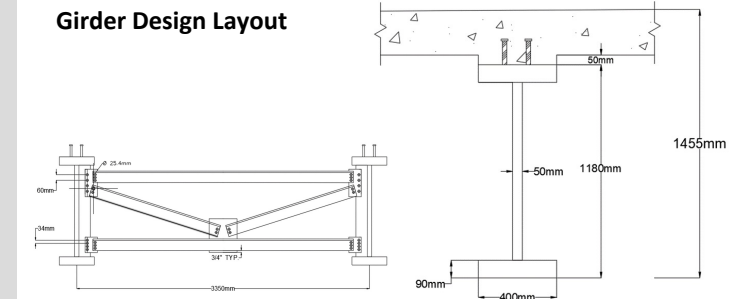
Final Design Model



Final Girder Design



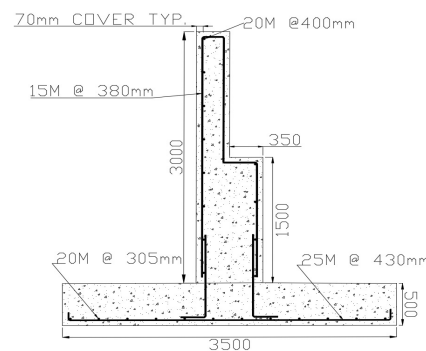
Girder Design Layout



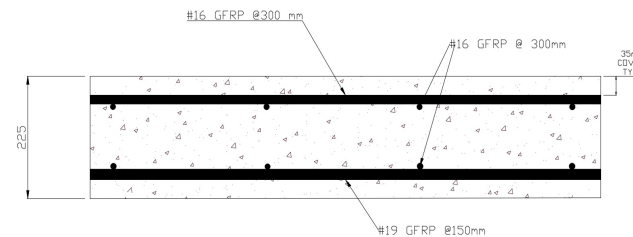
Bracing Detail

Girder Cross-Section

Detailed Drawings



Shallow Foundation



Bridge Deck Cross-Section

Class B Cost Estimate

Bridge Deck	\$550,000
Girders/Bearings	\$490,200
Abutments	\$299,360
Miscellaneous	\$60,000
Engineering Fees	\$20,000
Total (10% Contingency)	\$1,562,066

References

- CSA S6:19 Canadian Highway Bridge Design Code
- Concrete Design Handbook (4th Edition)
- Handbook of Steel Construction (12th Edition)