

WWE
MEMORANDUM

To: Big Dry Creek Major Drainageway Planning and FHAD Project Sponsors

From: Wright Water Engineers, Inc.
Derek Rapp, P.E.

Date: December 1, 2009

Re: November 20, 2009 Progress Meeting for Big Dry Creek Major Drainageway Planning and FHAD

ATTENDANCE

Shea Thomas, P.E., UDFCD
Brett Henry, P.E., City of Thornton
John Burke, P.E., City of Westminster
Derek Rapp, P.E., Wright Water Engineers, Inc.
Wayne Lorenz, P.E., Wright Water Engineers, Inc.

STATUS UPDATE ON BASELINE HYDROLOGY

The last meeting with the Project Sponsors was held in July and a considerable amount of work was completed by WWE during this four month period. The first part of the meeting was spent summarizing the work that was done and presenting the draft model results for discussion. The following topics were discussed

1. WWE provided a summary review of the model conversion and calibration process. The conversion process included obtaining all historic models (typically hard copy prints of model input data) and setting up new models in the latest versions of CUHP 2005 and EPA SWMM 5.0. Once the converted models were set up and operational, WWE calibrated the models to match the previously published peak flow rates within 10%. The purpose of this calibration was to reduce any discrepancies caused between different versions of the model. Six different models were converted and updated including:
 - o 1979 – Gay Reservoir, Westlake, and Windmill Basins
 - o 1989 – Southern Tributaries (e.g. Walnut Creek, Airport Creek, Hyland Hills, etc.)
 - o 2001 – McKay Lake
 - o 2001 – Quail Creek
 - o 2006 – City Park Basin and Drainageway 3207

- 2007 – Northern Tributaries
2. WWE then discussed the updates that were made to each of the Tributary models to reflect changes that have occurred over time. These changes included:
 - New projections for future zoning conditions and associated % imperviousness.
 - Impact from regional detention ponds that have been constructed.
 - New or revised inflow hydrographs at upper reaches of a few tributaries.
 - Increasing model routing capacity to handle runoff from 500-yr storm events.
 3. WWE presented information pertaining to release rates from Standley Lake and Great Western Reservoir. WWE obtained the best available information for release rates from the two reservoirs for various design storms. This information included Outfall System Plans, Flood Hazard Area Delineation Reports, Flood Insurance Studies, As-Built Drawings for recently constructed improvements, and interviews with the State Engineers Office and the Colorado Water Conservation Board. WWE interpolated 500-year release rates for both reservoirs using published 100-yr release rates and Probable Maximum Flood release rates identified on the As-built drawings. The Project Sponsors reviewed this information and later notified WWE that they were comfortable with the proposed release rates.
 4. WWE provided updated detention pond inventory tables and stage-area-volume-discharge relationships to each of the Project Sponsors for review. An explanation was provided to describe how previous studies provided stage-volume relationships as model input, but that current EPA SWMM models require stage-area relationships. A large map was presented showing the location of each of the ponds modeled. WWE requested that each sponsor review these tables and the map and confirm with WWE that the ponds modeled were acceptable and that no additional ponds should be included. WWE later received confirmation from the sponsors that the list of modeled ponds was acceptable. A total of 68 detention ponds were modeled with a combined storage volume 2,140 ac-ft. This is equal to approximately 27% of the runoff in the watershed during a 100-year storm event.
 5. WWE also provided summary tables of inflow hydrographs used in the Airport Creek and Lake Erie Basins. These summary tables described the approach WWE used to determine inflow hydrographs for other design storms not provided in the previously published Outfall Systems Plan or recent Letter of Map Revision.
 6. WWE then provided draft summary results for each of Tributary models. The results included a comparison of the peak flow rates at the outfall of each tributary for the published FHAD values, converted models (duplicate effective), calibrated models (corrected effective), and updated baseline models. WWE requested that the sponsors review this table and notify us if anything seemed inconsistent with anticipated results.

7. WWE outlined the strategy for linking outfall hydrographs to the main stem model and routing the combined flows downstream. The UDFCD policy regarding area adjustment of rainfall distributions for larger watersheds was explained and WWE provided summary tables showing the impact of various rainfall distributions on the peak flow at each tributary outfall. The breakpoints along the main stem where rainfall distributions would switch were identified (e.g. 0-10 mi², 10-20 mi², 20-30 mi², 30-50 mi², and 50-75 mi²). WWE explained to the sponsors how this method results in several of the models being run numerous times for a single design storm. Therefore, several of the design storms not commonly used were eliminated in an attempt to reduce unnecessary model runs. The design storms being evaluated include 2-, 10-, 50-, 100-, and 500-yr storms for future conditions and the 100-year storm for existing conditions.

ANTICIPATED SCHEDULE

At the close of the meeting, the group discussed the anticipated schedule for completion of the Baseline Hydrology phase of the project. It was agreed that each of the sponsors would review the information provided at the meeting and respond with any concerns or comments. In the meantime, WWE would focus on evaluating tributary flows for an undetained condition, setting up the main stem model, and calibrating the main stem model if necessary to closely match peak flows from the previously published FHAD. Once peak flow profiles were developed for the main stem of Big Dry Creek, the group could meet prior to Christmas to discuss the results.