February 24, 2014

Project: Inundation Mapping for City of Trinidad

Vendor: City of Trinidad, PO Box 880, Trinidad, CO 81082
Phone: (719) 846-9843
c/o Mr. Tom Acre

Consultant: W.W. Wheeler & Associates, Inc.; 3700 S. Inca Street, Englewood, CO 80110-3405
Phone: (303) 761-4130
c/o Mr. John Treacy, P.E.

CWCB funding source: Severance Tax Operational Fund

SCOPE OF WORK

W.W. Wheeler, Inc. (Consultant), at the direction of the City of Trinidad (Vendor), will perform a dam breach modeling study and flood inundation mapping for three dams within the Vendor's system. Two sets of maps will be generated: (1) Sunny Day dam failure breach inundation maps and (2) spillway discharge (non-breach) inundation maps. The studies shall be in accordance with the latest Breach Guidelines published by the Colorado Dam Safety Branch. The level of analysis shall be "INTERMEDIATE," as defined in Table 1 of the Guidelines for both the breach modeling and flood inundation mapping. Flood routing models and inundation mapping shall be based on USGS 10-meter Digital Elevation Model (DEM) or best available topographic mapping.

The three dams to be modeled are the Fisher Peak Detention Dam FPC-1, Fisher Peak Detention Dam FPC-2, and Pinon Canyon Detention Dam. The downstream limit of the inundation mapping will extend downstream of the dams to a location on the Purgatoire River where there is no potential for loss of life and no significant property damage.

The inundation limits shall be prepared in UTM coordinates (NAD 83, Zone 13 – meters) which shall be overlaid on base mapping that includes color aerial imagery (2009 or newer). The inundation map shall be printed in color on a minimum sheet size of 11"x 17". The inundation extents shall be clearly illustrated and include peak discharge estimates, peak flood wave arrival times, peak velocities and peak flood wave depths at critical locations. Roads, highways and critical infrastructure (schools, hospitals, fire stations, etc.) shall be annotated and any roads expected to be overtopped by the flood wave shall be identified. The map shall include a legend noting the dam, DAMID, north arrow and a graphic scale.

PROPOSED METHODOLOGY

The Consultant shall perform a clear day dam failure analysis of the dams and route the resulting outflow hydrographs downstream using an unsteady HEC-RAS model. Breach parameters shall be estimated in accordance with methodologies recommended by the Office of the State Engineer, Dam Safety Branch. Also spillway discharge (non-breach) inundation maps shall be prepared showing the downstream inundation areas associated with full spillway discharge flood events. Hydraulic parameters, including width of flow, depth of flow and velocity at critical locations shall be estimated using the Corps of Engineer's HEC-RAS computer modeling software using the unsteady flow option. A water surface profile resulting from peak flow rates at various locations shall be generated. Topographic

information for the floodplains shall be based on USGS 10-meter DEMs from the National Elevation Dataset (NED) elevation data.

Critical bridges shall be surveyed as needed where it is judged they will have a significant effect on the inundation areas. Correspondence shall be with Mark Perry of the Colorado Division of Water Resources to present preliminary dam breach parameters, water surface profile modeling, and inundation mapping and to determine if field measurements are necessary for critical bridges.

DELIVERABLES

For each dam the Vendor shall provide the CWCB the following:

1) a brief technical memorandum that documents key assumptions, analysis methods, and results used to generate the inundation mapping;
2) 1 printed copy of the inundation mapping;
3) 1 CD or DVD that includes the digital GIS inundation mapping files, HEC-1 and HEC-RAS files, PDF files of the inundation maps, and any additional supporting documentation.

SCHEDULE

Work may initiate on the date of the State's Purchase Order and delivery of the final product is due no later than June 20, 2014.

BUDGET

The estimated cost for completing the project is $25,000 based on Consultant's current rate schedule and projection of effort. The estimate is summarized in the attached Table(s). The Consultant shall invoice Vendor on a Time and Materials basis for services performed.

PAYMENT

The State shall pay Vendor up to $14,000 for Consultant's project related invoices following receipt of final deliverables. The Vendor is responsible for all expenses in excess of the State's contribution. Any overages or increases in project costs shall be the responsibility of the Vendor.

Estimated Project Cost Sharing:

Owner Match	$ 11,000
CWCB Grant	$ 14,000
TOTAL	$ 25,000

CWCB shall issue payment following receipt and processing of Vendor's Request for Payment submittal. CWCB will issue payment for 56% of the Project's total cost, not to exceed$14,000. The Request for Payment must include: a summary of Consultant's labor effort and direct costs in accordance with the attached estimate, copies of corresponding invoices from Consultant, and identification of any major issues with proposed or implemented corrective actions. All products, data, and information developed as a result of this grant must be provided to the CWCB in hard copy and electronic format as part of project documentation prior to CWCB issue of payment.