FACT SHEET/STUDY MEMO

Project Name:	Colorado Hazard Mapping Program – Phase I		
Regarding:	Coordination of Project Scope	*Date:*	August 13, 2015
Community	Larimer County		
Community Contact(s)	Eric Tracy, Development Services Engineer/Floodplain Manager: tracyel@co.larimer.co.us, 970-498-5729 Linda Hoffmann, County Manager: hoffmalc@co.larimer.co.us, 970-498-7004		
Project Contacts:	Thuy Patton, CWCB Floodplain Mapping Coordinator: thuy.patton@state.co.us, 303-866-3441 x3230 Remmet deGroot, AECOM Program Manager: remmet.degroot@aecom.com, 303-796-4633		

This memo documents the Colorado Water Conservation Board (CWCB) is coordinating with the appropriate community contacts regarding the scope and methodology of the Colorado Hazard Mapping Program (Project). The Project will take multiple years to complete, so it is important to have a record of this coordination. This memo serves to show the communities have reviewed and agree with the study methodology by signing at the bottom, and is for documentation purposes only. A summary of the Project is described below.

Project Objective

The Project involves conducting new flood hazard analyses and special flood hazard area delineations for streams particularly affected by the September 2013 flood event in the St. Vrain and Big Thompson HUC-8 watersheds (IDs 10190005 and 10190006, respectively). The resulting products and deliverables are expected to form the basis for a subsequent regulatory update for all studied streams under the Federal Emergency Management Agency's (FEMA's) Risk Mapping, Assessment, and Planning (MAP) Program. This regulatory update is not scoped or funded at this time. Throughout this process, CWCB and their consultant, AECOM, plan to coordinate with Federal, State, and local government entities as well as other relevant stakeholders to collaborate on project efforts, increase flood awareness, and assist in identifying risk mitigation actions.

General Project Approach

The following methodology will be applied to studying the selected streams in the St. Vrain and Big Thompson watersheds, except where deviations are specifically noted in the community-specific section below. All studies will be conducted using FEMA's applicable Guidelines and Standards for Flood Hazard Mapping. Project activities, including field surveys, will commence in the summer of 2015, except for reaches that will be studied starting in the fall of 2016 due to ongoing construction and recovery efforts.

The project tasks vary based on the study level of each stream. The scoped streams and their study levels are shown on the enclosed Scoping Map. Enhanced Level studies include survey and field reconnaissance and will eventually result in special flood hazard area delineations with plotted base flood elevations and regulatory floodways. Base Level studies do not incorporate field reconnaissance or survey data, rely exclusively on topographic data for terrain information, and will eventually result in model-backed special flood hazard areas without plotted base flood elevations. The Project tasks generally include the following sequence:

- Field Survey and Reconnaissance – Task will include the following for enhanced reaches (base level studied reaches are not surveyed):
  - Documenting the condition and types of hydraulic structures, such as bridges and culverts, and estimating associated parameters to include Manning coefficients
  - Surveying structure dimensions and adjacent cross sections
  - Surveying the channel and special flood hazard areas along cross sections spaced approximately 2,000 to 3,000 feet apart in the plains and mountains, respectively, where structure spacing allows
- Topographic Data – Task will include generating terrain models using topographic data from:
  - USACE 2014 LiDAR where available, collected in October 2014
  - USGS 2013 LiDAR elsewhere, collected from October 2013 through January 2014
- Hydrology – Task will include:
  - Using CDOT post flood hydrologic analyses where available and modifying it to include the "1% plus" and 4% flow rates per FEMA specifications

  - Calculating new peak flood flows for the 10%, 4%, 2%, 1%, "1% plus" and 0.2% annual chance events for streams not included in the CDOT post-flood hydrology analyses
- Hydraulics – Task will include performing 1-dimensional, steady-state HEC-RAS hydraulic analyses for all identified streams.
- Flood Hazard Mapping – Task will include producing special flood hazard area delineations for each level of study. While this phase of the project does not include a regulatory update, the work will tie into FEMA's National Flood Hazard Layer (NFHL) as appropriate and the analysis will be in accordance with FEMA's specifications and quality procedures. The following special flood hazard areas are mapped based on study level:
  - Enhanced Level – 1% and 0.2% annual chance flood hazard areas and regulatory floodway boundaries calculated with a ½ foot rise with profiles and floodway data tables
  - Base Level – 1%-annual-chance flood hazard areas
- Outreach – Due to the large area covered, project duration, and numerous stakeholders involved, routine communication is critical to this project. CWCB announced the project scope and objective to community stakeholders by email on May 28, 2015 and held a project kickoff meeting at CDOT's facility in Loveland on July 9, 2015. Community and county-specific discussions have been taking place as described in the section below. If additional or alternate contacts should be included in future discussions, please notify the project contacts listed above.

  Quarterly progress meetings will be held in Loveland starting in October, project information will be disseminated via newsletters and the project website (www.coloradohazardmapping.com), and flood risk review meetings will occur as necessary when results have been generated. Outreach is directed toward community officials, so they can disseminate appropriate information to the general public as necessary. Accompanying this memo is a brief flyer describing the scope and intent of this Project that can be shared with the public.

Community Specific Studied Streams and Decision Documentation

Streams were initially selected for study based on areas particularly affected by 2013 flood events. The table below summarizes additional conversations that were held and led to revision and/or confirmation of scope.

Date	Correspondence Type	Stakeholder	Comments Provided
June 17 and 22, 2015	Emails	Estes Park	• Will be conducting their own hydrology for Estes Park expected to be completed in late 2016. • Add Dry Gulch (BT-24) to studied area • Fall River and the Big Thompson River are higher priorities
July 20, 2015	Email	Loveland	• Will conduct a 2D analysis within the City limits to supplement or replace 1D model. • Will obtain new topographic data for areas identified by the community as a need.
July 9 and 22, 2015	Kickoff Meeting & Email	Larimer County	• Requested that Fish Creek and the Little Thompson River be studied in detail. • Larimer County and Glen Haven indicated that the studies upstream of the private land boundary limits near Glen Haven were not needed, so these streams will not be studied. • Indicated that survey and study should be held for approximately 1 year for the Big Thompson River (upstream of the confluence of Buckhorn Creek), Black Canyon Creek, Fall River, and Fish Creek. • Indicated that a Central Federal Lands model would be available for the North Fork Big Thompson River (BT-5) in the next three months. It could be utilized, but should not be treated as a detailed model.

FACT SHEET/STUDY MEMO

The table below summarizes the streams scoped for study within Larimer County.

Stream Name and Reach ID	Reach Description	Length (mi)	Level of Study	Topography Source	Hydrology Source	Anticipated Start
Big Thompson River (BT-1a)	From confluence with South Platte River upstream to confluence of Buckhorn Creek	33.6	Enhanced	2014 USACE LiDAR	CDOT Phase I/II Estes Park	Summer 2015
Big Thompson River (BT-1b)	From confluence of Buckhorn Creek, upstream to Rocky Mountain National Park eastern boundary	30.1	Enhanced	2015 USACE LiDAR	CDOT Phase I/II Estes Park	Fall 2016
Little Thompson River (BT-2a)	From confluence with Big Thompson River upstream 28.2 miles (St Vrain Canal Rd)	28.2	Enhanced	2014 USACE LiDAR	CDOT Phase II	Summer 2015
Little Thompson River (BT-2b)	From St. Vrain Canal Rd upstream 16.2 miles	16.2	Base Level	2013 USGS LiDAR	CDOT Phase I/II	Summer 2015
Little Thompson River (BT-2c)	From confluence of West Fork Little Thompson River, upstream 7.2 miles	7.2	Enhanced	2014 USGS LiDAR	CDOT Phase I/II	Summer 2015
Buckhorn Creek (BT-3a)	From confluence with Big Thompson River upstream 6.2 miles	6.2	Enhanced	2014 USACE LiDAR	New	Summer 2015
Buckhorn Creek (BT-3b)	From 6.2 miles upstream of confluence with Big Thompson upstream 26.2 miles	26.2	Base Level	2013 USGS LiDAR	New	Summer 2015
Redstone Creek (BT-4a)	From confluence with Buckhorn Creek upstream 1.4 miles	1.4	Enhanced	2013 USGS LiDAR	New	Summer 2015
Redstone Creek (BT-4b)	From 1.4 miles upstream from confluence with Buckhorn Creek upstream 14.9 miles	14.9	Base Level	2013 USGS LiDAR	New	Summer 2015
North Fork Big Thompson River (BT-5)	From confluence with Big Thompson River upstream 10.1 miles	10.1	Enhanced	2014 USACE LiDAR	CDOT Phase I/ Larimer County	Summer 2015
North Fork Little Thompson River (BT-6)	From confluence with Little Thompson River upstream 11.9 miles	11.9	Base Level	2013 USGS LiDAR	New	Summer 2015
West Fork Little Thompson River (BT-7)	From confluence with Little Thompson River upstream 9.8 miles	9.8	Base Level	2013 USGS LiDAR	CDOT Phase I	Summer 2015
Dry Creek (BT-8)	From confluence with Little Thompson River upstream 8.0 miles	8.0	Base Level	2013 USGS LiDAR	New	Summer 2015
Fish Creek (BT-9)	From confluence with Big Thompson River upstream 6.2 miles	6.2	Enhanced	2014 USACE LiDAR	New	Fall 2016
Fall River (BT-10)	From confluence with Big Thompson River upstream 5.0 miles	5.0	Enhanced	2014 USACE LiDAR	Estes Park	Fall 2016
West Creek (BT-11)	From confluence with North Fork Big Thompson upstream 1.5 miles	1.5	Enhanced	2013 USGS LiDAR	Larimer County	Fall 2016
Fox Creek (BT-12)	From confluence with North Fork Big Thompson upstream 1.6 miles	1.6	Enhanced	2013 USGS LiDAR	Larimer County	Fall 2016
Black Canyon Creek (BT-13)	From confluence with Big Thompson River upstream 1.2 miles	1.2	Enhanced	2014 USACE LiDAR	Estes Park	Fall 2016
Dixon Canal (BT-14)	From confluence with Big Thompson River upstream 0.5 miles	0.5	Enhanced	2014 USACE LiDAR	New	Fall 2016
Davy Ditch (BT-15)	From confluence with Big Thompson River upstream 0.1 miles	0.1	Enhanced	2014 USACE LiDAR	New	Fall 2016

FACT SHEET/STUDY MEMO

Stream Name and Reach ID	Reach Description	Length (mi)	Level of Study	Topography Source	Hydrology Source	Anticipated Start
Cedar Creek (BT-16)	From confluence with Big Thompson River upstream 0.2 miles	0.2	Enhanced	2014 USACE LiDAR	New	Fall 2016
Pine Creek (BT-17)	From confluence with Big Thompson River upstream 0.2 miles	0.2	Enhanced	2014 USACE LiDAR	New	Fall 2016
Little Beaver Creek (BT-18)	From confluence with Big Thompson River upstream 0.1 miles	0.1	Enhanced	2014 USACE LiDAR	New	Fall 2016
Tahosa Creek (BT-19)	From confluence with Big Thompson River upstream 0.5 miles	0.5	Enhanced	2014 USACE LiDAR	New	Fall 2016
Nelson Reservoir (BT-20)	From confluence with Big Thompson River upstream 0.1 miles	0.1	Enhanced	2014 USACE LiDAR	New	Fall 2016
Dixon Reservoir (BT-21)	From confluence with Big Thompson River upstream 0.1 miles	0.1	Enhanced	2014 USACE LiDAR	New	Fall 2016
Terry Lake (BT-22)	From confluence with Big Thompson River upstream 0.1 miles	0.1	Enhanced	2014 USACE LiDAR	New	Fall 2016
Sweck Lateral (BT-23)	From confluence with Big Thompson River upstream 0.1 miles	0.1	Enhanced	2014 USACE LiDAR	New	Fall 2016
Dry Gulch (BT-24)	From confluence with Big Thompson River upstream 1.5 miles	1.5	Enhanced	2013 USGS LiDAR	Estes Park	Fall 2016

Request for Concurrence

Should you have any questions or comments regarding the stated scope of work, please contact Thuy Patton, CWCB Floodplain Mapping Coordinator (thuy.patton@state.co.us or 303-866-3441 x3230), or Remmet deGroot, AECOM Program Manager (remmet.degroot@aecom.com or 303-796-4633). Otherwise please indicate your concurrence with the above approach and project understanding by returning a scanned signed copy of this Fact Sheet/Study Memo to Ms. Patton or Mr. deGroot (only one community representative needs to sign). We request that you contact us or provide concurrence within 10 business days. We appreciate your timely response and look forward to working with you on this Project.

MARK R. PETERSON	COUNTY ENGINEER	LARIMER COUNTY
Printed Name	Title/Position	Agency
[signature]	08/27/15	
Signature	Date	