

SCOPE

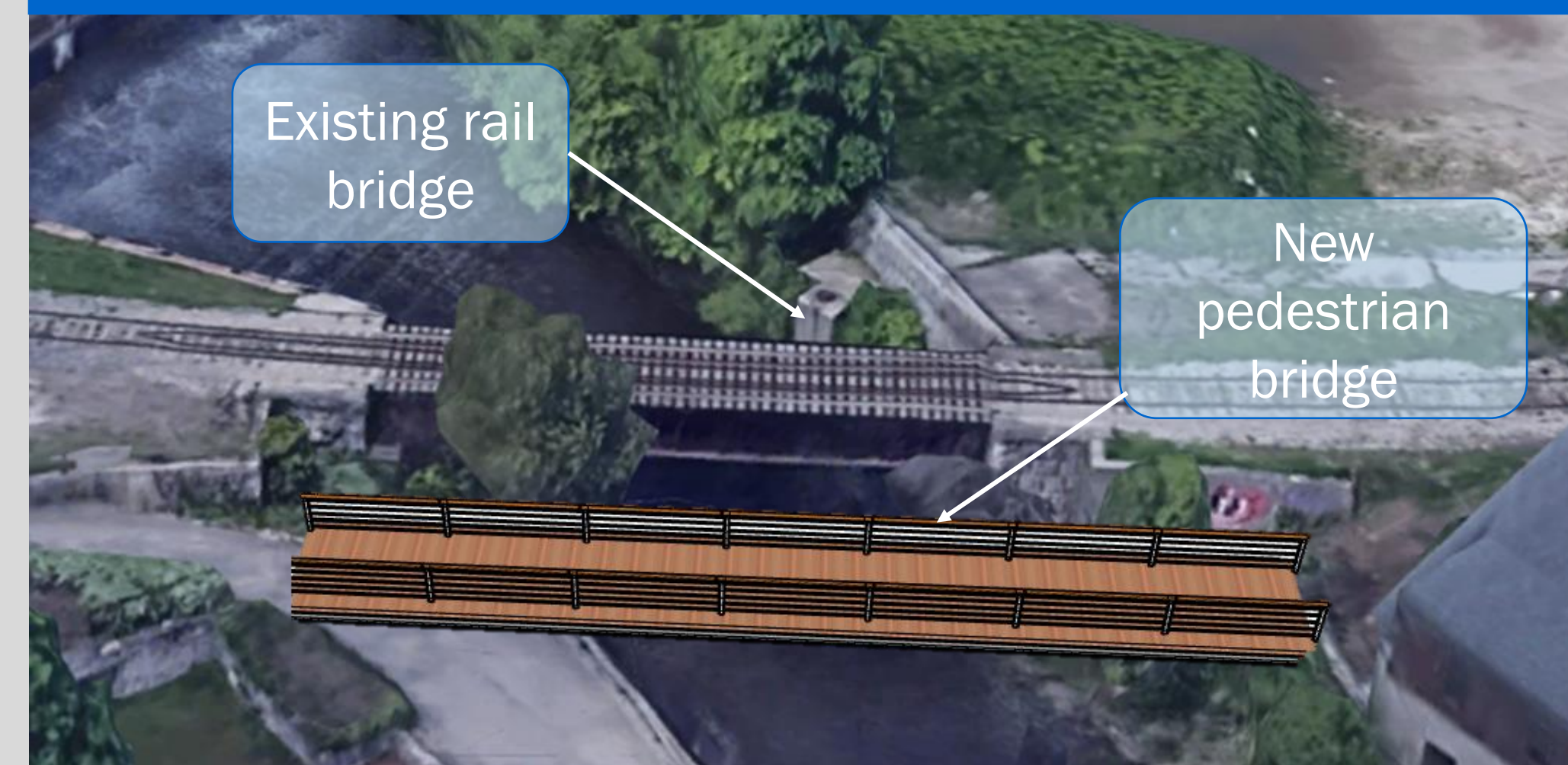
Overview

To accommodate predicted future growth, the city of Guelph, Ontario plans to connect St. Patrick's Ward to the downtown area with a pedestrian bridge.

Constraints and Objectives

- Bridge shall not disturb riverbed, clear span required
- Solution must divert pedestrians from using the nearby rail bridge to cross Speed River
- Must align with existing heritage landscape in the area
- Design should not obstruct existing views

SITE LOCATION



DESIGN PROCESS

OPTIONS ANALYSIS

- Location selection
- Determine constraints
- Compare materials

LOADING ANALYSIS

- Determine gravity loading: included self weight, superimposed dead, pedestrian live loading and maintenance vehicle
- Determine lateral loads: included wind load, earthquake loads were not considered due to the bridges seismic performance category

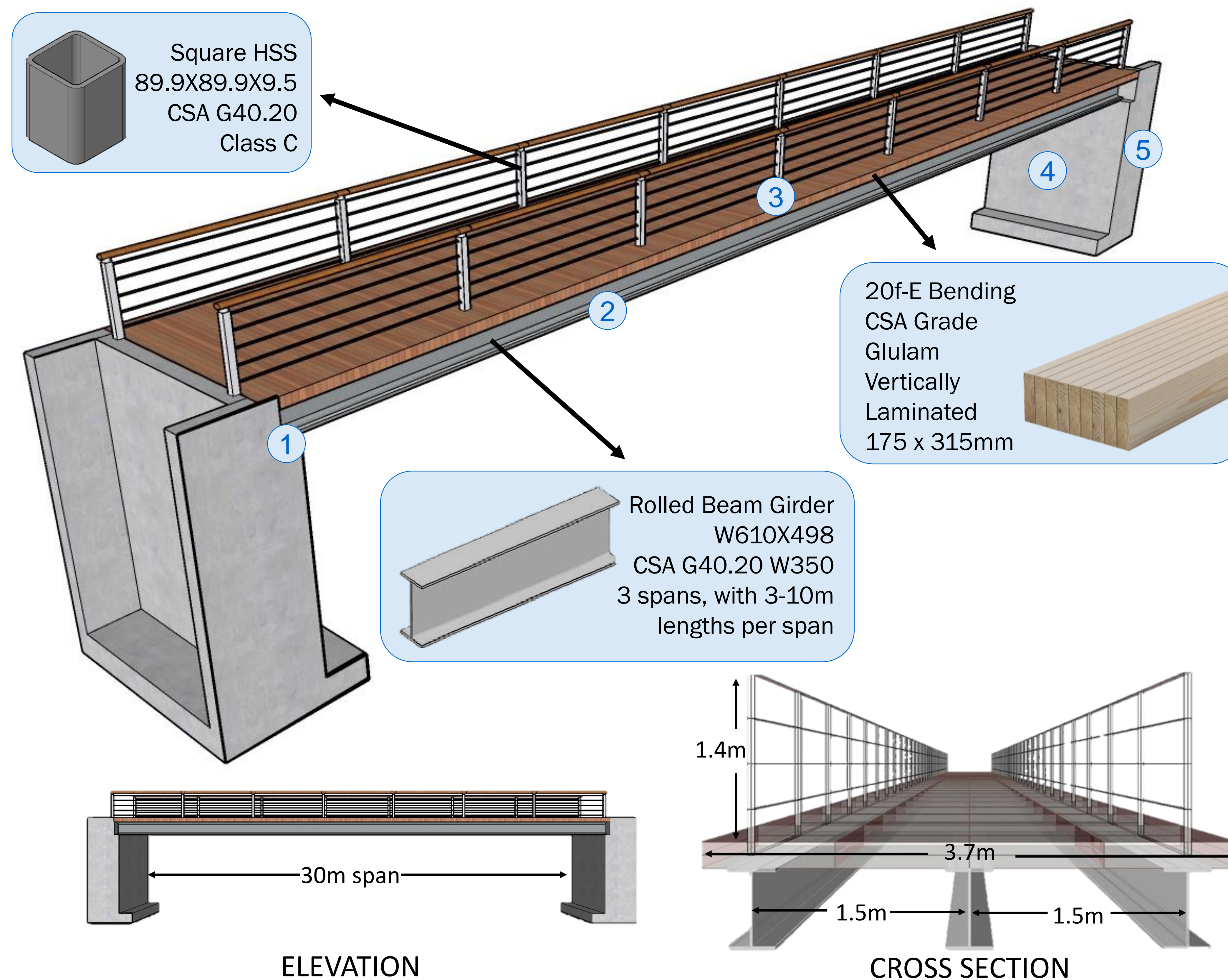
SUPERSTRUCTURE

- Determine governing load cases
- Select member sizes
- Conduct analysis of all bridge components under specified loading
- Conduct modal analysis for pedestrian frequency

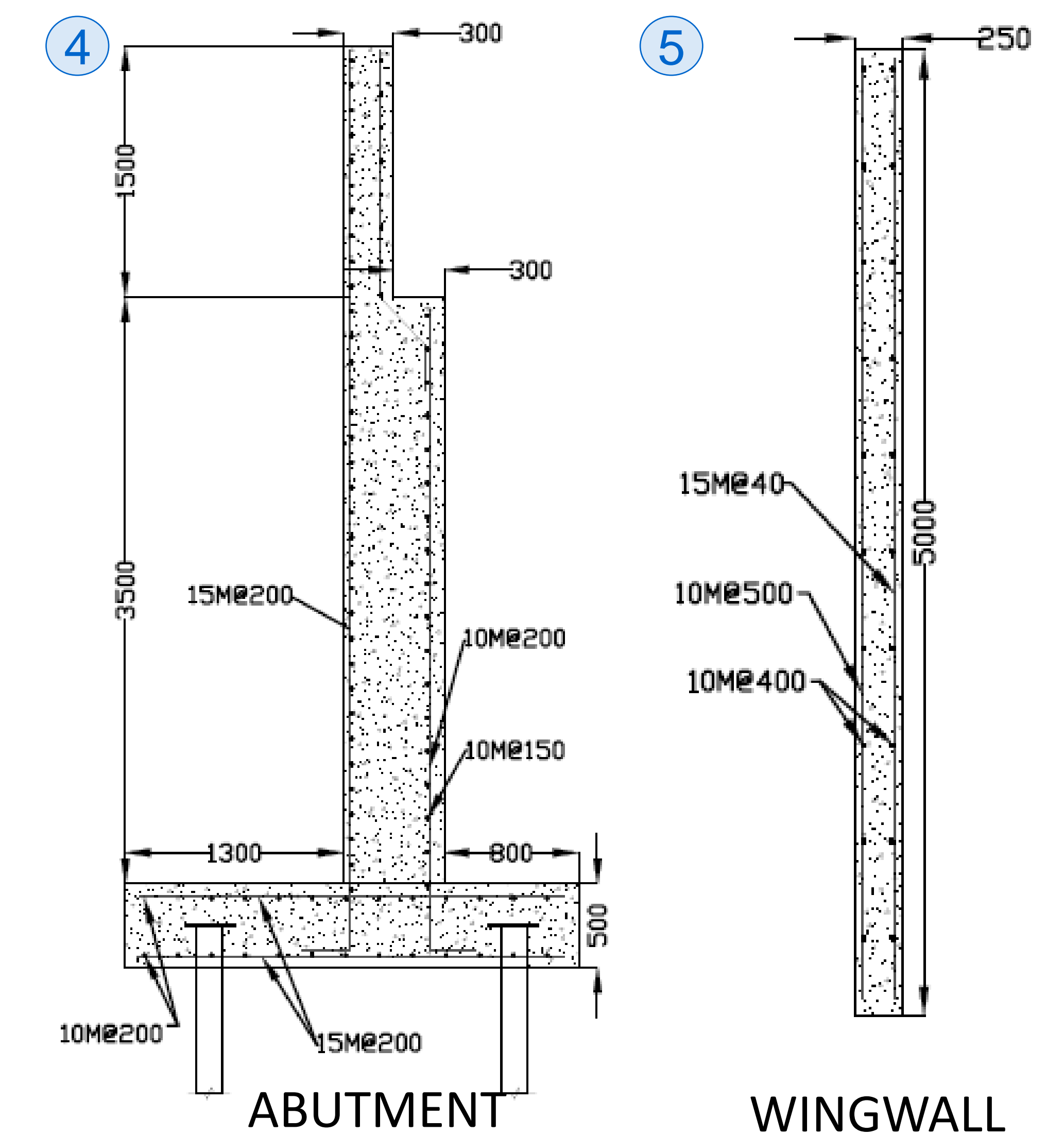
SUBSTRUCTURE

- Analyse geotechnical report
- Select micropiles to increase bearing capacity
- Design abutment and wingwalls

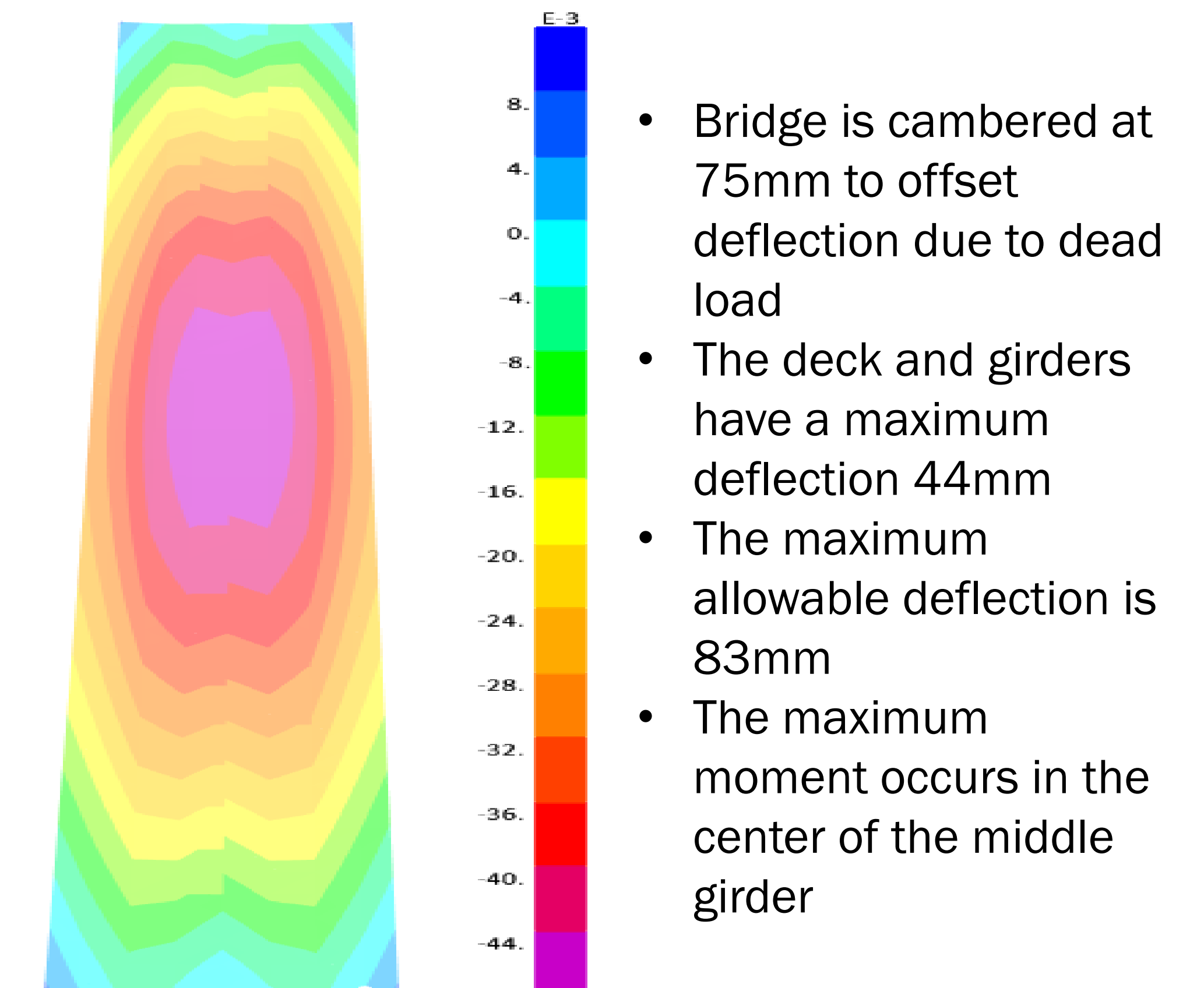
FINAL DESIGN



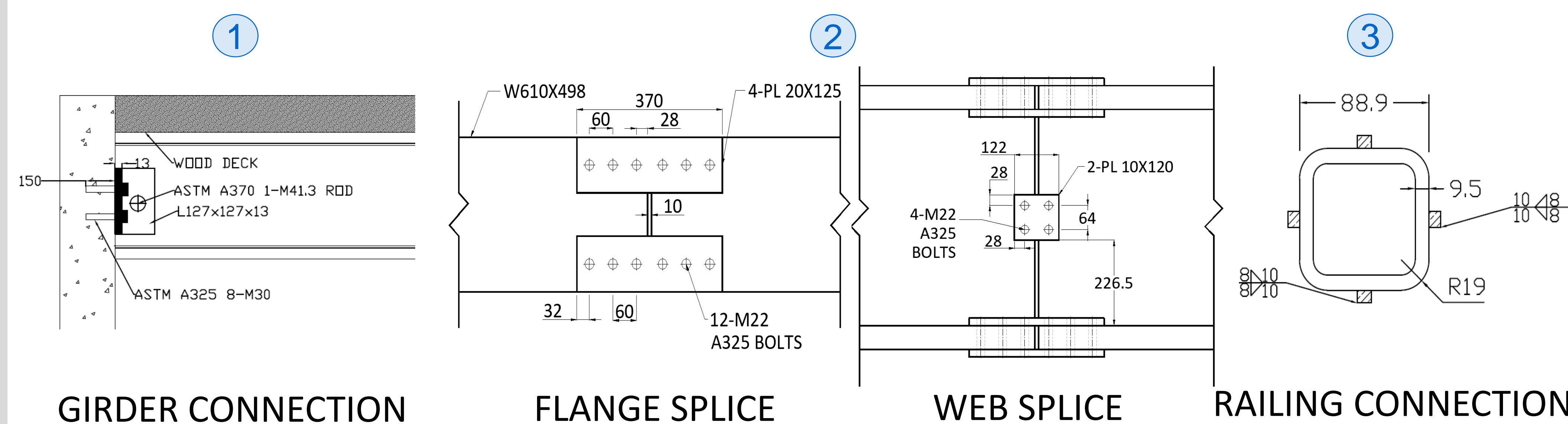
SUBSTRUCTURE



DECK DEFLECTION



DETAILS AND CONNECTIONS



CONCLUSIONS AND RECOMMENDATIONS

The final design chosen for the Ward to Downtown Pedestrian Bridge maintains the heritage character of the area, while providing pedestrians a safe crossing over the river. The steel girder allowed for minimal overall depth of the bridge, maintaining views in the area. The concrete abutments compliment those of the rail bridge and the surrounding concrete buildings, and the timber deck reduced the overall load, can be weatherproofed and provides a smooth surface for cyclists and strollers.

CLASS A COST ESTIMATE

Cost Type	Cost
Superstructure	\$216,000
Substructure	\$200,000
10% Contingency	\$42,000
Engineering Fees	\$20,000
Total Cost	\$478,000

Key References

1. Canadian Standards Association. (2019). *CSA S6-19*.
2. Canadian Institute of Steel Construction. (2019). *Module 4: Straight Steel Girder Bridges*
3. Canadian Wood Council. (2022). *Glulam*.