

## COTTONWOOD/PEORIA POND

---

# Memorandum

**William P. Ruzzo, PE, LLC**  
6641 West Hamilton Drive,  
Lakewood, Colorado 80227  
(303) 985-1091  
bill.ruzzo@comcast.net

**To:** Chuck Reid, Manager, CCBWQA  
**CC:** Rick Goncalves, Chairman, TAC  
**From:** William P. Ruzzo, P.E.  
**Date:** November 12, 2013  
**Re:** Cottonwood Creek \ Peoria Street Pond – Project Summary

Presented in this memorandum is a summary of the Cottonwood Creek Peoria Street Pond (Cottonwood \ Peoria Pond, Project).

## BACKGROUND AND PURPOSE

The Cottonwood\Peoria Pond was part of a regional master plan prepared for multiple governmental agencies<sup>1</sup> lead by UDFCD. The Project is located just outside of the Park boundary but within the Corps of Engineers flowage easement (see Figure 1, General Location Map).

Design was started in 1997 but was put on hold until the spring of 2000 due to right-of-way and annexation requirements for the roadway portion of the project. Design was completed in 2001. Construction was underway by July 2001 and the final “punch-list” was issued in April 2003.

## PROJECT PARTNERS AND FUNDING

Funding for the project was contributed by the UDFCD (~\$280,000), Arapahoe County (~\$280,000), Greenwood Village (~\$250,000), CCBWQA (\$200,000), and a private developer<sup>2</sup>,

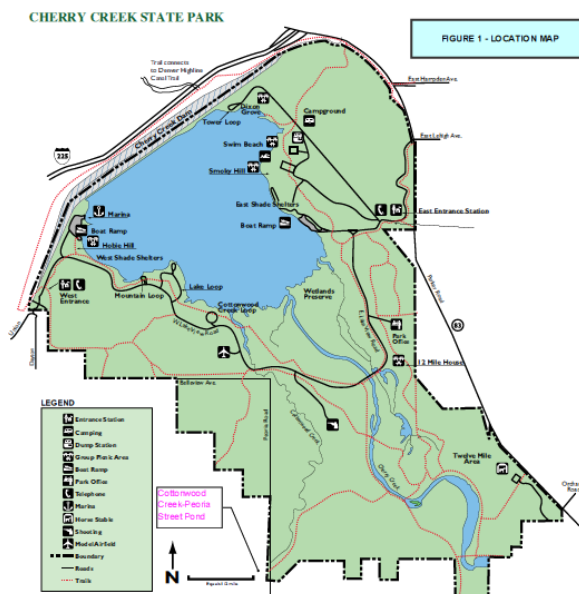


Figure 1 - General Location Map

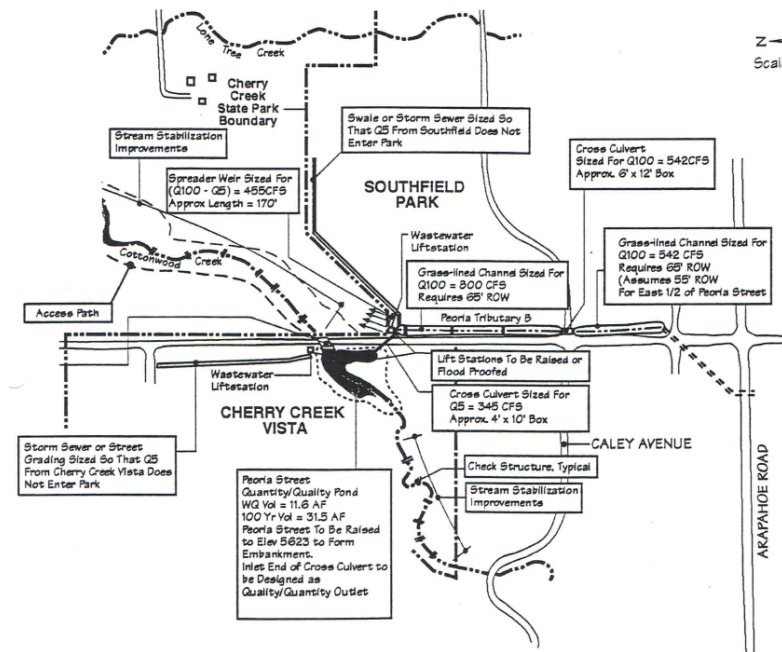
<sup>1</sup> Agencies represented at the meetings included Arapahoe County, Greenwood Village, Arapahoe Water and Wastewater Authority, Cherry Creek State Park, U.S. Army Corps of Engineers, and the CCBWQA. Also represented was Cooper Investments and Southfield Park.

<sup>2</sup> Participation by the Landmark\Cooper Investments on behalf of Cherry Creek Vista was due, in part, to development requirements to make roadway and waterway improvements along Peoria Street

Landmark/Cooper (\$373,000). Total project cost was approximately \$1,500,000 including construction services.

## DESIGN APPROACH

The Cottonwood/Peoria Pond provides flood protection and water quality benefits for Cherry Creek State Park and Cherry Creek Reservoir through a sediment basin, wetlands, and temporary storage or runoff (i.e.: water quality capture volume) from a tributary area of 7.8-square miles.



Since the project is part of a watershed master plan for drainage and storm water quality, the design tributary area for water quality is 500-acres.

The Project also provides detention and water quality for the Southfield Park runoff in the Peoria Tributary B and a storm sewer from the Cherry Creek Vista development (see Figure 2 to the left). For flood control purposes, the Project provides 31.5-acre feet of storage with a maximum release

of 4,400-cubic feet per second (cfs) during the 100-year flood.

The design is based on the extended detention basin (EDB) approach, which has surcharge volume and a “micro pool”. 11.6-acre-feet of surcharge volume is provided with a maximum release of 15-cfs. This volume is equivalent to 0.28-inches of runoff from 500-acres. The design criteria for an EDB are 40-hour release of the capture volume. Base flow channel in Cottonwood Creek is very sinuous to increase contact time for sediment control.

The creek improvements were designed to emulate the meandering character of the upstream Cottonwood Creek channel, lush with wetland and riparian vegetation. The construction of the facility rehabilitated the unsightly project area, which had been used for years



Photo 1 - Meandering Channel

as a dumping ground for broken-up concrete and other rubble. Other features include a bike trail and crossing of Peoria Street through the box culverts under the street. Other trails along the wetlands perimeter provide a nature experience.

The improvements were designed to facilitate ongoing maintenance. A bypass system of gates and pipes allows Cottonwood Creek base-flows to be diverted around the facility during maintenance operations and a local electric power panel enables night operation of quiet electric pumps to dewater the sediment basin and micro-pool. An underwater rock bench provides a stable platform for an excavator and dump truck to work from as sediments are removed from the basin. A comprehensive Operations and Maintenance Manual was prepared to guide maintenance crews



Photo 2 - Vegetation Established

### WATER QUALITY BENEFITS

Water quality benefits were not calculated by the Authority for Cottonwood\Peoria Pond prior to design and construction. As part of the Authority's 2007 operations and maintenance plan for PRF's, the Authority contributed \$6,000 to UDFCD in support of removing sediment accumulated in the Cottonwood Creek Peoria pond. The contribution was for sediment sampling and analysis of the phosphorus content in the sediment by GEI3. The measurements by GEI show average total phosphorus content in the sediment basin to be 743-mg/kg of which 3-mg/kg is extractable phosphorus available for plant uptake. A final quantity

of sediment removed from the project was not provided to the Authority therefore, an estimate of cost per pound was not prepared. However, the Authority's experience has been that sediment removal and disposal projects have very low cost per pound of phosphorus amounts when compared to stream reclamation projects.



Photo 3 - Mature Project Site

<sup>3</sup> GEI, March 21, 2008. *Peoria Pond Phosphorus Results*. Email communication from Craig Wolf.