In order to bridge the gap between project proposal and delivery of the finished design, the team engaged in several key steps. Initially, the team developed sketches to outline potential solutions in the form of bridges and cross-sections. Ideas which were well-received by the client and the team went on to the modeling phase, where an analytical model of this sketch was created and fine-tuned. This model was meticulously designed and scrutinized, to ensure deflections were as close as possible to the finished structure. With the analytical model finished, fabrication documents were drawn up based on the member length found within. Connections at critical points were identified, designed, and checked to ensure they could withstand the expected loading. Table 1 shows a list of pros and cons the team came up with to help pick an option for the bridge type. Table 2 shows how the team chose the cross section and the material shape.
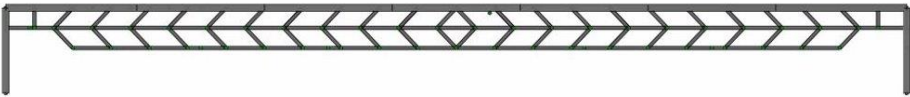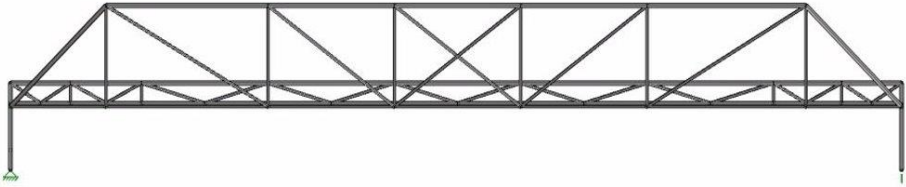

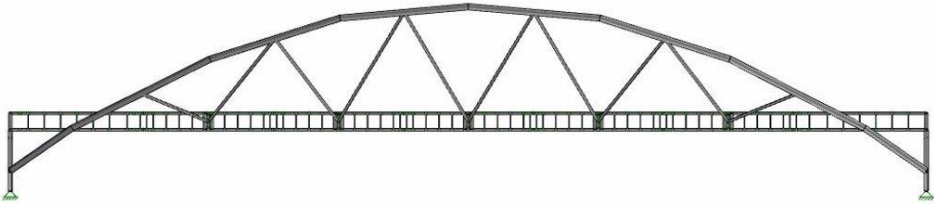*Figure 1: Deck Bridge*

Figure 2: Truss Bridge

Figure 3: Arch Bridge

Table 1: Bridge Type Pros and Cons

Bridge Type	Pros	Cons
Arch	- Low deflection - Potentially lightest - Potentially lower build times	- Angles critical to performance - Difficult fabrication process - Hard to analyze
Truss	- Low deflection - Reasonable analysis	- Potentially heavy - Complex fabrication process - Long assembly time
Beam	- Easy analysis - Simple fabrication process - Quick assembly	- Heavy - Lacking support at middle span

Table 2: Cross Section and Material Shape

Cross-Section		Material Shape	
Triangular	Complex Composite Shape – Difficult to design and manufacture	**Square Tube Steel**	- Poor bending resistance - Excellent Machineability
Monolithic	Uses members themselves as cross-section - Inefficient	**Circular Pipe**	- Excellent strength to weight - Difficult to work with
Box	Composite Shape – Easier to analyze and manufacture	**Solid Stock**	- Strongest bending resistance when loaded on stronger axis - Potentially Heavy - Good Machinability