Footbridge Update

Introduction

The Graeagle Community has recognized that a serious threat endangers pedestrians especially children at the Highway 89 Bridge over Graeagle Creek in downtown Graeagle. Even without a study recording the volume of foot traffic it is evident to any observer that this dangerous condition exists. During the summer months with a peak during the Fourth of July celebration hundreds of pedestrians use the bridge on their way to the various activities downtown. The bridge has very limited on-grade foot traffic lanes marked with white stripes on either side of the traffic lanes. Children either being pushed in carriages or walking by themselves free of restraint are often seen crossing the white pedestrian stripe. All the while, traffic including autos, trucks, motorcycle groups and bicycling groups stream by inches away from the pedestrians. The obvious answer to this public hazard is a footbridge. The Board of Directors of the Graeagle Community Services District has recognized this danger and made a footbridge their number one priority.

Background

The GCSD placed the footbridge on the priority list in 2014. The planning, design, construction drawings and specifications were completed in 2016 and the project was put out to bid. Three firms submitted bids and the low bid was $994,000. This bid exceeded the GCSD's budget by almost $200,000. Subsequently, in 2019 the GCSD Board of Directors voted to re-evaluate the bids and "value engineer" the project looking for cost savings. Based on value engineering a new project was designed. The goal was to limit the cost of the footbridge project to $650,000.

Value Engineering

Value engineering consisted of looking for items which could be reduced in cost resulting in significant savings. The bid items considered includes the following:

1. Length and width of bridge
   The length of the bridge varies depending on the location. The length can be reduced by the placement of an embankment fill bridging over low areas at either entrance. The width can be reduced to a minimum of 6 feet wide from a width of 13 feet specified for the first design. Based on the average per square foot cost of the bridge deck area the savings compared to the first bid submitted would be as follows:

Alternate 1: Bid basis 13' x 150' x $250 = $487,500
Revised 6' x 150' x $250 = $225,000
Savings $265,500

Alternative 2: Revised 6' x 150' x $250 = $225,000
Savings $265,000

Alternative 3: Revised 6' x 110' x $250 = $165,000
Savings $322,500

2. Fill embankments

The embankment volumes of Alternatives 1 and 2 are so close that they can be considered equal. Therefore, no savings are derived. Alternative 3 has no fill so the savings would be $40,000

3. Abutment Design.

There are two concepts for the abutment design. The first concept is shown on the plans and used for Alternate 1. This design is based on a cantilevered retaining wall buried in an excavation that is backfilled with engineered fill. The second concept supports the abutment on Micro piles which are 6-inch diameter steel pipes with diamond tips for drilling through rock. The steel pipe is left in the ground and fill with concrete . These two methods are close enough in cost we consider them roughly equal. Therefore, no cost savings have been calculated.

4. Material used for Deck

Three material types can be considered for the bridge decking. These include Timber, Composite, and Light Weight Concrete Based on an estimated cost for concrete of $60,000 wood would save about 7% of the initial cost. $4,200

5. Engineering Design.

The engineering has not been completed therefore we cannot determine a cost savings at this time. However, we think because the entire project was completed for the first Alternative there will be a significant amount of work that will not have to be repeated. Savings = $10,000

6. Utility Pipe Support System

The utility support system has been removed from the GCSD list with a savings of $87,729

Estimated Potential Savings per Alternative *

Alternate	Size, Square Feet	Savings, $	Embankment Savings, $	Engineering Savings, $	Pipe Support Savings, $	Total Potential Savings, $K	Estimated Bid Price $K
1	1950	265,500	-	10,000	87,729	363	631
2	1200	265,500	-	10,000	87,729	362	630
3	880	322,500	40,000	10,000	87,729	460	484

- The estimated savings are subtracted from the low bid received for Alternative 1 of $994,000 to determine the total estimated Bid price.

Conclusions

The three alternatives also have pros and cons which are not shown in the cost estimate analysis. A brief summary of these additional items is presented below.

Alternative 1

Pros:

- This alternative is located 60 feet parallel to the highway bridge. At this distance the pedestrian path connects to the bridge with minimal added path length.
- The bridge will be in line with the existing water lines with minimal extra length of suspended pipeline require .

Cons

- The bridge will be close to the noise of the highway.
- The north ramp off the bridge will be in a congested area close to traffic.

Alternative 2

Pros

- The bridge will cross the creek in an area where mature ever- green trees will be between the footbridge and the highway bridge.
- The view from the bridge will include the pond with the mountains behind it.

- The north ramp off the bridge will have easy access to the pond, the OutPost coffee shop and Grocery Store away from the street congestion.

Cons

- This route will require a 50-foot long fill embankment to reduce the length of the bridge.
- May be some confusion about north entrance location requiring signage.

Alternative 3

Pros

- This location would have the shortest length of bridge.
- This location is the least expensive bridge.

Cons

- Location is about 300 feet from the highway pedestrian trail.
- The location will require 600 feet of additional trench and pipe for the water line.

Summary

Of the three locations Alternative B provides a scenic location, connects to the shopping area, connects to the pond, and has the approval of the neighbors and most importantly the property owner.

Richard Short
Project Manager

Attachments: Figure 1 – Three Alternatives
Figure 2 - Alternate 2 with Topo
Figure 3 – Cross Section
3 Photos of Typical Footbridge Construction

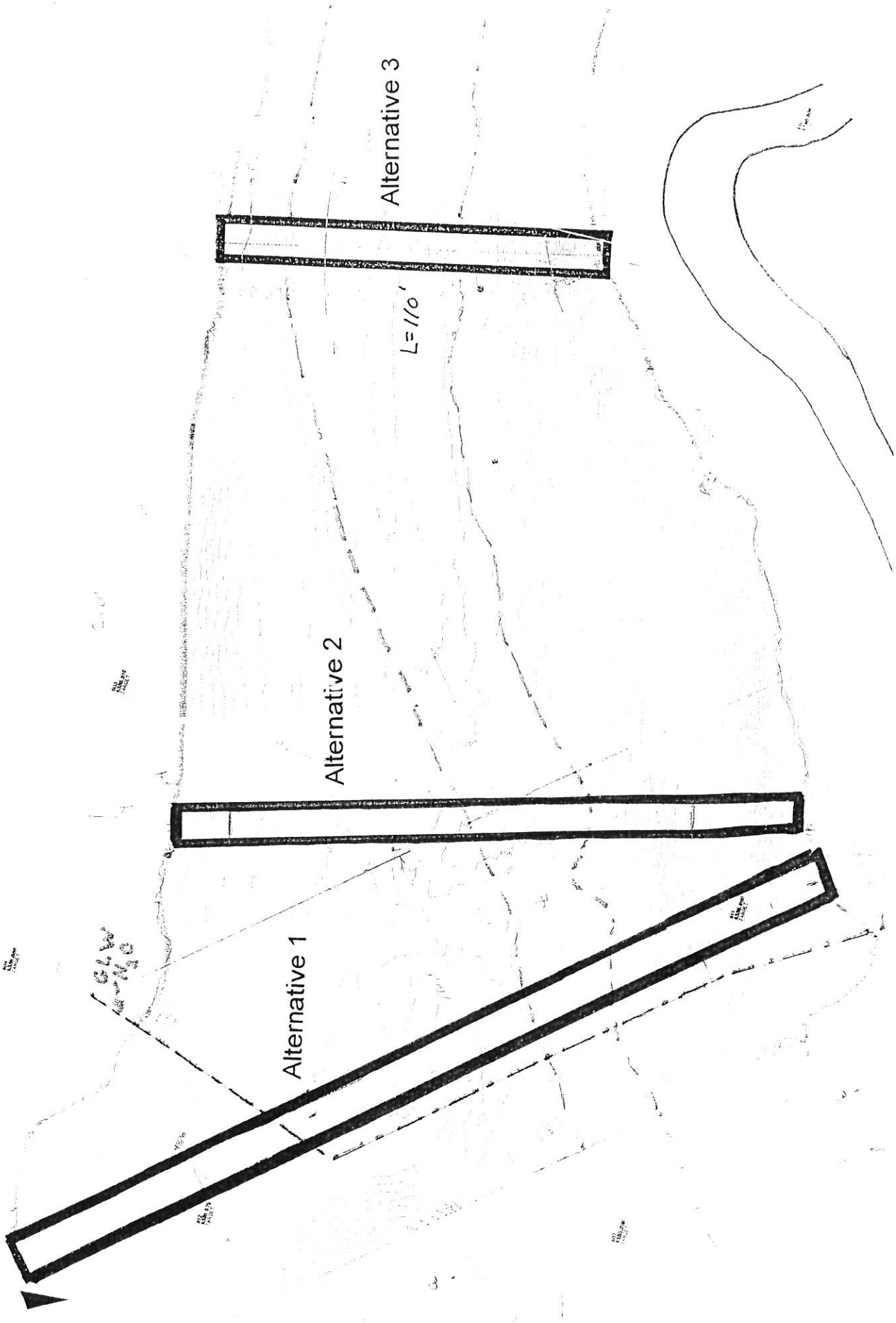


Figure 1 - Three Alternates

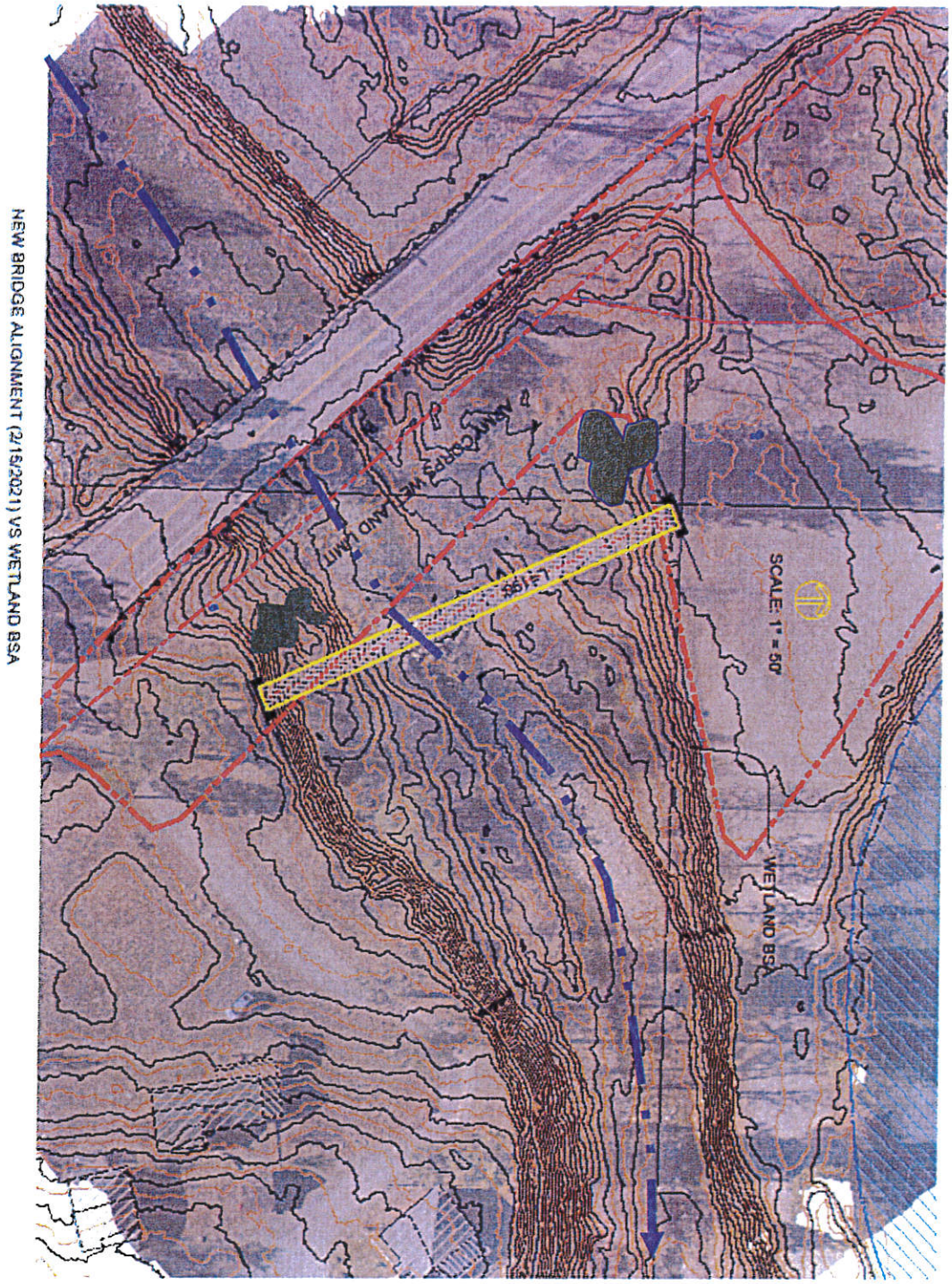
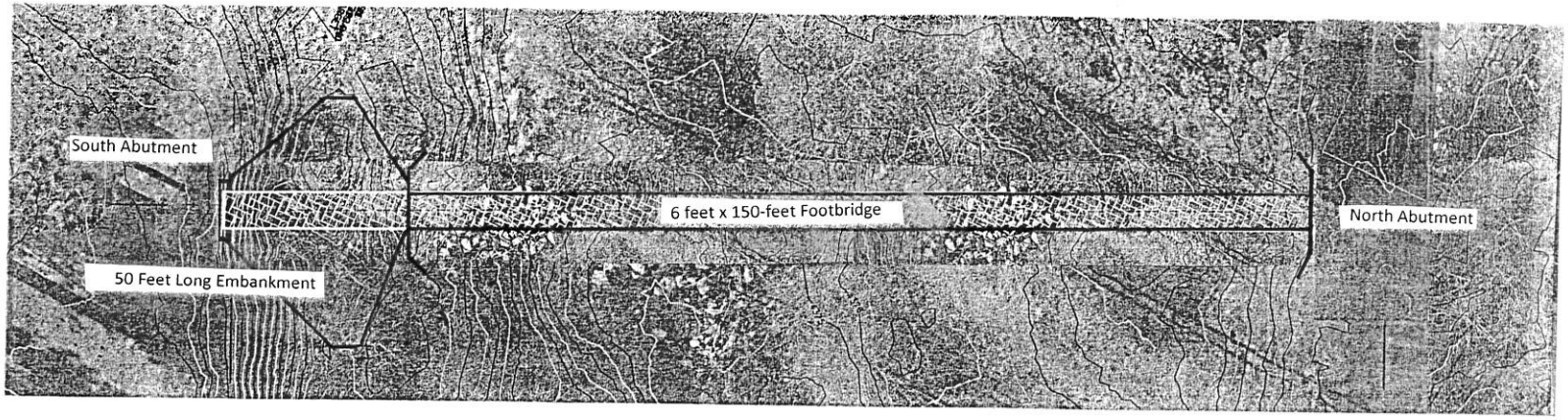
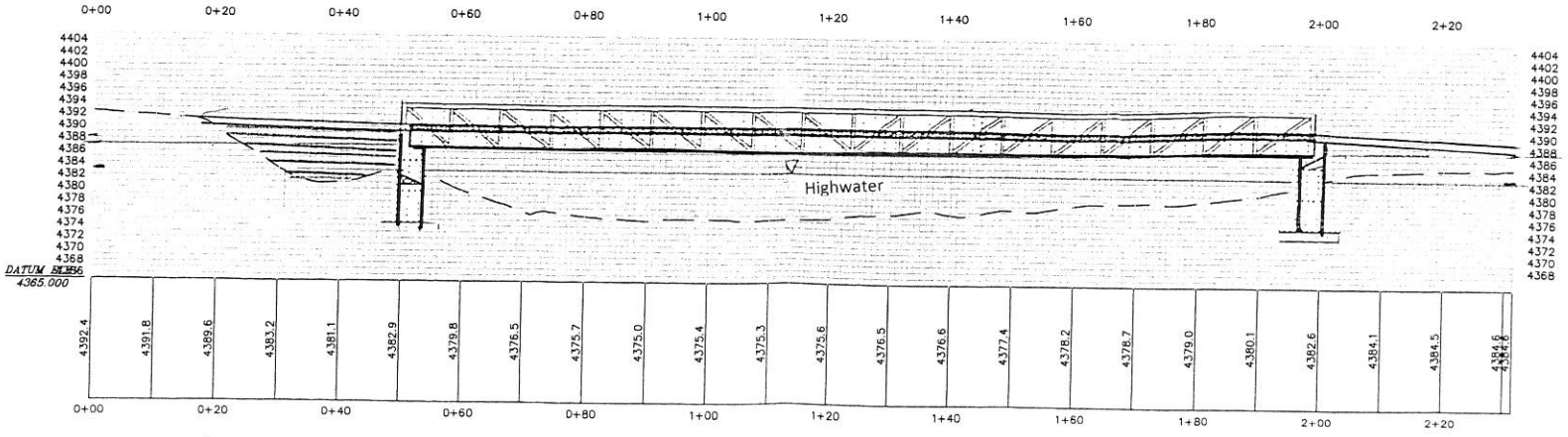


Figure 2 - Alternate 2 with Topo





SCALES: 1" = 20'

Figure 3 - Cross Section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