

# MEMORANDUM

JRS ENGINEERING CONSULTANT, LLC

**TO:** Chuck Reid, Manager - CCBWQA  
**CC:** Rick Goncalves, Chairman, TAC  
**FROM:** James R. "Jim" Swanson, P.E.  
**DATE:** December 6, 2017  
**SUBJECT:** Piney Creek Stream Reclamation - Reach 7

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## BACKGROUND AND PURPOSE:

UDFCD and SEMSWA initially entered into an intergovernmental agreement (IGA), on December 22, 2006, for stream reclamation improvements on Piney Creek at Caley Drive. The Authority entered into this intergovernmental agreement (IGA), on September 3, 2014, with UDFCD and SEMSWA. This agreement established funding for needed stream reclamation improvements through Reaches 6 and 7 of Piney Creek; reach locations are shown in Exhibit 1 attached hereto. Since the Authority entered into the initial IGA with UDFCD and SEMSWA, six amendments were executed on 9/10/2015, 12/16/2015, 12/23/2016, 3/02/2016, 9/28/2016 and 3/29/17. Each amendment increased project funding. To date the Authority's funding contribution totals \$2,250,000.

## EXISTING CONDITIONS:

Piney Creek, in this project area, has severely eroded and continues to experience significant erosion during storm events. This continued erosion threatened water quality within the basin, sensitive riparian areas and wildlife habitat as well as existing trails and utilities. The project includes grade control / drop structures and bank stabilization that will mitigate the existing erosion and minimize future erosion on Piney Creek. Typical pre-project conditions are shown in Photos 1, 2 and 3 documenting Piney Creek's degradation within Reach 7.



Photo 1 - Existing Condition



Photo 2 - Existing Condition



**Photo 3 - Existing Condition**

**DESIGN APPROACH:**

The design approach to reclamation of this project reach is the combination of a natural bioengineering approach connecting the streambed to the overbanks and a more engineered approach in areas where topography or site conditions constrain the channel geometry.

Four constructed Grouted Boulder Drop Structures and two riffle drops were incorporated into the Project to flatten and control the longitudinal grade. Sheet-pile cut-off walls installed at each Grouted Boulder Drop Structure protect the channel gradient from damage during a larger flood event and anchor the lower end of

the project reach. The sideslopes along the stream channel was graded with flatter slopes to reconnect higher channel flows to the riparian corridor. Outer bank protection channel bends protect the bank from eroding in a storm event. Root wad stream bank protection was used within Reach 7 utilizing tree trunks and their root wads from the site, and an adjacent site, emphasizing the use of bioengineering on the project, as shown in Photo 4. This channel reconstruction reduces channel velocity, shear forces and stream power allowing for more filtration and infiltration and thus reducing erosion and nutrient transport.

The Project was designed to raise the streambed and re-establish the water table to prevent further loss of vegetation and down cutting, erosion and sediment transport. The overall project goal was to restore and enhance the aquatic, wetland and riparian functions of Piney Creek. In-progress construction for the Cherry Creek Stream Reclamation Channel Improvements constructed in 2016/2017 is shown in Photos 5 and 6.



**Photo 4 – Root Wad Stream Bank Protection Installation**



**Photo 5 – Channel & Boulder Drop Construction**





**Photo 6 – Boulder Drop Structure Construction**

**CONSTRUCTED PROJECT:**

The 2,340 linear foot Piney Creek Reach 7 Stream Reclamation Channel Improvements Project contract was awarded to Edge Contracting, Inc., in the amount of \$2,693,034.25. The Notice to Proceed was issued on December 19, 2016. The work was substantially complete on July 27, 2017. The final Project cost totaled \$2,730,224.68. The constructed improvements are shown in Photos 7, 8 and 9.



**Photo 8 – Constructed Channel**



**Photo 7 – Constructed Channel**



**Photo 9 – Constructed Channel**

**WATER QUALITY BENEFITS:**

An assessment of the stream stabilization and water quality benefits for the entire project was made by the Authority<sup>1</sup> and found to include reductions in sediment and other pollutant loads, including phosphorus and nitrogen. These benefits are supported by Authority data, literature research and quantitative analysis. Based on the outcome of this assessment, it is calculated that 44 lbs of phosphorus per year will be eliminated from being transported downstream from the Piney Creek – Reach 7 stream reclamation improvements. The project was found to lower stream velocities, channel shear and stream power from that found prior to the stream reclamation, all which minimizes the transport of sediment and pollutants.

**SUMMARY:**

**Project Length = 2,340 linear feet.**

**Water Quality Benefits ≈ 44 # / year Phosphorus removal.**

**Total Construction Cost = \$2,730,224.68.**

**Authority's Share = \$682,556.**

**Project Partners: UDFCD, CCBWQA & SEMSWA.**

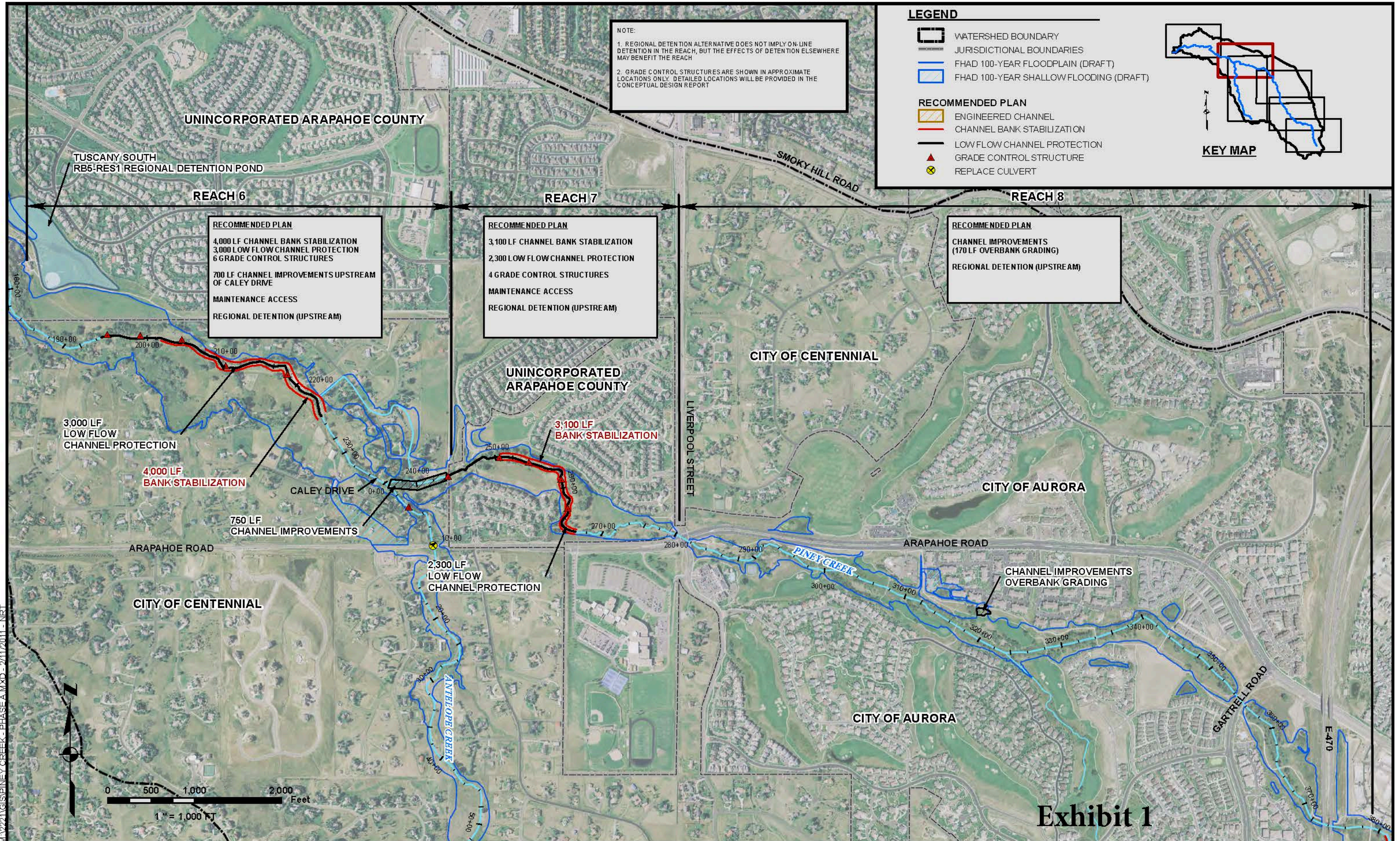
**Engineer: CH2M Hill Engineers, Inc.**

**Contractors: Edge Contracting, Inc.**

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<sup>1</sup> CCBWQA Technical Advisory Committee, June 16, 2011. *Stream Reclamation, Water Quality Benefit Evaluation – Interim Report.*





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