US Army Corps of Engineers®

Technical Report

Japanese Creek Flood Risk Reduction
Seward, Alaska

September 2021

Figure 4. Dieckgraeff Road culverts

Figure 5. Main 12’ culvert under Dieckgraeff Road.

3.2.4. Road Modification

Anecdotal information states that the culverts under Dieckgraeff road are under the elevation of the floodplain upstream and downstream. However, it is not recommended to raise the elevation of Dieckgraeff road without a full hydrologic analysis due to the risk of increasing flood risk around the road.

It is possible that paving a spillway on the top of Dieckgraeff road could improve waste trucks accessing the dump after an overtopping event, but this was not investigated by the team.

Another alternative would be to install more culverts, such as two 4’ or larger culverts so that one culvert could be closed for maintenance. It is possible that a box culvert shape could make it easier to perform maintenance.

Lastly, a bridge crossing was briefly considered. A bridge would allow access to the dump site as higher flow conditions than present and would not need to be regraded if overtopped. However, the costs of installing and maintaining a bridge are high and were not investigated.

flood event with 974,000 cy of sediment, water jumps the channel and spreads over the alluvial fan. The water depth is minimal, only one to two feet in some areas, which is likely too shallow to occur significant damages. Therefore, the sensitivity analysis revealed that the current sediment (as of the 2009 LiDAR survey) of Japanese Creek, coupled with a 0.2% flood does not incur enough damages to justify a project.

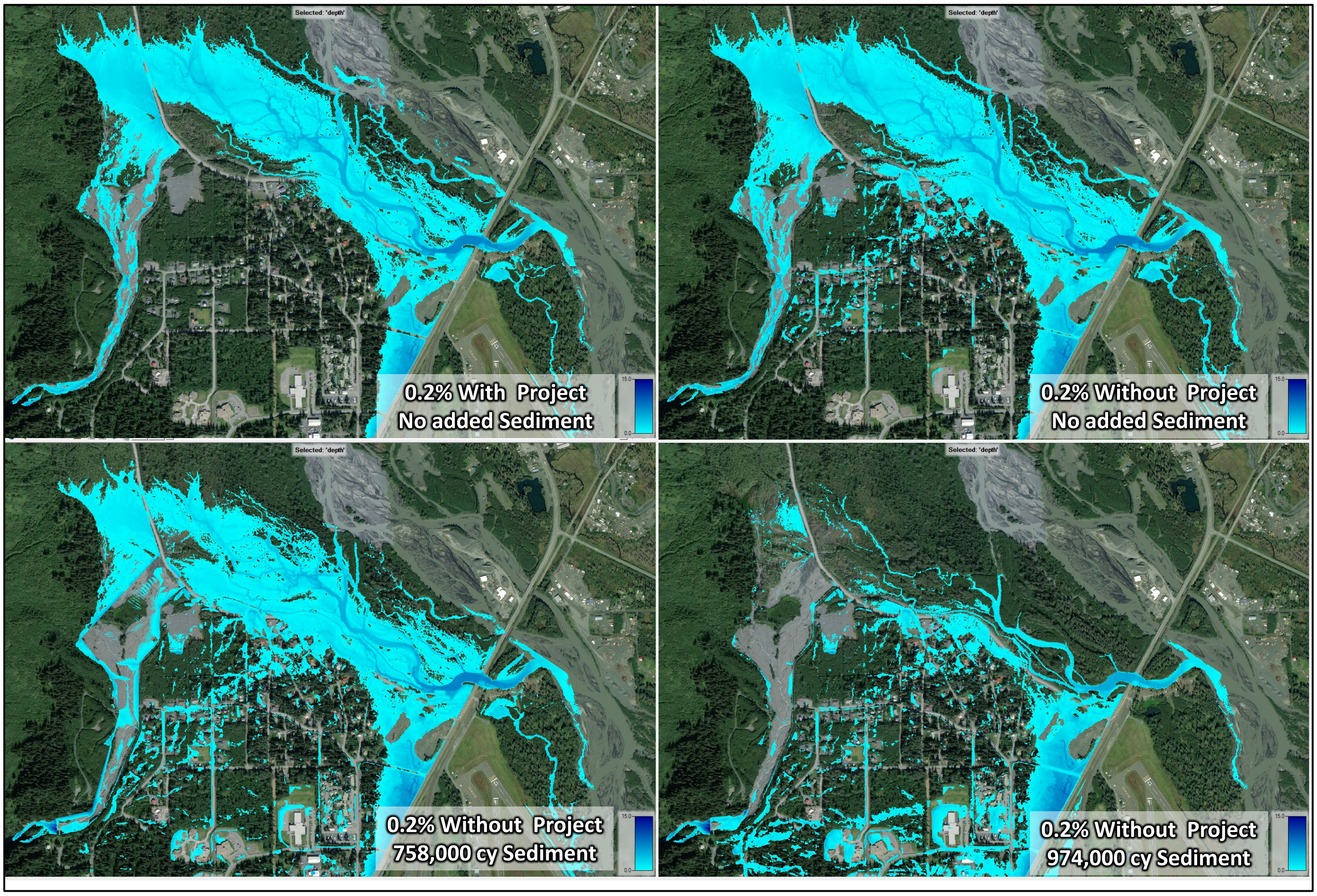

Figure 18. Modeling flood depth grid results with additional sedimentation.

6.1.3 Rehabilitating Embankment

Initial investigations focused on rehabilitating the existing embankment (Alternatives 2 and 3). During the site visit, the uppermost extent of the embankment at the mouth of the canyon was observed to be in good condition. Vegetation did not permit a close inspection of the stone, but the presence of vegetation indicates that the area has not experienced recent erosion. The elevation of this section of embankment appeared to provide adequate protection.

Moving downstream, the displacement of large armor stone was observed, as well as sections of exposed geotextile fabric (Figure 19).

sediment trap is performing regular maintenance and should be constructed in a location to provide easy access to a side dump.

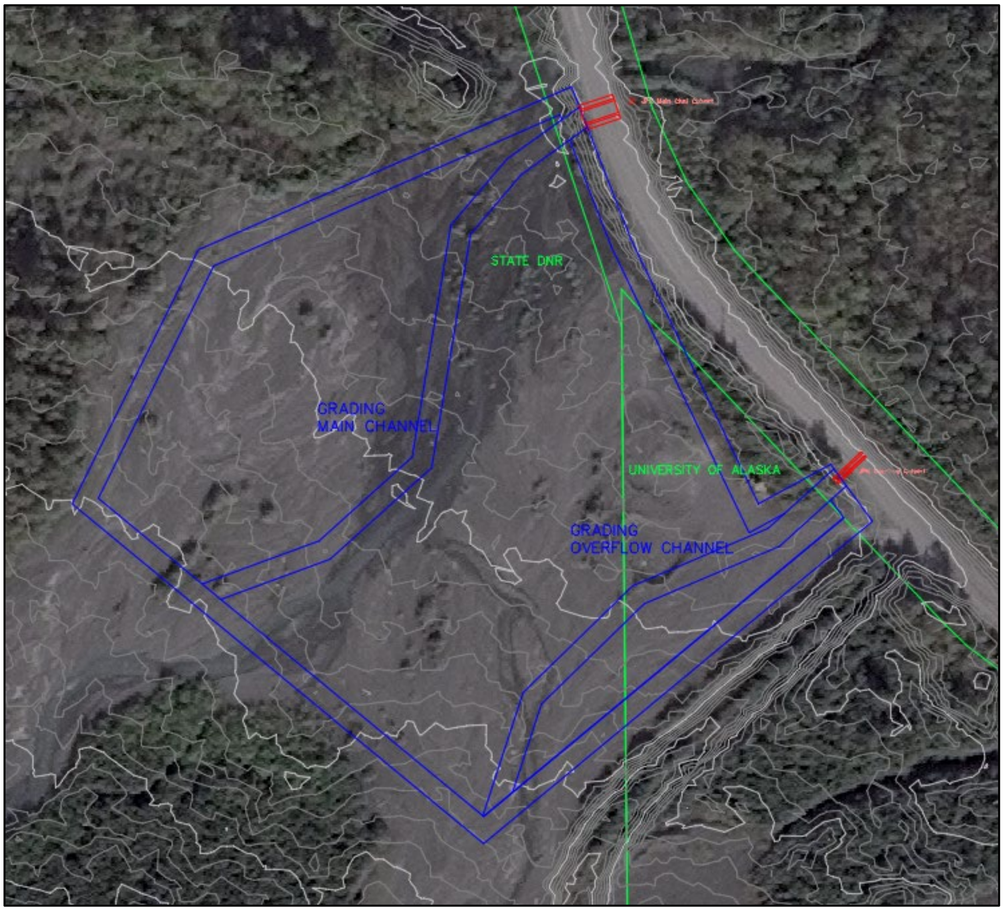

Figure 22. Basic sediment trap design.

Another possible mitigation measure would be to construct a groin or series of groins consisting of rock perpendicular to the direction of flow, extending out into the channel. The groin would push the flow of the main channel away from the edge of the embankment. Behind and downstream of the groin, sediment would be allowed to deposit, acting as a mini sedimentation basin. The sediment would need to be regularly removed for the groin to function properly.

6.2 Second Iteration

A total of three structural alternatives (summarized in Table 6) were identified as options to reduce the costs of sediment management and ease the impact of sediment deposition. Values listed in this document are based on fiscal year (FY) 2021 price levels unless otherwise noted. Annualized benefits and costs are computed using a 50-year period of analysis and the FY21 federal discount rate of 2.5 percent. One nonstructural alternative of moving the waste transfer station was briefly discussed but was ruled out due to costs. In addition, Alternative 2a was screened out after the initial cost analysis based on the high cost. Therefore, Alternative 1a and Alternative 3a were warning system as identified in Alternative 1a.

6.2.2 Evaluation of Hydraulic Modeling Results- Second Iteration

Second iteration hydraulic analysis focused on the downstream channelization (dredging) alternative (2a). This alternative included excavating and lining a channel with rock as shown in Figure 23 along the alignment shown in Figure 24. The channel capacity would be approximately 1% percent chance exceedance, or a 100-year flood. The dredging channel location follows the existing channel as closely as possible and could improve conveyance of sediment to the Resurrection River.

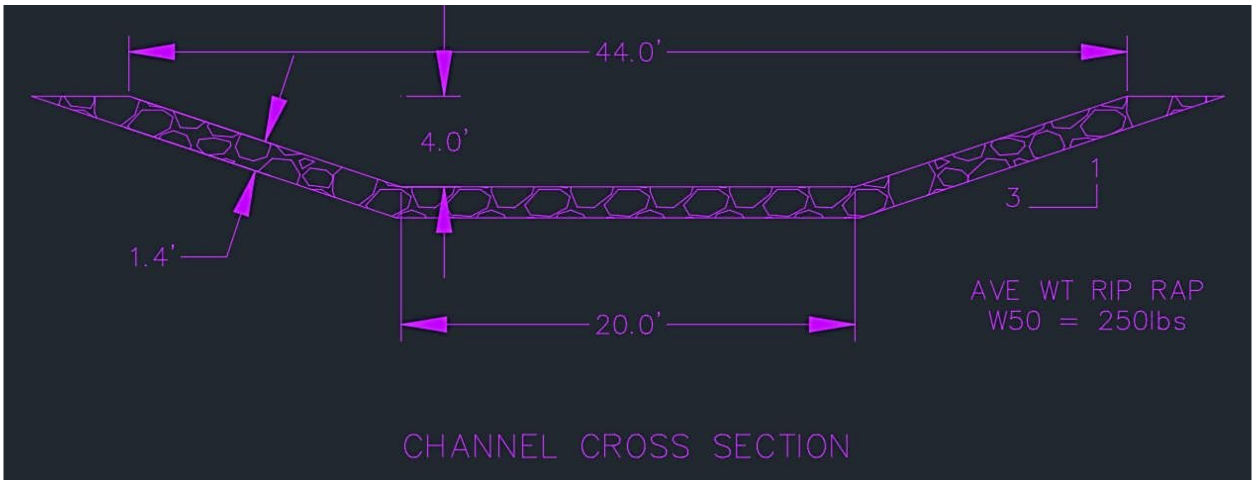

Figure 23. Downstream dredging channel cross section.

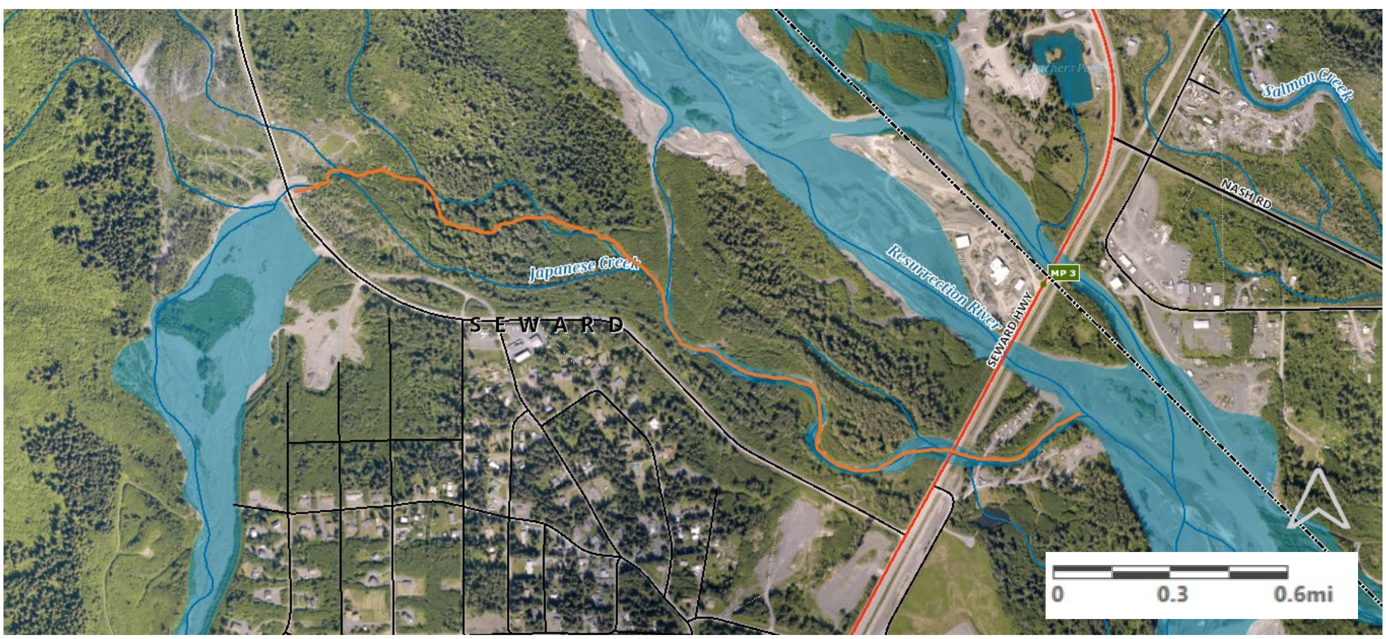

Figure 24. Downstream dredging channel location (orange).