RED GATE BRIDGE

ANSWERS TO FREQUENTLY ASKED QUESTIONS

Below are some frequently asked question regarding the design of the bridge.

1. **What are the reasons behind the concept of hanging the pedestrian bridge below the highway bridge?**

   There are several reasons that make sense to hang the pedestrian bridge below the highway bridge.

   - The experience of using the bridge will be enhanced by separating the pedestrian and bike bridge from the vehicle traffic and placing the bridge closer to the water. It is the hope of the City and the designers that walkers and cyclists will slow down and have a chance to observe the river from the vantage point of the bridge.
   - The safety of the pedestrians and bicyclists using the bridge is greatly improved by separating them from the vehicle traffic.
   - This concept makes the whole bridge narrower and reduces the footprint of the structure in the river and on the land. The reduced footprint creates less impact on the river and creates less shade on the banks.

2. **Wouldn't it be cheaper to build a sidewalk on the bridge rather than build a separate bridge for pedestrians?**

   Making the highway bridge narrower will reduce theamount of structural steel used by about 200 tons, concrete by about 650 cubic yards (1,300 tons), and excavation by about 10,000 cubic yards of earth. This will save about $1,500,000 from the cost of the highway bridge. The cost of adding a cable supported pedestrian bridge below the highway bridge is also estimated to cost about $1,500,000. The cost of building a sidewalk on the bridge and the cost of providing a separate cable supported pedestrian bridge are essentially the same. See Question #1 above for reasons that make a separate bridge a better choice than adding a sidewalk to the bridge.

3. **How much headroom will there be for bicyclists? Will there be room for bicyclists to pass people walking on the bridge?**

   There will be about 18 feet between the bike bridge deck and the bottom of the highway bridge girders. There will also be a minimum of ten feet of headroom as the bridge passes through the piers.

   The bridge will be twelve feet wide, which is adequate to allow bikes to pass pedestrians. Most bike paths in the area are only ten feet wide.

4. **Describe the preferred bridge type.**

   The preferred bridge type for this project will be five steel girders and eight spans. There will be seven piers in total with three of these in the river, one on the west bank, and three on the east bank. The end spans will be 120 feet long and all the interior spans will be 150 feet long. The two-lane roadway will have a total deck width of 32 feet from curb to curb.

5. **Describe the design process that was used to develop the preferred bridge type.**

The engineering team looked the following design elements:

- Girder type (precast concrete or steel)
- Girder size (longer spans require larger girders)
- Span lengths
- Bridge height over the river
- Girder spacing

Over 1,500 different combinations of these elements were compared by cost and narrowed down to a small group of feasible bridge types. This group was studied in detail considering additional factors such as:

- Future maintenance costs
- Environmental issues
- How the cost of the entire project was affected by the bridge alternate
- Aesthetic considerations

Out of this more detailed analysis a single bridge type was developed. The optimum bridge type is the alternate that is cost effective to build and maintain, creates the least impact on the environment, and provides the greatest opportunity for aesthetic enhancement.

6. **Why was steel selected as the girder material instead of precast concrete?**

The main reason that steel was chosen is that the end spans of the bridge are curved. Steel girders can be curved to match the curve of the roadway; precast concrete girders cannot be curved. Precast girder bridges built in short, straight segments with a pier at each "kink" in the beam line, and the bridge deck is built in a curve on top of the girders. Constructing a curved roadway on straight precast concrete girders would require at least one additional pier.

A second reason that steel was chosen is that steel girders are built in relatively short sections in a fabrication plant and then transported to the site and bolted together to make up any span length. These short sections can be designed so that they can be easily transported to the site. For instance, a 150-foot long span could be made of two 75-foot long girder sections that are bolted together at the site. Concrete girders must be built in one single piece. Concrete spans greater than 125 feet have been constructed, but it is very difficult to transport concrete girders this long. Transporting two 75-foot girders through an urban area is much easier than transporting a single 150-foot long girder.

One last reason that steel was chosen is that steel is a recycled and recyclable material. The steel used on this project will come from bridges and buildings that have been demolished, old cars, and even soup cans from your recycling bin. When this bridge has finally lived its useful life, the girders will be recycled to make other bridges, buildings, automobiles, and soup cans. When concrete girders are demolished, the reinforcing steel is recycled, but the crushed concrete is only useful as fill material.