

BRIDGE TYPE SELECTION WORKSHEET

September 2017

Bruce Freeman Rail Trail Project



Bridge No. S-31-013(XXX)
Proposed Bike Path over Pantry Brook
Sudbury, Massachusetts

AKB
Comments on
Part C
Rejected

PREPARED FOR



PREPARED BY



9/29/17

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Proposed Superstructure Type

6.1 Proposed Superstructure Discussion

The proposed bridge typical section will consist of a 14ft travel way between timber railings, resulting in a bridge width of approximately 16ft. The superstructure types for both alternatives are discussed below. Drawings of the two alternatives are included in Appendix A.

Alternative 1

Three buried arch systems were considered for Alternative 1:

- Precast concrete arch
- FRP tube/decking arch ("Bridge-in-a-Backpack")
- Galvanized steel arch

Three different vendors were contacted in order to gather information on each system's costs and advantages. The three systems will have similar aesthetics since they are all buried arches, and the most visible element will be the headwalls and retaining walls, which would be similar for any of the systems.

While the precast concrete arch system may be the most common buried arch system for roadways, it is estimated to be the most expensive of the three arch systems. In addition to the highest delivered cost, the installation would require larger equipment for the heavier concrete elements.

The FRP tube system is estimated to be the second most expensive alternative of the three systems. Its elements are light weight, but this system is a newer and more specialized system, which could increase cost and complications during construction.

The galvanized steel arch is the cheapest and recommended superstructure type. This system has a 75-year design-life, and has full HL-93 highway loading capacity. There is a miss-perception that galvanized steel is a poor material for stream crossings due to corrosion, but the corrosion is very small when the steel is above the water, and there is no bottom. This system is a proven AASHTO system.

Alternative 2

Conventional reinforced concrete slabs on abutments are inefficient for spans greater than 25' due to their excessive depth and heavy reinforcement and were thus eliminated from further consideration. Therefore, the following three deck beam systems were considered for alternative 2:

- Adjacent Concrete Deck Beams

This is a demand rung counter to MassDOT experience. Consider concrete arch