PINEY CREEK STREAM RECLAMATION AT BUCKLEY ROAD

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Memorandum

To: Chuck Reid, Manager, CCBWQA

CC: Rick Goncalves, Chairman, TAC

From: William P. Ruzzo, P.E.

Date: November 13, 2013

Re: Piney Creek Stream Stabilization at Buckley Road – Project Summary

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Presented in this memorandum is a summary of the Piney Creek stream stabilization project at Buckley Road, which was the Authority's first participation in stabilizing or reclaiming a degraded stream channel for water quality purposes.

BACKGROUND AND PURPOSE

During development of the Watershed Plan 2000[1], stream stabilization was given high priority as a PRF due in part to phosphorus content in sediment. This was not a new concept as controlling erosion in streams was recommended in the 1985 watershed plan[2] and continued in the 1989 revision[3].

In Watershed Plan 2000, Piney Creek was considered a high priority due to rapid development in the watershed and its close proximity to the Reservoir. The cost for stream stabilization in Piney Creek was extracted from the stabilization plan for Piney Creek[4] funded in part by the UDFCD. The 1989 plan costs were updated for inflation but street and utility costs were *not* included. These adjustments resulted in $5,915,000[5] capital cost for 17.4 miles of stabilization. At that time, it was assumed that the Authority would participate at a 1/3 level as a means of accelerating the implementation of stream stabilization measures by local jurisdictions. The total capital costs for the recommended PRFs in the Watershed Plan 2000 were $17,394,000, which included the $5,915,000 for Piney Creek.

EVALUATION OF STREAM STABILIZATION

During development of the 2002 CIP at 2001 TAC meetings (which included some Board members) the Authority's participation in stream stabilization was discussed at length. It was argued that although stabilization was important to managing water quality in the Reservoir, local jurisdictions would share in the costs through the UDFCD, thereby allowing the Authority to fund other priority PRFs.

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[1] CCBWQA June 2000. *Watershed Plan 2000*
[2] DRCOG, September 1985. *Cherry Creek Basin Water Quality Management Master Plan,*
[3] CCBWQA November 1989. *Cherry Creek Basin Water Quality Management Master Plan (Revised 1989).*
[4] Greenhorne & Omeara 1989. *Stream Stabilization and Major Crossing Planning*.
[5] CCBWQA 2000, p5-10

However, it was also determined by the TAC that the Authority could participate in stream stabilization to the extent that improvements go beyond stabilization and include *reclamation* of the stream corridor. The reclamation concept results in more frequent "connection" between flow in the main channel and flow in the floodplain, which results in more infiltration and filtration of storm runoff. Reclamation, which also includes the impacts of increased runoff from urbanization, was considered to provide additional, quantifiable phosphorus reduction benefits and, therefore, should be an Authority focus[6]. This argument was applied to Piney Creek and lower Cottonwood Creek stabilization projects that were subsequently included in the 2002 CIP.

PROJECT PARTNERS AND FUNDING

The Authority contributed $118,000 (~6%) to the Piney Creek stream stabilization at Buckley Road whose total costs was $1,853,000 and included engineering and construction costs. The Project construction, which was a joint effort between UDFCD, Arapahoe County, and the Authority, began in November 2003 and was completed around May 2004.

DESIGN APPROACH

The approach to stabilization of Piney Creek included the construction of 8-sheet pile reinforced drop structures to flatten the grade along with re-vegetation of the stream banks. The design cross section allowed for more frequent connection between the base flows and the channel overbank. The shallower longitudinal grade in conjunction with the sheet pile cutoff wall that forced the shallow ground water to the surface allowed for more rapid and more extensive wetland development.

WATER QUALITY BENEFITS

Although the Authority concluded that stream stabilization of Piney Creek would result in water quality benefits[7], an approach to quantify the benefits in terms of phosphorus reduction had not been developed at the time the project was approved. Therefore, no calculations of phosphorus reduction benefits were performed.

[6] William P. Ruzzo, P.E., April 2, 2002. *Piney Creek Stream Stabilization 2002 CIP*. Memorandum to CCBWQA Technical Advisory Committee.
[7] Ibid.