APPENDIX A

LEGAL OPINION
BY HAND DELIVERY

Re: Legal opinion in regard to alternative and planned drainage facilities in general as contained in alternatives development and evaluation reports

Dear Ben:

You have asked me to provide you with a legal opinion that you may use to initially evaluate in general all alternatives development and evaluation reports for compliance with the law of the State of Colorado applicable to drainage. What follows is such an opinion which will need to be supplemented by a short legal opinion in regard to each report to either indicate that no further comment is necessary or that certain other factors, other than those noted herein, will need to be considered before proceeding to the selection and construction of drainage improvements contained in that specific report.

In order to properly evaluate these reports you first must take note of the following comments in regard to the law of drainage in Colorado:

I. GENERAL LEGAL DRAINAGE PRINCIPLES

Natural drainage conditions may be altered by an upper (dominant) owner provided the water is not sent down in a manner or quantity to do more harm than formerly to the lower

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Chief, Master Planning Program
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1980) the Colorado Court of Appeals held that: “Although we recognize the right of the owner of higher land to a drainage easement over the lower land of others, . . . the discharge of water will be enjoined as a continuing trespass if the drain sends the water down in a manner or quantity to do more harm than formerly.” In the case of Hoff v. Ehrlich, 511 P. 2d 523 (Colo. App. 1973) the Colorado Court of Appeals was faced with the question of the propriety of a servient owner blocking drainage from a dominant estate in order to protect the servent owner’s land. The Court held that: “The owner of the dominant estate has a legal and natural easement or servitude in the lower or servient estate for the drainage of surface water flowing in its natural course and manner. . . . When an interruption in the natural flow or passage of surface waters is caused by the servient owner to the detriment or injury of the estate of the dominant owner, the court should issue a mandatory injunction for the opening of the easement which has been blocked . . . [the servient owner] may not act to the extent that damage is caused thereby to the dominant landowner . . . in order for the owner of the servient estate to be afforded a remedy, it must be evident that the water was sent down in a manner or quantity causing more harm than it formerly had done.”

If a government permits the development which in turn causes “more harm than formerly,” then the government, as well as the developers, may be held liable. (Cases consistently move toward governmental, as well as developers’ liability.) See Metro Dohoff, supra, which held as follows: “The trial court found that the city had accepted the streets and storm drains for maintenance and control and, therefore, had exclusive control over the water collected in the subdivision. It determined that by approving the subdivision and drainage plan and accepting control, the city interfered with the natural conditions and thereby caused surface water to be collected and discharged upon plaintiff’s land ‘in a greater quantity or in different manner than had previously occurred under natural conditions.’”

Recently, governmental entities have raised in their defense of drainage cases the Governmental Immunity Act. In two recent cases, that defense has not been successful. In Burnworth v. Adams County, 826 P. 2d 368 (Colo. App. 1991) the Colorado Court of Appeals held that actions “. . . against public entities arising from the maintenance of a sewer, a storm sewer, or a storm drainage system,” were not prohibited by the Governmental Immunity Act. In the case of Scott v. City of Greeley, 931 P. 2d 525 (Colo. App. 1996), the Colorado Court of Appeals again denied protection under the Governmental Immunity Act to a public entity when it argued that the damage complained of was the result of a design flaw rather than from the operation of a facility. The facts were that the City designed and constructed a new storm water line which was 42” and connected it to a line which was only 15”. This caused the water to back up, or surcharge, through the storm drains and manhole covers, overtopping the curb and flooding adjacent property. In addition to the denial of protection to the entity under the

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Governmental Immunity Act, the Court also rejected the City’s defense that the connection to the smaller pipe was only temporary.

Any improvements upstream must be made taking into consideration the outlet capability downstream. (Long line of cases.) See Hankins, supra, which states: “The trial court has found that the water which these defendants have sent into the Boland drain is in greater quantity and more rapid in time — a finding fully justified by the evidence. Under such circumstances it is the court’s duty to determine what the dominant owners must do in order to prevent their increased waste water from damaging the servient owner.”

Colorado generally imposes strict liability on owners of dams (regional detention ponds). (Long line of cases.)

Interfering with natural drainageways or channels is generally looked upon with disfavor by Colorado Courts. However, builders of irrigation canals, railroads, and highways in other times were not aware or were unconcerned with the problems they might be creating in the future by artificially blocking natural drainageways. Sometimes the very passage of time (at least eighteen years) provides an argument that the blockage should be allowed to be continued because parties have relied and should be able to continue to rely on this “protection.” Generally, the laws of nature prevail in these situations and artificial structures such as canals, railroads and highways do not rise to the status of permanent dams which require spillways and other features under the jurisdiction in the State of Colorado of the State Engineer.

With the enactment of federal environmental (including water quality) provisions, the quality of the runoff may also have an effect, as well as on other ecological matters.

Natural waters are subject to the doctrine of prior appropriation in Colorado and what may have become a water right must also be considered with any plan for the “handling” of surface runoff in natural waterways.

Finally, any drainage, “facility” built by a government must be maintained. “If you’re not going to maintain it, then don’t build it!” is the theme of a long line of cases.

II. GENERAL COMMENTS ON COMMONLY PROPOSED FACILITIES AND CONSTRUCTION TECHNIQUES

I. It is my understanding that the purpose of all reports in regard to this subject is to
2. In general, consideration must be given to any potential adverse effects of the selected alternative on properties within the study area and downstream of the study area.

3. If any selected facilities would increase or materially change the direction of the flows across downstream property in a study area, the downstream property has a right to claim damages and/or protection from such a material increase or change in flow. Thus, care should be taken to make sure that increased flows from upstream facilities are accommodated by sufficiently increasing the size of the downstream channels and conduits. If, in final design, the selected alternative still has the effect of placing water on the residents and land owners in the area that they either never had or in a quantity larger than what they have had previously, the same must be revised to eliminate that result or the selected alternative must not be constructed.

4. If re-alignment of a channel is the selected alternative, careful consideration should be given to the channel's geometry, alignment and ability to carry flood flows so as not to create additional potential damages to surrounding landowners.

5. If the selected alternative is the collection of overland flows from a specific area and returning those flows to a drainage structure of some kind, care should be taken not to adversely impact landowners in the area.

6. If a selected alternative involves the redirection of flows from their historic path, prior to its finalization in the design process, caution should be taken that this redirection will not cause any increase in damage to those adjacent or downstream of the proposed redirection.

7. If any selected alternative, when it is finalized in the design process, is changed to include a plan for the diversion of runoff from one watershed to another; extreme caution should be used in implementing that portion of the selected alternative since the participants may be faced with the imposition of strict liability for any damage that occurs from any size storm event if it can be shown that the same would not have been suffered if the diversion had not occurred.

8. If the construction of crossing structures over irrigation canals are part of the selected alternative for the project, caution must be taken in regard to the capacity of those crossing structures. The structures, when designed for the design event, should not cause any more water than presently exists to flow into those canals.

9. The intentional routing, as opposed to inadvertent inflows, of flood flows into an irrigation ditch should be eliminated from any plan if at all possible unless a written agreement from the owner of the irrigation ditch is obtained permitting the use of the ditch to carry those flood flows. The participants have no control over the available capacity of the ditch at the time it would be necessary to carry flood flows so the ditch cannot realistically be used to control the flows downstream.

10. If an alternative is being selected that relies upon inadvertent detention and the participants do not intend to formalize such detention by written agreement, it is my opinion that the effect of that non-formalized inadvertent detention cannot be taken into consideration in the final design.

11. If a selected alternative includes the formalization of inadvertent detention it will be necessary for at least one of the participants to formalize that detention by entering into a written agreement with the owner of the facility causing the detention. The agreement must prohibit the owner from operating or modifying the facility in a way that would have the effect of lessening the inadvertent detention of the facility necessary to implement the selected alternative. Further, the owner must either agree to maintain the facility so that the same does not lose its current inadvertent detention or agree to permit at least one of the participants to maintain the facility.

12. If the owner of the facility will not agree to maintain the inadvertent detention facility, at least one of the participants should confirm in writing to all of the participants that the participant is committed to maintaining the inadvertent detention facility in a manner that ensures the necessary inadvertent detention to implement the alternative. This should be done prior to the implementation of any of the alternatives involving inadvertent detention. The level of maintenance must at least permit the facility to function as relied upon in flooding events and not fail structurally during the design and larger events.

13. Any formalized detention facilities that are utilized in the final design of a project will need to be the subject of a written agreement between the owner and at least one participant that the facility will be maintained in a manner that assures the necessary flood storage to implement the design and that adequate maintenance will be performed by either the owner or the participant so that the facility will function as designed in flooding events and that it will not fail structurally during the design and larger events.

The participating entities must agree amongst themselves, in writing, that any one of the participants may enforce the terms of the agreement with the owner of the facility if the responsible participant does not. This agreement must include the maintenance of no more than
a certain level of water in the facility at any one time and that any one of the participants may, at
their sole cost and expense, maintain the facility so that its effectiveness in the selected
alternative will be continued in perpetuity.

14. The embankments of all detention facilities should be designed so that they will not
fail during a design event.

15. If a potential wetland is involved in a design alternative, it will be necessary that a
Section 404 Permit from the United States Army Corps of Engineers be applied for and obtained,
if necessary. Such a Permit should be obtained before any construction is done on the
recommended alternative.

16. During construction of the selected facilities, care should be taken in constructing
those facilities so that downstream property is not adversely affected temporarily by such
construction. Usually, with the exception of the construction of detention facilities, the best
method to avoid that problem is construction from the downstream limit of the project in an
upstream direction which would then have the effect of having the downstream facilities ready to
accept any increased flows as a result of the project.

If you have any questions in regard to my comments and opinions contained in this letter,
please feel free to telephone me to discuss the same.

Very truly yours,

Edward J. Krisor
APPENDIX B

MEETING MINUTES AND PRESENTATIONS
KICK-OFF MEETING
BOULDER CREEK MASTER PLAN
UDFCD, BOULDER COUNTY, CITIES OF BOULDER & LONGMONT
DECEMBER 9, 2014 AT 3:00 PM

MINUTES

1) Attendees:
- Craig Jacobson, ICON Engineering, Inc.
- Brian LeDoux, ICON Engineering, Inc.
- Mark Wilcox, DHM Design
- Dave Blanch, Ecological Resource Consultants, Inc.
- Shea Thomas, Urban Drainage and Flood Control District
- Diane Malone, Boulder County
- Julie McKay, Boulder County
- Katie Knapp, City of Boulder
- Ward Bauscher, City of Boulder
- Marianne Giolitto, City of Boulder Open Space and Mountain Parks
- Dan Wolford, City of Longmont
- Clair DeLeo, Boulder County Parks and Open Space

2) INTRODUCTIONS

The project team consists of ICON Engineering Inc. as the lead consultant with assistance from DHM Design and Ecological Resource Consultants (ERC).

The project sponsors include the UDFCD, City of Boulder, Boulder County, and City of Longmont.

The notice to proceed for the project will be set as December 8th 2014.

Communication will primarily be by email. Shea will set up a dropbox folder to be used for file transfers.

Monthly progress meetings will be held at the County offices (approximately every 3rd meeting may be moved to a Longmont location). There will be approximately 8 meetings over the course of the project. The next meeting is scheduled for Tuesday January 13th, 2015 at 1:00pm.

Additional stakeholders were identified and may include:
- Colorado Water Conservation Board (CWCB)
- Federal Emergency Management Agency (FEMA)
- University of Colorado Boulder (CU)
- Weld County
- Town of Erie
- Colorado Department of Transportation (CDOT)
- Irrigation ditches and associated water users
- General public

Weld County, Town of Erie, and CDOT will be invited to the next progress meeting. Shea will contact Wendy and the Town of Erie and Steven (with Muller) at CDOT. Craig also mentioned that he had been working with Steve Harelson at CDOT from the Coal Creek project. His contact information is stephen.harelson@state.co.us, (720) 497-6913, if needed. Dianna Wink is the Weld County contact.

3) PROJECT SCOPE:

Baseline hydrology and hydraulics information has been requested from FEMA. The City of Boulder indicated that the pending Boulder Creek Study by Anderson Consulting Engineers is the preferred study to use within the City of Boulder limits. The City of Boulder will provide additional data that is relevant. The County will check with Dave Watson on availability of additional data within the County. The City of Longmont does not have any additional data to provide. ICON will compile all provided hydrology and hydraulic information and provide a list of the areas where information is not available.

ERC will compile all aquatic and habitat data that is available. The City of Boulder’s habitat assessment is in progress and will be provided upon completion.

Additional review of recreation, open space, and transportation plans will be completed as information availability allows. It was noted that the City of Boulder is starting projects at the Eben G. Fine Park and at Arapahoe and 13th (pedestrian underpass) which may be incorporated into the master plan.

Mapping for the project will utilize the 2014 USGS LiDAR data.

Field work will be started soon. Access to County and City of Boulder Open Space and Mountain Parks (OSMP) properties will be reviewed separately with corresponding staff. It was noted that New Zealand mud snails are present in Boulder Creek from approximately 55th Street and downstream. Basic decontamination efforts are needed for personal or equipment that encounters the creek in this area. Between 75th and 95th there is a nesting bald eagle that restricts access in this area. Longmont also has bald eagles. Field visits will be coordinated with City of Boulder OSMP, City of Longmont, and Boulder County Parks and Open Space and likely be scheduled the first week in January.

4) PROJECT Schedule:

The following project schedule was presented to the group. It was noted that the City of Boulder plans to present the draft alternatives analysis to their Water Resources Advisory Board (WRAB) in May. It was noted that this schedule is acceptable with potential grant scheduling including watershed resilience grants (mid March - $300K max) and watershed only grants (November 2015 - $1-$3M)
5) STAKEHOLDER INPUT (PROBLEM AREA REVIEW)
   Due to time constraints this item was not addressed. It was noted however that Boulder County desires improvements to include 100-year roadway crossings (the County’s floodplain manager and transportation group will confirm).

6) PUBLIC ENGAGEMENT PLAN
   The approach to the public engagement plan was discussed. Options were presented, including up-front mailings to ask for interest in meeting attendance (for the January 13th meeting). Shea will develop a map and corresponding mailing list depicting how many properties may be involved. The group will discuss this more at the next progress meeting.

7) PROJECT WEBSITE
   The project website was reviewed. An interactive comment form is forthcoming. A single main point of contact will be advertised in addition to the general comment form. Team members will be left on for public reference, however only email contact information will be shown.

8) ACTION ITEMS
    ICON Engineering Inc.
    ✓ Assemble floodplain information and provide list of information gaps
    ✓ Coordinate field visits
    ✓ Send out recurring meeting invitations.
    ✓ Coordinate with CU Boulder as a stakeholder.
    ✓ Coordinate collection data from City of Boulder and Boulder County

    DHM Design
    ✓ Brainstorm format for a public engagement mailer

   - END OF MEETING --
1) ATTENDEES
- Craig Jacobson, ICON Engineering, Inc.
- Brian LeDoux, ICON Engineering, Inc.
- Mark Wilcox, DHM Design
- Troy Thompson, Ecological Resource Consultants, Inc.
- Shea Thomas, Urban Drainage and Flood Control District
- Naren Tayal, Federal Emergency Management Agency
- Diane Malone, Boulder County
- Katie Knapp, City of Boulder
- Annie Noble, City of Boulder
- Marianne Giottoło, City of Boulder Open Space and Mountain Parks
- Dan Wolford, City of Longmont
- Claire DeLeo, Boulder County Parks and Open Space
- Jonathan Akins, CU Boulder
- Kristine Obendorf, Boulder County Transportation (by phone)

2) INTRODUCTIONS
Brief introductions were completed by everyone in attendance.

3) PROJECT MANAGEMENT
Website: The project website was reviewed. No issues were noted; however ICON will add the following items:
- Form to assemble a mailing list;
- Ticker to track site usage.

Schedule: The project schedule was reviewed. No issues or requests for changes were noted. See attached copy of the proposed project schedule.

Meeting Dates: The standing progress meeting was chosen to occur on the 3rd Wednesday of each month from 10am until noon. The next meeting will be held on February 18th at the City of Longmont Natural Resources / Parks facility (7 So Sunset St.). The previous recurring meeting invitation will be canceled and an update Outlook meeting invitation will be provided. Shea requested a list of meeting invitees for review.

4) ACTION ITEMS FROM PAST MEETING:
Floodplain Information: ICON has obtained various sources of floodplain information including workmaps and HEC-2 (hard copy) and HEC-RAS (electronic) hydraulic models.

Field Visit Coordination: Initial field visits were completed on January 12th, 2015. Additional field visits will be completed on an as-needed basis.

Additional Stakeholders including CU, CDOT, Town of Erie, and Weld County have been contacted and invited to the recurring progress meetings.

Data Collection from City of Boulder / Boulder County is in progress.

5) FLOODPLAIN SUMMARY
A summary of the hydrologic information gathered to date was reviewed (see attached figure). It was noted that the recent CDOT “Boulder Creek Hydrologic Analysis" provided discharge values on Boulder Creek just downstream of the confluence with Fourmile Creek. These discharges are notably less than the FEMA effective discharges (approximately 60% of the effective values). This master plan project will not revise discharges and will use FEMA effective discharge values for all hydraulic analysis.

Sources for effective floodplain delineation and modeling include the following:
- 1981 Upper Boulder Creek and Fourmile Creek Floodplain Information Report (HEC-2)
- 2013 Boulder Creek Floodplain Mapping Study (HEC-RAS)
- 1983 Flood Hazard Area Delineation (HEC-2)
- Letter of Map Revision Case No. 11-08-1090P (HEC-RAS)
- Letter of Map Revision Case No. 12-08-0198P (HEC-RAS)
- Letter of Map Revision Case No. 12-08-1047P (HEC-RAS)

A comprehensive hydraulic modeling will not be developed, the source models will be utilized and recreated as needed on a site specific basis to evaluate alternatives.

Several stream gage facilities exist throughout the project reach (see attached figure). No additional gage analysis will be completed for flood discharge purposes. However, gage information may be used to determine more frequent return interval storm discharges for geomorphology analysis and design purposes.

6) DATA COLLECTION
ICON has obtained background data from the following list of sources:

Hydrology and Hydraulics
- Upper Boulder Creek and Fourmile Creek, Gingery Associates 1981
- Fourmile Mouth to Boulder Canyon Mouth
- Anderson Study
- Boulder Canyon Mouth to 61st St.
- Lower Boulder Creek, Flood Hazard Area Delineation, Muller Engineering Co. 1983
- 55th St. to Weld County
- LOMR 11-081090P
- LOMR 12-08-0198P
- LOMR 12-08-1047P

Master Planning Information
City of Boulder:
- Justice Center LOMR
- Boulder Slough
- Eben G. Fine Park
- Civic Area Master Plan
- Arapahoe Avenue Underpass
- North of Boulder Creek (See University of Colorado Master Plan)
- Open Space Restoration Projects From 55th to downstream of 61st
Boulder County
- Boulder County Transportation Master Plan
- Lower Boulder Creek Restoration (COE)
- 109th St. to Kenosha Rd.
- The Boulder Valley Comprehensive Plan
- Boulder County Trail Plan

City of Longmont
- St. Vrain Master Plan

A listing of data collected by ERC and approach to their Habitat, Ecological, Geomorphic work is attached.

The following sources of data were noted by the project team as applicable to the Boulder Creek master planning efforts. ICON will obtain the following reports:
- Boulder County: Parks and Open Space Plan
- Boulder County: Transportation Master Plan
- City of Boulder: Transportation Master Plan
- City of Longmont: St. Vrain Trails Master Plan (for confluence area)
- CU Boulder: North of Boulder Creek Redevelopment Master Plan
- CU Boulder: Research Park Redevelopment Master Plan (in progress)

7) GEOMORPHOLOGIC & HABITAT ASSESSMENTS
Troy Thompson reviewed ERC's preliminary geomorphologic and habitat assessment work. See attached figures from the power point presentation.

The aerial imaging provided by the City of Boulder was noted to not be georeferenced. Katie will review this issue and see if it can be rectified. For historic channel alignment review previous USGS topographic mapping was used. Marianne noted that the City of Boulder Parks department has georeferenced aerials that date back to 1937 as well and will see what format they could be provided in.

The potential for completing channel restoration in a piecemeal approach was discussed in light of the patchwork of land ownership and exiting land uses adjacent to the channel. Troy noted that piecemeal restoration can be done but there can be issues with sediment transport where the creek transitions between existing conditions and restoration reaches. Given that approximately 75% of Boulder Creek downstream of the City of Boulder is publicly owned there are many options for restoration alignments, the project team indicated that restoration should be viewed from a big picture and long range approach.

8) OUTREACH
Mailing: The project team indicated that public engagement should occur early in the process. Shea noted that the initial mailing list based on the channel alignment with an additional buffer included 830 properties in Boulder County and 75 properties in Weld County. Shea will send out an email asking for any additional entities to be included in the mailing list. A post-card type mailing will then be sent out providing an address for the project website and indicating that there will be future public meetings. A second mailing will be sent out approximately 10 days prior to the initial public meeting.

Social Media: The City of Boulder and Boulder County will review use of its facebook/social media account for announcing this project and future public meetings.

Email List: All public meeting attendees and those who use the interactive website comment form will be compiled into a project email list for future news distribution. ICON was asked to add a form for people to sing up on the mailing list.

Web Statistics: The statistics for the project website will be reviewed following the initial mailing in order to gage the public interest and expected engagement.

Public Meeting: After lengthy discussion it was determined that two locations will be used for the initial public meeting (one in the City of Boulder, the other in the Weld County Annex). The meeting will likely be an open house style of format; however a short presentation may be made at the start (and also produced as a webex). The first meeting will be on or around March 1st. Shea will set up a doodle poll for an ideal date and time.

9) NEXT MEETING
The next progress meeting will be on February 18th at the City of Longmont Natural Resources / Parks facility conference room (7 So Sunset St., Longmont CO 80501)

10) ACTION ITEMS
ICON Engineering Inc.
- Send out invitations for recurring progress meeting; cancel previous Outlook invitations; sent invitee list to Shea
- Provide Shea with list of ditch/canal contacts along project reach

UDFCD
- Incorporate other mailing list entities provided by others and send out initial mailing.
- Set up doodle poll for the initial public meetings.

-END OF MEETING--

Minutes prepared by: Brian LeDoux, P.E., CFM
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**Project: Boulder Creek MP Schedule.**

**Date:** Tue 1/13/15
Compiled applicable shapefiles to show closures and other sensitive lands including: wildlife closure areas – New Zealand mud snail, nest sites, other closure areas, OSMP lands and OSMP closures.

- Shapefiles are available to ICON as needed.

- Identified State/Federal Threatened and Endangered Species known in project area
- Species to be screened for likelihood of presence/absence and included in master plan as a summary table.

- Currently historic data from available USGS topographic maps and imagery will be used:
  - 1904-USGS Topo
  - 1950 USGS Topo
  - 1960 USGS Topo
  - 2004-Aerial and USGS Topo
  - 2010-Aerial and USGS Topo
  - 2013 Aerial and USGS Topo
  - 2014 LiDar and 1’ Contours

- Imagery is not georeferenced therefore cannot be easily overlaid on project base mapping for spatial analysis and measurement. For example, the year 1966 has 300 images
- Based on the appearance of the file names (ex., S10W07_1971) each year contains random coverage for various USGS ‘Sections’.
- Complete coverage for the project area is unlikely from any one year.
- It is possible based on the section numbering, that aerial coverage may exist for portions of the project area however further analysis would be required.

- Acquired extensive historical aerial imagery from City of Boulder.
- Imagery is not georeferenced therefore cannot be easily overlaid on project base mapping for spatial analysis and measurement. For example, the year 1966 has 300 images
- Based on the appearance of the file names (ex., S10W07_1971) each year contains random coverage for various USGS ‘Sections’.
- Complete coverage for the project area is unlikely from any one year.
- It is possible based on the section numbering, that aerial coverage may exist for portions of the project area however further analysis would be required.

- Georeferenced USGS topos for entire project area covering years 1904, 1950, 1960.
- More detailed evaluation of sinuosity to follow.

- Received cost for one of three years requested.
- 1949 would require 11 frames and cost $4,650 for georeferenced coverage of entire project area.
- Image searches for years 1939 and 1963 are still pending.

- ERC will follow up with Claire DeLeo to confirm appropriate current files- we would like to verify which mapping (GIS or 12/18/2013 PDF maps) is most appropriate for use in the master plan.
- Claire to provide Boulder County Flood Mapping Shapefiles, possible historic imagery, post flood studies and any available current restoration designs for Boulder Creek
Objective of Initial Geomorphology Evaluation

- Evaluate evolution of channel through recent times
- Quantify changes in alignment and planform
- Identify natural channel form to aid in restoration objectives
Changes to Historic Alignment
Comparison of Historic Planform and Stream Widths (USGS Maps and Current Topo)

<table>
<thead>
<tr>
<th>Reach ID and Description</th>
<th>1904</th>
<th>1960</th>
<th>2004</th>
<th>2013</th>
<th>2014</th>
<th>Greatest Observed Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>Sinuosity</td>
<td>Width</td>
<td>Sinuosity</td>
<td>Width</td>
<td>Sinuosity</td>
<td>Width</td>
</tr>
<tr>
<td>REACH 1: Fourmile Creek Confl. to Broadway</td>
<td>None</td>
<td>1.22</td>
<td>45**</td>
<td>1.25</td>
<td>None</td>
<td>1.29</td>
</tr>
<tr>
<td>REACH 2: Broadway to Foothills Parkway</td>
<td>None</td>
<td>1.16</td>
<td>45**</td>
<td>1.31</td>
<td>None</td>
<td>1.12</td>
</tr>
<tr>
<td>REACH 3: Foothills Parkway to Valmont</td>
<td>None</td>
<td>1.26</td>
<td>85</td>
<td>1.36</td>
<td>None</td>
<td>1.12</td>
</tr>
<tr>
<td>REACH 4: Valmont Road to N 75th St.</td>
<td>None</td>
<td>1.16</td>
<td>60</td>
<td>1.38</td>
<td>60</td>
<td>1.36</td>
</tr>
<tr>
<td>REACH 5: N 75th St. to Hwy 287</td>
<td>None</td>
<td>1.24</td>
<td>45</td>
<td>1.44</td>
<td>40</td>
<td>1.35</td>
</tr>
<tr>
<td>REACH 6: Hwy 287 to CO-52</td>
<td>None</td>
<td>1.32</td>
<td>40</td>
<td>1.42</td>
<td>40</td>
<td>1.48</td>
</tr>
<tr>
<td>REACH 7: CO-52 to CO-199</td>
<td>None</td>
<td>1.27</td>
<td>100</td>
<td>1.41</td>
<td>100</td>
<td>1.38</td>
</tr>
</tbody>
</table>

Observations from Historic Characteristics

• Stream through the canyon and developed City had historically lower sinuosity that areas downstream from the developed City
• Sinuosity downstream from the City historically was in the 1.25 to 1.45 range
• Sinuosity has decreased fairly significantly in several locations over time
• Areas with limited development or encroachment exist and should form the basis for idealized restoration reaches
• Active stream width have decreased, with largest decreases observed towards the downstream end of the project
  • This may at least in part be a response to diversions and decreased flows
What is the natural state of the stream?

Area downstream of N. 75th Street is likely a good example of Boulder Creek functioning in its natural geomorphic state.
More detailed evaluation of 2014 conditions

<table>
<thead>
<tr>
<th>Segment</th>
<th>Upstream ID</th>
<th>Upstream El (ft)</th>
<th>Downstream El (ft)</th>
<th>Segment Length (ft)</th>
<th>Valley Length (ft)</th>
<th>Slope (%)</th>
<th>Sinuosity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fourmile Confluence to Mouth of Canyon</td>
<td>5733</td>
<td>5400</td>
<td>13,039</td>
<td>9,128</td>
<td>2.81%</td>
<td>1.30</td>
<td></td>
</tr>
<tr>
<td>Mouth of Canyon to 38th Street</td>
<td>5400</td>
<td>5388</td>
<td>10,764</td>
<td>10,778</td>
<td>0.02%</td>
<td>1.01</td>
<td></td>
</tr>
<tr>
<td>8th Street to Valmont</td>
<td>5388</td>
<td>5389</td>
<td>13,760</td>
<td>13,061</td>
<td>0.79%</td>
<td>1.10</td>
<td></td>
</tr>
<tr>
<td>Valmont to N. 75th Street</td>
<td>5389</td>
<td>5393</td>
<td>18,448</td>
<td>16,750</td>
<td>0.63%</td>
<td>1.10</td>
<td></td>
</tr>
<tr>
<td>N. 75th Street to N. 95th Street</td>
<td>5393</td>
<td>5394</td>
<td>18,419</td>
<td>15,267</td>
<td>0.82%</td>
<td>1.24</td>
<td></td>
</tr>
<tr>
<td>N. 95th Street to 107th</td>
<td>5394</td>
<td>5395</td>
<td>18,047</td>
<td>9,187</td>
<td>0.38%</td>
<td>1.15</td>
<td></td>
</tr>
<tr>
<td>107th to Upstream End of Gravel Pits</td>
<td>5395</td>
<td>4932</td>
<td>24,303</td>
<td>24,024</td>
<td>0.94%</td>
<td>1.21</td>
<td></td>
</tr>
<tr>
<td>Upstream to Downstream End of Gravel Pits</td>
<td>4932</td>
<td>4853</td>
<td>5,853</td>
<td>3,946</td>
<td>0.69%</td>
<td>1.40</td>
<td></td>
</tr>
<tr>
<td>Downstream End of Gravel Pits to St. Vrain Confluence</td>
<td>4853</td>
<td>4814</td>
<td>22,585</td>
<td>20,635</td>
<td>0.27%</td>
<td>1.29</td>
<td></td>
</tr>
</tbody>
</table>

Non-Channelized Sections

Constraints on Current Alignment
Gravel pits were mined for alluvial materials. The extents of the gravel pits provide a good indication of the lateral extents of the historic stream meanders (similar in width to the historic channel locations observed downstream of N. 75th St.).

Stream Classification (Rosgen) Based on Slope for Comparison with Natural Sinuosity

<table>
<thead>
<tr>
<th>Upstream ID</th>
<th>Segment length (ft)</th>
<th>Slope (%)</th>
<th>Rosgen Classification Based on Slope and Thread</th>
<th>Current Sinuosity</th>
<th>Expected Sinuosity Based on Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upstream to Downstream End of Gravel Pits</td>
<td>22,185</td>
<td>0.27%</td>
<td>C, E or F</td>
<td>1.09</td>
<td>&gt;1.2</td>
</tr>
<tr>
<td>Downstream End of Gravel Pits to St. Vrain Confluence</td>
<td>22,185</td>
<td>0.27%</td>
<td>C, E or F</td>
<td>1.09</td>
<td>&gt;1.2</td>
</tr>
<tr>
<td>N. 95th Street to 107th B</td>
<td>10,447</td>
<td>0.38%</td>
<td>C, E or F</td>
<td>1.15</td>
<td>&gt;1.2</td>
</tr>
<tr>
<td>107th to Upstream End of Gravel Pits</td>
<td>24,303</td>
<td>0.34%</td>
<td>C, E or F</td>
<td>1.01</td>
<td>&gt;1.2</td>
</tr>
<tr>
<td>N. 75th Street to N. 95th Street</td>
<td>18,448</td>
<td>0.73%</td>
<td>C, E or F</td>
<td>1.10</td>
<td>&gt;1.2</td>
</tr>
<tr>
<td>28th Street to Valmont</td>
<td>13,790</td>
<td>0.75%</td>
<td>C, E or F</td>
<td>1.10</td>
<td>&gt;1.2</td>
</tr>
<tr>
<td>Mouth of Canyon to 28th Street</td>
<td>10,748</td>
<td>1.03%</td>
<td>C, E or F</td>
<td>1.05</td>
<td>&gt;1.2</td>
</tr>
<tr>
<td>Fourmile Confluence to Mouth of Canyon</td>
<td>11,849</td>
<td>2.81%</td>
<td>B</td>
<td>1.30</td>
<td>&gt;1.2</td>
</tr>
<tr>
<td>Upstream to Downstream End of Gravel Pits</td>
<td>22,185</td>
<td>0.27%</td>
<td>C, E or F</td>
<td>1.09</td>
<td>&gt;1.2</td>
</tr>
</tbody>
</table>

Exhibits natural sinuosity
Most Probable Natural Rosgen Stream Type for Valley Sections

• **Type C Stream**
  • Broad valley with terraces, connected to floodplain; riffle/pool morphology
  • Slope < 2%
  • Entrenchment Ratio > 2.2
  • Width/Depth Ratio > 12
  • Sinuosity > 1.2
    • (avg sinuosity 1.4 for C3 and 1.9 for C4 types)

Challenges for Restoration

• Land practices have significantly impacted Boulder Creek
• True geomorphologic restoration would put the stream back to a meandering stream system with sinuosity on the order of 1.4 and allow the stream to access its broad floodplain most years
• Land constraints may make this impractical or economically infeasible
• Objectives of natural restoration associated with this project will need to consider these constraints
PROGRESS MEETING
BOULDER CREEK MASTER PLAN
UDFCD, BOULDER COUNTY, CITIES OF BOULDER & LONGMONT
FEBRUARY 18, 2015 AT 10:00 AM

MINUTES

1) ATTENDEES
- Craig Jacobson, ICON Engineering, Inc.
- Brian LeDoux, ICON Engineering, Inc.
- Mark Wilcox, DHM Design
- Troy Thompson, Ecological Resource Consultants, Inc.
- Shea Thomas, Urban Drainage and Flood Control District
- Yige Gao, Boulder County
- Varsha Blum, Boulder County
- Kristine Obendorf, Boulder County Transportation
- Julie McKay, Boulder County
- Dan Wolford, City of Longmont
- Clair DeLeo, Boulder County Parks and Open Space
- Scott Holwick, LGKH Law / Boulder County Planning Commission
- Dan Marcucci, CDOT

2) INTRODUCTIONS
Brief introductions were completed by everyone in attendance. It was noted that representatives from the Town of Erie and Weld County were not in attendance.

3) WEBSITE ACTIVITY
Following the post card mailing by the UDFCD, the project website traffic was documented and a graph showing unique visitors over the previous few weeks was shown. Additionally, several comments have been received via the interactive comment form. The form to add an email address to the project mailing list was placed on the project website and the current mailing list was shown to the project team. This email list will be used to provide notifications for the upcoming public meetings in addition to a 2nd post card mailing by the UDFCD.

4) ACTION ITEMS FROM PAST MEETING:
Ditch / Canal Contacts – The UDFCD incorporated ditch and canal contact information into the post card mailing list. Scott Holwick represents several Boulder Creek diverters and will provide additional contact information for subsequent mailing efforts.

Initial information mailings – these have been sent out by the UDFCD.

Public meeting mailings - Subsequent mailings will be sent out by the UDFCD for the upcoming public meetings to be held on March 10th and March 18th. The public meeting on March 10th will be held in the City of Boulder, and the meeting on March 18th will be held at the Weld County Annex. Shea will send out the mailing list for project team review and possible additions.

5) UPCOMING PUBLIC MEETINGS
The upcoming public meetings will be held on March 10th (City of Boulder) and March 18th (Weld County Annex). No alternatives will be presented, rather, the initial meeting will be to gather public input and present initial findings. A survey card will be developed for use at the public meetings. The public meetings will stress that this master plan effort is focused on restoration of Boulder Creek and is not specifically looking at flooding mitigation efforts. The public meetings will follow the general UDFCD format of a short presentation at the start of the meeting followed by an open house type meeting where attendees can ask specific questions of project representatives and review and mark up maps of the project area. Maps to be used at the public meetings will be developed by ICON and provided to the project team. If time allows, after review by the stakeholders, these maps will be available on the project website prior to the public meetings.

6) ALTERNATIVES ANALYSES – REVIEW PROJECT FOCAL AREAS
The draft project focal area maps were reviewed and additional discussion items for each reach are noted below. See attached maps. Boulder County will review the problem ID maps and provide any needed revisions prior to the public meetings.

Reach 1 – The alternatives for the confluence area adjacent to the St. Vrain River will rely on the St. Vrain River master plan that is currently in progress. Once the St. Vrain plan is further refined, the recommended plan for Boulder Creek will incorporate the proposed St. Vrain improvements. Dan confirmed that the St. Vrain work was still in the initial stages. He will coordinate with ICON when more information is available.

Reach 2 – For Weld County bridges, the project team would like to discuss the County’s criteria for roadway improvements, and the County’s general tolerance for roadway washout in areas that are not immediately adjacent to bridge structures. Diversions in reach 2 will be proposed to be modified for aquatic and habitat passage. Scott noted that a Boulder Creek bank breach near the Idaho diversion occurred prior to the September 2013 flooding but remains a significant issue in this area. (bank breach is located on property owned by Helen Bryant).

Reach 3 – Mineral Road was recently re-built by CDOT.

Reach 4 – It is anticipated that the washed-out bridge on Boulder County Open Space will be removed. This was confirmed with the County at the meeting. The Kenosha Road area including the potential to remove the bridge over Boulder Creek and to acquire flood impacted properties was discussed at length. It is anticipated that the Kenosha Road bridge structure was not damaged in September 2013 and for transportation purposes is expected to remain in place for the foreseeable future. Due to the eastern sloping gradient of the roadway, providing 100-year conveyance would likely not be achievable under the current condition. Craig asked if this level of capacity was needed at this location, as with the others. Shea noted that alternatives to raise Kenosha Road would focus is on restoration not necessarily flood impact mitigation. Craig also suggested the potential to abandon the roadway crossing with traffic using the ancillary roadways east and west to cross Boulder Creek. The County will review the needs at this location. For now, it was agreed to consider more of the channel needs for restoration as opposed to flood control at this location.

ICON explained that a cursory review of acquisition was made at Kenosha Road using FEMA’s benefit-cost software. The benefit values (per the FEMA BCA software) for acquisition of structures adjacent to Kenosha Road were reviewed. With a single exception, benefit values were low relative to the expected fair market value of the properties. Although the actual acquisition costs are still unknown, this would likely result in a low benefit vs cost ratio. It was noted that these draft benefit values were based on elevations taken from USGS LiDAR mapping with a assumption of a finished floor at 1.0 foot above average adjacent grade. It was noted that at least one structure (11664 Kenosha Road) has been removed following the September 2013 flood. However, several adjacent properties are in the process of rebuilding. The County is working on some acquisition efforts in the area and the timing for additional proposed acquisition would be
good, however, as noted the estimated benefits are low and acquisition will likely not be a recommended alternative in this master plan effort. The County will provide information on properties that are in the process of rebuilding which may be able to be coordinated with further analysis.

The US Army Corps of Engineers project in Reach 4 has a final design completed but construction has not started begun. The master plan will review the design to determine if recommendations are compatible.

US Highway 287 does have 100-year capacity. The potential to abandon 109th Avenue was discussed as the stream crossings did not provide additional access to the residences.

Reach 5 - Previous restoration work has been completed in Reach 5; however much of this work has since been flanked by the flood event. The channel will require restoration and drop structures in Reach 5 will be proposed to be modified for aquatic and habitat passage. The diversion at 95th Street was damaged in September 2013.

Reach 6 - This reach includes several private bridges but is also an ideal restoration reach.

Reach 7 - City of Boulder open space projects are in progress. The master plan will note these projects and proposed alternatives will be compatible with the City’s improvements.

Reach 8 – This reach includes a notable capacity issue at the railroad crossing. The Boulder Slough and 2 ditches are also issues within this reach. CDOT is going to construction a wetland mitigation project in the summer of 2015. CDOT will provide plans to the project team. The hospital and its need for access during the 500-year event will be reviewed for alternatives in Reach 8. Additionally, planning for the CU east campus will also be incorporated into any alternatives in this reach. Additional project focal areas included reviewing acquisition for homes along Cordry Court located in the proposed high hazard areas, Boulder Slough, Civic Center, and CU north of Boulder Creek.

Reach 10 - The Boulder Creek trail extension and roadway repair project is just now beginning. CDOT noted that the road repair design is likely 1 year out and should generally consist of pushing the road off of fill and onto bedrock, where feasible, and the road will likely have 6 foot shoulders. CDOT will provide ICON with the damage report for CO Highway 119. Damage photographs can be obtained from www.cdotfloods.org. For the master plan, ICON will identify ongoing efforts from CDOT and provide specific restoration needs for the canyon area which can be incorporated into CDOT’s approach.

7) GEOMORPHIC DESIGN PRESENTATION

Troy Thompson presented a review of the initial geomorphic investigation and conceptual restoration parameters that would satisfy sinusity and riparian sizing for typical restoration design. It is important to note that the channel orientation depicted by the presentation was not the presentation was not reflective of actual recommendations; only what a natural stream system may look like. No consideration was given to defining an actual stream location at this time.

8) INITIAL BOULDER COUNTY ALTERNATIVES –

See individual reach discussions in item 6 above. A typical roadway crossing improvement alternative was presented that illustrated overbank culverts in flood prone areas outside of the main channel. This approach reduces the contraction and expansion required for the floodplain to be passed through a typical single opening roadway crossing and will allow for additional overbank floodplain capacity below the roadway grade. These additional culverts can reduce or eliminate roadway washouts caused by overtopping flows and will increase habitat connectivity. The details of this type of roadway crossing alternative will not be presented at the public open houses.

9) INITIAL CITY OF BOULDER ALTERNATIVES

Cordry Court Acquisition – draft benefit values were calculated for structures adjacent to the proposed high hazard zone along Cordry Court east of 28th Street and the three large apartment buildings south of Boulder Creek and east of 28th Street. Similar to at Kenosha Road, draft benefit values for acquisitions were estimated to be much lower than and anticipated market value and would not likely present a viable alternative. City staff was not in attendance during the meeting.

10) NEXT STEPS

a) Refinement of stream channel location / restoration philosophy
b) Mitigation costs for Boulder County reaches
c) Continuation of City of Boulder alternatives development
d) Weld County & City of Longmont alternative strategies (input needed)

11) SCHEDULE & NEXT MEETING

The March meeting will be canceled in light of the March 18th public meeting. The draft alternatives report will be submitted 2 weeks after the March 18th meeting such that the project team will have 2 weeks to review prior to the April progress meeting.

12) ACTION ITEMS

All   
- Review Focal Area maps prior to public meetings. Please provide ICON comments by March 2nd such that the maps can be uploaded to the website prior to the meetings.

ICON Engineering Inc.   
- Develop mitigation costs for Boulder County reaches
- Continue to develop City of Boulder alternatives
- Confirm with Weld County desired roadway crossing criteria

ERC   
- Refinement of stream channel location / restoration plan

UDFCD   
- Provide project team with contact mailing list
- Send out public meeting mailings

Boulder County   
- Provide information on which Kenosha Road properties are being rebuilt
- Set up a meeting with Transportation to discuss roadway conveyance approach

CDOT   
- Provide wetland mitigation project design drawings
- END OF MEETING --

Minutes prepared by:  
Brian LeDoux, P.E., CFM  
ICON ENGINEERING, INC.

Provide Highway 119 damage report
Inform design team of upcoming improvements with the canyon area.

ICON ENGINEERING, INC.
Boulder Creek Restoration Master Plan
Project Focal Areas
February 2015
Page 1
**REACH 4:**
- **Location:** Mineral Rd
- **Increase Bridge Capacity**
- **Capacity:** 10,000 cfs

- **Location:** County Line Rd
- **Increase Bridge Capacity**
- **Capacity:** 1800 cfs

**REACH 5:**
- **Location:** 95th St
- **Increase Bridge Capacity**
- **Capacity:** 3,300 cfs

**REACH 6:**
- **Location:** 75th St
- **Capacity:** 6,200 cfs

**REACH 2:**
- **Bank Stabilization at Re-Use Facility**

**REACH 4:**
- **Stabilize Pond Outfall and Streambank**

**REACH 4:**
- **Remove Washed Out Bridge**

**REACH 4:**
- **Residential Flooding Potential Acquisition of Flood Prone Properties**

**REACH 4:**
- **Coordinate With Corps of Engineers Restoration Project (109th St to Kenosha Rd)**

**REACH 5:**
- **Natural Stream Restoration Through US 287 (107th St)**
- **Modify Boulder Weld Ditch for Aquatic and Habitat Passage**
- **Modify Drop Structures for Aquatic and Habitat Passage**
- **Modify Lower Boulder Ditch for Aquatic and Habitat Passage**

**REACH 6:**
- **Modify Ligget Ditch for Aquatic and Habitat Passage**

**Legend:**
- Hydraulics Feature
- 100-Year Floodplain
- Open Space
REACH 7:
Modify Diversion for Aquatic and Habitat Passage
Location: DS of 61st St
- Remove Debris

REACH 7:
Location: 61st St
- Capacity: 8,300 cfsQ
- 100: 13,050 cfs

Coordinate With City of Boulder Ongoing Restoration Projects
Valmont Rd to 70th St

REACH 8:
Location: Valmont Rd
- Capacity: 13,050 cfs
- 100: 13,050 cfs

REACH 8:
Location: 55th St
- Capacity: 1,000 cfs
- 100: 13,050 cfs

REACH 8:
Location: Foothills Pkwy
- Capacity: 12,150 cfs
- 100: 13,050 cfs

Coordinate With City of Boulder Ongoing Restoration Projects
Foothills Pkwy to Valmont Rd
Access Must Be Maintained at the Hospital During 500-Year Event

REACH 9:
Coordinate With CU Boulder Research Park Planning Study & East Campus Plan

REACH 9:
Coudry Ct Property
- Within High Hazard

REACH 9:
Senior Housing Critical
- Facility In Floodplain

REACH 9:
Boulder High Trail Inundation

REACH 9:
Modify Boulder Ditches for Aquatic and Habitat Passage

REACH 9:
Coordinate with Eben G. Fine Park Restoration Project

REACH 9:
Coordinate with CU Boulder North of Boulder Creek Planning Study

REACH 9:
Millenium Harvest House
- High Hazard Remediation

REACH 9:
Floodplain Spill to Boulder Slough

REACH 9:
Arapahoe Avenue Underpass Concept

REACH 9:
Coordinate with Civic Center Area Plan

REACH 10:
Modify Anderson Ditch for Aquatic and Habitat Passage
Location: Boulder Canyon Dr
- Capacity: xxxx
- 100: 11,660 cfs

Coordinate With City of Boulder Ongoing Restoration Projects

Boulder Creek Restoration Master Plan
Project Focal Areas
February 2015
Page 4
Observations from Historic Characteristics

- Stream through the canyon and developed City had historically lower sinuosity that areas downstream from the developed City
- Sinuosity downstream from the City historically was in the 1.25 to 1.45 range
- Sinuosity has decreased fairly significantly in several locations over time
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- Active stream width have decreased, with largest decreases observed towards the downstream end of the project
  - This may at least in part be a response to diversions and decreased flows

What is the natural state of the stream?

Area downstream of N. 75th Street is likely a good example of Boulder Creek functioning in its natural geomorphic state.
Most Probable Natural Rosgen Stream Type for Valley Sections

- Type C Stream
- Broad valley with terraces, connected to floodplain; riffle/pool morphology
  - Slope < 2%
  - Entrenchment Ratio > 2.2
  - Width/Depth Ratio > 12
  - Sinuosity > 1.2
  - (avg sinuosity 1.4 for C3 and 1.9 for C4 types)
Gravel pits were mined for alluvial materials. The extents of the gravel pits provide a good indication of the lateral extents of the historic stream meanders (similar in width to the historic channel locations observed downstream of N. 75th St.).
Ideal Restoration Objectives

- Allow the stream to replicate natural conditions
- No single “correct” alignment as the stream has migrated across a wide valley in response to flow and sediment load as is evident by aerial photos and recent gravel operations
- Create a bankfull channel cross section to contain flows during normal conditions
- Allow the stream to access its floodplain approximately every other year
- Provide a riparian zone that is protective of the stream and provides ecological benefits of an undisturbed natural corridor

Bankfull Flow Estimates

- Estimated as the flood flow with an approximately 1.5 – 2 year recurrence interval
  - 460 cfs at Orodell
  - 600 cfs at Boulder gage
  - 670 cfs at 75th Street
  - 620 cft at Mouth near Longmont
Typical Channel Geometry for Bankfull Flows and Rosgen Type C Stream Type

- Bankfull width ~ 45'
- "Floodprone" width ~ 140' (width at 2x the bankfull depth)
- Bankfull depth ~ 2.5'

Riparian Corridor Sizing

- Not a significant amount of research on “ideal” riparian corridor sizing
- Typical width for water quality buffering protection is 50’ – 200’ from uplands
- EPA generally defines “ideal buffering capabilities” as greater than 50’
- Within the current project area, wider existing riparian areas are on the order of 200’ on either side (this equates to roughly 450 feet total corridor)
- ERC’s initial thought is for an approximately 400 foot corridor
What does this look like from a conceptual level downstream of developed areas within the City?
1) Attendees
- Craig Jacobson, ICON Engineering, Inc.
- Brian LeDoux, ICON Engineering, Inc.
- Matt Wempe, Boulder County Transportation – Regional Trails Planner
- Anne Pagano, Boulder County Transportation – Project Implementation Manager
- Julie McKay, Boulder County Transportation – Planning Division Manager
- Kristine Obendorf, Boulder County Transportation – Project Engineer
- Tim Swope, Boulder County Transportation – Capital Improvements Coordinator
- Mike Thomas, Boulder County Engineer
- George Gerstle, Boulder County Transportation - Director

2) Introductions and Background
Brief introductions were completed by everyone in attendance. Julie provided an overview of the Boulder Creek Master Plan project and approach. This meeting with the Boulder County Transportation department was set up to gather input on potential improvement and restoration alternatives from the group. Other master planning efforts within Boulder County would include the potential for property acquisition along Kenosha Road and coordination with other entities that are completing or planning for improvements along Boulder Creek (i.e. USACE, Town of Erie).

Craig noted that the City of Boulder portion of the master planning effort is for site specific issues, but the Boulder County portion would develop a big picture conceptual plan that would identify immediate needs.

3) Focal Areas
The focal areas within Boulder County pertaining to the transportation group include:
- General channel restoration (optimal channel size and sinuosity)
- 61st Street (Boulder County)
- 75th Street (Boulder County)
- 95th Street (Boulder County)
- US HWY 287 / 103rd (CDOT)
- 109th Street (Boulder County)
- Kenosha Road (Boulder County)
- CO HWY 52 / Mineral Road (CDOT)
- East County Line Road / Weld County Road 1 (Boulder / Weld County)

It was noted that CO HWY 52 / Mineral Road was recently reconstructed by CDOT and has close to the 100-year discharge capacity. US HWY 287 has 100-year capacity and needs to be open for emergency services during a 100-year event.

4) County Bridge and Roadway Criteria
All new Boulder County bridge structures must be able to convey the 100-year discharge. However, the adjacent roadways must be able to accommodate the 100-year event which can include overtopping to a specified depth. The roadway classification dictates the allowable overtopping depth, if allowed at all. ICON will review classifications for all County roads and determine the roadway accommodation requirements for each crossing.
George noted that the criteria for all new bridges to convey the 100-year discharge may not be reasonable given the perched nature of several of the County’s crossings (i.e. not all of the 100-year discharge will make it to the bridge structure given that the floodplain will overlap the roadway at another location). This will be considered for each crossing, however, if a roadway is proposed to remain open throughout the 100-year event (i.e. raise the adjacent road grade above the base flood elevation), then the bridge structure(s) would be proposed to convey the full 100-year discharge.

5) Initial Roadway Improvement Concept

The initial roadway improvement concept of a major bridge crossing along with secondary overbank culverts was presented to the group. The secondary overbank culverts would allow the flood waters in the overbank areas to pass through the roadway without contracting to fit through the bridge structure and then expanding downstream of the bridge to return to the extent of the floodplain. This will reduce discharges and scour adjacent to the bridge crossing and allow for better overbank hydrology and habitat connectivity.

The initial concept would have approximately 60% of the peak discharge passing through the major bridge structure and 40% of the discharge passing through the secondary overbank culverts. The improvement concept would not negatively impact the base flood elevations and would be anticipated to have a maximum velocity of 6 ft/s in the main bridge and 2-4 feet in the overbank culverts. The group was receptive to this conceptual improvement approach.

It was noted that at 95th Street the multiple opening approach is likely to be problematic due to property owners on the downstream side of 95th. It is expected that any channelization or concentration of flows as a result of the secondary overbank culverts would be met with opposition by the property owners. Damage to 95th Street in 2013 was approximately $120K, but time that the crossing was out of operation was excessive.

A prioritization matrix will be developed for proposed roadway improvements. This matrix will include data such as traffic volume data, emergency access needs, existing bridge capacity, existing roadway overtopping depths, county criteria, improvement costs, restoration benefit, and existing bridge condition. This matrix will be used to develop a priority list for all proposed roadway improvements as presented in the master plan.

It was noted that the County may want some roads to be improved above and beyond the County’s criteria. An initial discussion indicated that 61st, 75th, and East County Line Road (Weld County Road 1) would be likely candidates for exceeding the criteria. Julie will email ICON results of additional internal discussion on which roadways are desired to remain passable throughout a 100-year event.

6) Roadway Removal Concept

The concept of removing (or more likely the concept of not replacing when significantly damaged or deemed no longer in usable condition) crossing structures such as Kenosha Road and 109th Street was discussed. The general consensus was that existing crossing structures should not be proposed to be removed (or not replaced). It was noted that both Kenosha Road and 109th Street are close to other crossing structures and serve a low number of properties. For these reasons removal would be expected to have a relatively small impact on traffic use patterns. It was noted that bridge removal and any associated roadway reclamation would be beneficial to channel restoration efforts. Regardless, based on feedback the concept of roadway removal will not be included in the list of master planning alternatives. Dependent on channel restoration design, new locations for bridge structures may be proposed in order to facilitate future restoration efforts and channel behavior.

7) Town of Erie

George noted that the Town of Erie has substantial land use plans for development in the areas near the current boundaries of the Town of Erie. These planning efforts likely include 109th Street and Kenosha Road. ICON and the UDFCD will contact Gary at the Town of Erie to discuss their land use plans and how they may potentially affect restoration and crossing improvements.

8) CWCB Hydrology Update

It was noted that the CWCB is in the process of completing the Phase 2 hydrology updates that would include this reach of Boulder Creek. This information has not yet been made public. Regardless, the master planning effort will not address changes in hydrology. However, selected projects will ultimately have the option to review any new hydrology that is available at the time of the project design work.

9) CO Highway 119

No Boulder County roads exist between Fourmile Creek and the City of Boulder along Boulder Creek. It was noted that CDOT is in the process of designing improvements to make CO HWY 119 more resilient within the canyon area.

- END OF MEETING--
1) Attendees
- Craig Jacobson, ICON Engineering, Inc.
- Brian LeDoux, ICON Engineering, Inc.
- Diane Malone, Boulder County
- Naren Tayal, FEMA
- Katie Knapp, City of Boulder
- Dan Wolford, City of Longmont
- Yge Gao, Boulder County
- Shea Thomas, UDFCD
- Randy Ray, CCWCD
- Mohammed Said, Frederick
- Kristine Obendorf, Boulder County Transportation – Project Engineer

2) Weld County
Contact had been made with Weld County regarding their participation in the master plan process. The County indicated that since much of the proposed improvements would be located on private property that the County will not be involved much in the project. It was noted that the County has provided roadway criteria information.

3) Website Activity
Updated meeting minutes and the initial public meeting presentation has been posted on the project web site. Comments from the interactive comment map have slowed down considerably. The mailing list continues to grow per web site submissions of email addresses.

4) Public Meeting Feedback and Public Outreach
Attendance at both public meetings was very low. Several citizens did provide input via speaking with project team members or submitting the comment cards. Input included concerns about flooding along South Boulder Creek (near the confluence with Boulder Creek), a recycled asphalt/concrete operation in close proximity to the channel, and general concerns about diversions and water right implications.

5) Stakeholder Meetings
Several stakeholder meetings have been completed and the ultimate direction of the master plan has been influenced by the stakeholder desires.

Boulder County Transportation provided direction that not all crossings would need to have 100-year capacity, and instead overtopping of the roadway (outside of the bridge structure) would be acceptable. 61st, 75th, and County Line Road were identified as needing a 100-year capacity (with no overtopping) alternative. The overbank culverts were recommended to be removed and not pursued given the criteria allowing overtopping to occur. Additionally, it was noted that overbank culverts may lead to concentrated flows and result in additional erosion during flood events.

Boulder County Open Space provided direction that a full length restoration effort would be a lengthy process and may not be realistic and recommended that specific projects be identified for restoration in terms of completion in the next 5-25 years.

The City of Boulder has been contacted and specific projects within the City were discussed. Katie noted that bridge crossing within the City should also be analyzed in similar fashion to the bridges in Boulder County, but no bridge replacement projects will be identified.

6) Stream Restoration Approach
The initial stream restoration approaches were reviewed – full restoration; realistic restoration; and a hybrid of the realistic restoration that includes many of the large oxbow areas from the full restoration approach. Following discussions it was recommended that the master plan present the three initial stream restorations but provide recommended projects. Costs will be developed for the recommended projects and those costs will be extrapolated to the full length in order to document the costs of unmet needs along Boulder Creek for County and FEMA budgeting and grant purposes. Restoration projects that are currently in progress will be noted within the master plan (both channel and gravel pit spillways).

7) Project Alternatives
The project alternative maps were reviewed with the project team (see attached maps). The proposed projects were reviewed and the following was noted:
- For the Civic Center / Arapahoe Underpass the projects can be referenced but not further addressed as they are in their own design phase.
- The Boulder Slough project will likely involve a box culver to deliver flows south to Boulder Creek where minor impacts due to increased discharge will need to be addressed. Water right issues and other constraints will be addressed.
- No projects will be presented for bridge crossings within the City of Boulder, however, the City would like to have general data for each bridge crossing similar to what has been developed for Boulder and Weld County bridge crossings.

8) CWCB Hydrology
The CWCB hydrology report for Boulder Creek was reviewed. The project team concluded that discharges presented in the CWCB report should not be used for the alternatives phase of the project but that any selected plan and conceptual design could consider the revised discharge values where higher than the current values.

9) Next Steps
Given the general agreement with the alternatives approach, a draft alternatives report will be produced. Given the current timing of the project, the alternatives report will combine the Weld County, Boulder County, and City of Boulder projects into a single report. Once this report is reviewed and alternatives have been selected, the conceptual design phase will begin.
10) Schedule and Next Meeting

The draft alternatives plan will be completed in approximately 4 weeks. The next progress meeting will be scheduled for after the draft alternatives analysis report is submitted.

-END OF MEETING--
REACH 4:
Location: Mineral Rd
No Improvements

4A:
Modify Gooding A. and D. Plumb Ditch for Aquatic and Habitat Passage

4B:
Location: County Line Rd
Replace Bridge with 180’ Span Bridge
Option: Install 100-Year Crossing

REACH 4:
Bank Stabilization at Re-Use Facility

REACH 4:
Location: DS of Kenosha Rd
Remove Washed Out Bridge

4E:
Location: Kenosha Rd
Replace Bridge with 180’ Span Bridge

REACH 4:
Corps of Engineers Restoration Project (No Improvements)

REACH 4:
Location: US 287
No Improvements

4G:
Location: 109th St
Replace Bridge with 180’ Span Bridge

5A:
Stream Restoration at Alexander Davis Open Space

5B:
Modify Boulder Weld Ditch for Aquatic and Habitat Passage

5C:
Modify Grade Control Structures for Aquatic and Habitat Passage

5D:
Modify Lower Boulder Ditch for Aquatic and Habitat Passage

5E:
Location: 95th St
Replace Bridge with 180’ Span Bridge

6A:
Modify Ligget Ditch for Aquatic and Habitat Passage

6B:
Location: 75th St
Replace Bridge with 180’ Span Bridge
Option: Install 100-Year Crossing

Alternate Stream Alignment

5C (All Markers):
Protect Boulder Valley Ponds Inlet & Outlet During Storm Flows, Typical.

6C (All Markers):
Protect Gravel Ponds/Town of Erie Reuse Pond/Wittemeyer Ponds Inlet & Outlet During Storm Flows, Typical.

5A (All Markers):

5B (All Markers):
Diversion Structure

5C (All Markers):
Diversion Structure

5D (All Markers):
Diversion Structure

5E (All Markers):
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6A (All Markers):
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6C (All Markers):
Diversion Structure
City of Boulder
Wastewater Facility

Modify Diversion for Aquatic and Habitat Passage

Location: 61th St
Replace Bridge with 180’ Span Bridge
Option: Install 100-Year Crossing

City of Boulder Ongoing Restoration Projects
Valmont Rd to 70th St
(No Improvements)

REACH 8:
Location: Valmont Rd
(No Improvements)

REACH 8:
Location: 55th St
(Do Nothing)

8C:
BNSF Railroad
Replace Bridge with 180’ Span Bridge

8B:
Stream Restoration from BNSF RR to 55th St
Hospital Access Improvements for 500-Year Event

8A:
Stream Restoration, 55th St to Valmont Rd

REACH 10:
CDOT Permanent Highway Improvements
(No Improvements)

Boulder Creek Restoration Master Plan
Project Alternatives
April 2015
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**BOULDER CREEK MDP SIGN-IN SHEET**

*Date: March 10, 2015*

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**BOULDER CREEK MDP SIGN-IN SHEET**

*Date: March 18, 2015*

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<td>Scott Strack</td>
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<td>Phone: 303-586-6700, E-mail: <a href="mailto:5strack@comcast.com">5strack@comcast.com</a></td>
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<tr>
<td>Sean Houlihan</td>
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<td>Dave Newton</td>
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Plan for Resiliency for Boulder Creek:

- Multiple Objectives Including:
  - Stream & ecological restoration
  - Immediate impacts and needs
  - Floodplain management
  - Transportation
  - Recreation
  - Public safety

- Collaborative Effort
- Prioritization and Funding

This master plan will provide general guidance for stream and ecological restoration;
This study will not re-evaluate the 100-year floodplain limits
Schedule and Process

- Project Kickoff (Dec 2014)
- Baseline Data (Jan/Feb 2015)
- Alternative Analysis (Mar – May 2015)
- Conceptual Design (June – Sept 2015)
- Project Completion (Oct 2015)

Boulder Creek Watershed

- 440 square miles
- Continental Divide to confluence with St. Vrain Creek
- Boulder Canyon
  - Steep Mountain Stream
- City of Boulder
  - Urban Waterway
- Downstream of City Limits
  - Plains Stream with broad floodplain

Historic Flooding

- Since 1864 – 6 major floods including September 2013
  - 1894 - Produced peak flow rates on main stem of Boulder Creek that exceeded September 2013
September 2013 – Boulder Canyon
- Mountain Stream confined to narrow canyon
- High velocities caused bank erosion undermining roads in number of locations

September 2013 – Boulder County
- Primarily City and County Open Space
  - Restricts future development
- Lack of development prevented substantial flood damages
- Primary problems related to road crossings
- Gravel ponds didn’t provide adequate outlet
  - 95th Street – Overtopping occurred 1,000 feet north of the creek bridge
  - 109th Street – Boulder Creek cut a course through ponds

September 2013 – City of Boulder
- Sewer backups from high groundwater and saturated soils caused extensive damage
- City of Boulder Survey ~ $41.3 million in damages from Boulder Creek

95th Street Overtopping
- 95th Street Overtopping – David Mallory, UDFCD 2013

September 2013 – Weld County & Longmont
- Primary problems related to road crossings
- Reclamation & Gravel ponds didn’t provide adequate outlet
  - 16.5 Road - Overtopping
  - 20.5 Road – Flood flanked bridge through ponds
- Saint Vrain Creek
  - Confluence Shifted

2013 Discharge Frequency
- Although rainfall exceeded 100-yr storm for some areas, peak flows didn’t exceed 50-yr flows.
- Didn’t produce peak flows in the same magnitude of rainfall frequencies due to temporal and spatial distribution

Project Focal Areas
- Project Reaches
  - Canyon Reach
    - Define Restoration needs and Coordinate with CDOT
  - City of Boulder
    - Catalyst for future work
    - Specific locations to evaluate and coordinate
  - City of Boulder through 61st Street
    - Stream restoration & open space
- 61st Street through East County Line Road
  - Stream restoration & open space
  - Transportation
  - Inclusion of access and recreation needs
- East County Line Road through St. Vrain Creek
  - Stream restoration & open space
  - Transportation
  - Saint Vrain Creek confluence

Rainfall-Runoff Analysis for September 2013 Flood in the City of Boulder, Colorado, Wright Water Engineers 2014

Table 1.1 – September 2013 Flood Flow Information for St. Vrain Creek and Major Tributaries Reach of Study

<table>
<thead>
<tr>
<th>Location</th>
<th>100-yr Flood (ft³/s)</th>
<th>50-yr Flood (ft³/s)</th>
<th>Confluence Shifted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle St. Vrain Creek at Boulder</td>
<td>425</td>
<td>345</td>
<td>Yes</td>
</tr>
<tr>
<td>South St. Vrain Creek at Boulder</td>
<td>315</td>
<td>200</td>
<td>No</td>
</tr>
<tr>
<td>North St. Vrain Creek at Boulder</td>
<td>280</td>
<td>190</td>
<td>No</td>
</tr>
<tr>
<td>Boulder Creek &amp; St. Vrain Creek Confluence</td>
<td>1,500</td>
<td>800</td>
<td>No</td>
</tr>
<tr>
<td>48th St. Bridge on St. Vrain Creek</td>
<td>150</td>
<td>100</td>
<td>Yes</td>
</tr>
<tr>
<td>61st St. Bridge on St. Vrain Creek</td>
<td>2,000</td>
<td>1,200</td>
<td>No</td>
</tr>
<tr>
<td>East County Line Road through St. Vrain Creek</td>
<td>3,500</td>
<td>2,000</td>
<td>No</td>
</tr>
<tr>
<td>Stream restoration &amp; open space</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Outreach

- Community involved within planning process:
  - Website Updates
  - Informational Mailing List
- Opportunity for comment and feedback:
  - Interactive Comment Map
    - Accessible through UDFCD or ICON website
    - www.iconeng.com/project/boulder-creek
  - Email: contact.boulder.creek@gmail.com
Objective of Initial Geomorphology and Riparian Assessments

1. Evaluate evolution of channel through recent times
2. Quantify changes in alignment and planform
3. Identify natural channel form to aid in restoration objectives
4. Identify ideal or reference riparian community

Observations from Historic Characteristics

- Stream through the canyon and developed City had historically lower sinuosity than areas downstream from the developed City
- Sinuosity downstream from the City historically was in the range of 1.25 to 1.45 or greater
- Sinuosity has decreased fairly significantly in several locations over time
- Areas with limited development or encroachment exist and should form the basis for idealized restoration reaches
- Active stream width have decreased, with largest decreases observed towards the downstream end of the project. (This may at least in part be a response to diversions and decreased flows)
What is the natural state of the stream?
(Area downstream of N. 75th Street is likely a good example of Boulder Creek functioning in its natural geomorphic state)

- **Type C Stream**
  - Broad valley with terraces, connected to floodplain; riffle/pool morphology
  - Slope < 2%
  - Entrenchment Ratio > 2.2
  - Width/Depth Ratio > 12
  - Sinuosity > 1.2 (1.4 to 1.9)

Riparian Zone
- defined as the transitional area or interface between upland terrestrial and aquatic habitats
- generally considered that portion of the landscape from the ordinary high water mark towards the adjoining uplands that interacts with stream flow
- contains unique and diverse vegetation communities
- integral in stream health and function

<table>
<thead>
<tr>
<th>Runoff Filtering</th>
<th>Aquatic Biomass</th>
<th>Wildlife Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank Stabilization</td>
<td>Aquatic Habitat</td>
<td>Wildlife Movement</td>
</tr>
<tr>
<td>Flood Water Storage</td>
<td>Flood Water Filtering</td>
<td>Shading</td>
</tr>
</tbody>
</table>

Most Probable Natural Rosgen Stream Type for Valley Sections
- **Type C Stream**
- Broad valley with terraces, connected to floodplain; riffle/pool morphology
  - Slope < 2%
  - Entrenchment Ratio > 2.2
  - Width/Depth Ratio > 12
  - Sinuosity > 1.2 (1.4 to 1.9)
What is the natural state of the stream?

(Areas downstream of N. 75th Street is likely a good example of Boulder Creek functioning in its natural geomorphic state)

Ideal Restoration Objectives

- Allow the stream to replicate natural conditions
- No single “correct” alignment as the stream has migrated across a wide valley in response to flow and sediment load as is evident by aerial photos and recent gravel operations
- Create a bankfull channel cross section to contain flows during normal conditions
- Allow the stream to access its floodplain approximately every other year
- Provide a riparian zone that is protective of the stream and provides ecological benefits of an undisturbed natural corridor

Next Steps

- Development of Initial Alternatives
  - March – April 2015
  - Draft Reports Posted Online
- 1st Public Meeting
  - Wednesday, March 18, 2015, 6:30 pm
  - SW Weld County Annex
  - 4209 County Road 24.5
  - Longmont, CO
- More Public Meetings with Subsequent Phases
The Draft Alternatives Report Feedback items were discussed:

2A: Typos & Text Additions
- ICON is in the process of editing the report and addressing all comments. There was great input from the sponsors on the report.

2B/C: Ditch identification and names / Acknowledgment of ditch diversions, goal to maintain them
- Scott will work with ICON to identify the irrigation canals within each reach, which will be included in the report. ICON will provide a listing within the report and need to coordinate future projects with the canal companies.

2D: Acknowledgements of project participants
- The group discussed the inconsistencies for each of the project participants when listing their titles and departments. Julie will provide ICON the correct departments for the participants within Boulder County.
- Shea noted the need to stay consistent with professional designations (P.E., CFM, etc.) whether they are listed for everyone or for no one.
- If anyone would like their professional designation changed from what appeared on the report, they will contact ICON and the report will be updated.

2E: City of Boulder OSMP – Grassland and Ecosystem Management Plan
- Marianne noted ICON should add the Ecosystem plan as a reference to the report

2F: Weld County involvement:
- Shea noted Weld County did review the draft alternatives report. Diana was present at this meeting.
by the flooding are interested in restoring the area, including the president of the water users group, and the home owners association.

Craig explained how this could be the best area for restoration within Weld County besides the confluence with the St. Vrain Creek.

After discussion of the 95th Street area it was decided to apply the same concept with the most feasible alternative in this area. This included restoration through the area including channel work to prevent future breaches but maintaining the existing bridge alignment.

3E/F: 95th St. Restoration

- Craig gave an overview of the area, outlining the perched bridge with the low point along occurring through the pond north of the existing alignment. The alternative report outlined two different possibilities for the area, keeping the existing alignment (with restoration) or realigning Boulder Creek to flow through the pond. Previously 95th Street was not identified as a location for a 100-year bridge alternative to be developed.
- Julie stated there may be a desire for a 100-year alternative to be developed for the 95th Street bridge.
- Craig noted the bridge is relatively new so prioritization for any alternative at 95th Street would be low relative to other areas.
- While the property east of 95th Street was flooded, Marianne did not believe any of their residential structures were impacted by the flooding.
- Shea questioned whether there could be a third alternative where restoration to the creek around the pond is designed but the existing bridge is maintained.
- Marianne asked whether there could be a third alternative where restoration to the creek around the pond is designed but the existing bridge is maintained.
- Shea stated the more feasible design, maintaining the existing bridge alignment, should be carried forward. ICON will investigate restoration opportunities in the area, while maintaining the bridge alignment.

3G: St. Vrain Confluence

- Dan outlined how the confluence of Boulder Creek and the St. Vrain Creek will occur upstream on Boulder Creek. The confluence will now occur where flows breached the embankment during the September 2013 flood, shortening the overall length of Boulder Creek.

3H: Additional restoration from 61st to Valmont

- Craig described how general restoration costs will be added to this reach for grant funding.

3I: Keep or Remove Pond Protection on City of Boulder – Open Space

- The group discussed formalizing the inflow/outflow spillway structure proposed in the alternatives. Marianne states that the City of Boulder Open Space charter is only in favor of restoration, which may include taking down the gravel pit embankment and creating a floodplain terrace in the vicinity of the gravel pits. The spillways will be removed from City of Boulder Open Space and replaced with general stream restoration instead.
The spillways are still applicable for gravel pits residing within Boulder County.

3J: Property owners near South Boulder Creek Confluence
- Craig detailed how an owner on South Boulder Creek would be an interested party to collaborate on a future project. The property owner is interested in dredging the pond on his property and providing an overflow to protect the embankment.
- Craig noted another property owner that had reached out expressing interest in alternatives for Boulder Creek. This property owner was concerned about the floodway associated with the City of Boulder floodplain mapping update residing on his property. While not directly involved in this masterplan since it would only mitigate hazards to the floodway, Craig wanted to inform the sponsors about the interest and determine if an alternative was needed for this area.
- Shea described how there was an existing masterplan for the Boulder Creek and South Boulder Creek confluence. No alternative was needed at this time.

3M: Plan layout – orientation
- The project team discussed the orientation of the alternative maps if there was any confusion or a better way to identify alternatives.
- The project team informed ICON the plan layout was straightforward and did not need any revision.

3N: Anything else
- The recent storms have led to frequent flooding of pedestrian underpasses in the City of Boulder. Katie will pass along the map identifying these areas for general problem ID maps. Craig and Shea will help with the maintenance plan and the potential for treating sediment and alternatives for the flooding.
- Craig inquired about the Civic Center Masterplan and its relationship to this study. Katie noted that it was a separate entity from this masterplan. Craig wanted to inform the sponsors about the interest and determine if an alternative was needed for this area.

4A: Phasing and Schedule for Public Meeting
- Shea described the schedule for the project. ICON will address all comments received from the draft alternative analysis report and submit the final alternative analysis to the sponsors. UDFCD and the sponsors then will create a selected plan for ICON to refine in the Conceptual Design phase noting any differences from the recommended plan.
- The group discussed whether the next public meeting should be held before or after the selected plan was issued. It was decided some of the alternative areas would be drafted by DHM prior to the public meeting to help the public visualize the selected plan.
- Mark described to the project team some of the media channels he has used to get great public involvement in past public meetings. He mentioned social media, sponsors websites, posters in key locations in addition to the mailers. The project team would further discuss strategies to gather public interest for the public meeting at the next progress meeting.

4B: Report Corrections / Formalize Selected Plan
- The public meeting was estimated to be held in 8 weeks.
- ICON will correct the alternative draft report and submit the final alternative analysis prior to the next progress meeting. Conceptual Design sketches will be developed after the next progress meeting, before the public meeting. After the public meeting is held the Conceptual Design Draft Report will be submitted.

4C: Conceptual Design Approach & Focal Locations
- The focal locations will be identified at the next progress meeting.

4D: Prioritization of Alternatives
- Craig described the process of prioritizing the projects that was very success on the Coal Creek Watershed Restoration Masterplan. Each project will be given individual ratings in several different categories creating a weighted average for ease of comparison. Craig will bring an example of the spreadsheet to the next meeting to review with the project team.

-END OF MEETING--

To the best of my knowledge, these minutes are a factual account of the business conducted, the discussions that took place, and the decisions that were reached at the subject meeting. Please direct any exceptions to these minutes in writing to the undersigned within ten (10) days of the issue date appearing herein. Failure to do so will constitute acceptance of these minutes as statements of fact in which you concur.

Minutes prepared by: Jeremy Deischer
ICON Engineering, Inc.

Date
Mark Monger informed the project team that keeping the existing bridge alignment should be a high priority as the existing diversion structure just downstream of 95th Street is very expensive and a high priority for the Lower Boulder Ditch Company. Scott Holwick pointed that while the base flow of Boulder Creek would still be intercepted by the Lower Boulder Ditch, the flood flows would bypass the diversion structure and could be a loss of water opportunity to water rights users downstream. Shea pointed out these flood flows would be conveyed underneat 95th Street instead of overtopping the roadway, and no flows would be diverted from the Lower Boulder Ditch.

Craig inquired about developing parallel conceptual designs for this area to better visualize the proposed alternatives and provide an opportunity of two alternate plans which to be carried forward after the completion of the master plan. Shea expressed concern of having two conceptual designs in the final master plan with the possibility of multiple entities implementing different aspects of the design.

ICON will meet with the Boulder County Transportation Department to clarify what is being proposed in the recommended plan. Any changes to the proposed plan that are developed in this meeting will be reported to the team at the next project meeting.

**Cordry Court**

- When selecting the recommended plan Cordry Court was linked to the Harvest House alternative. The Cordry Court alternative could be implemented separately from the Harvest House with grading of the Boulder Creek overbanks and trail realignment to eliminate the High Hazard Flood Zone located along Cordry Court. Property acquisition was evaluated but not included in the recommended plan due to a low BCA ratio.
- Annie noted that the City generally has interest in acquisition for properties within the High Hazard Zone as a safety measure above and beyond the BCA computations. She confirmed the need to add conveyance by moving the trail away from the creek and that acquisition may help address both restoration in addition to eliminating the High Hazard Zone.
- Craig suggested including the minimum improvement to eliminate the High Hazard along Cordry Court in the Selected Plan but to elaborate in the report that consideration could also be given to property acquisition in the high hazard location to address a life and public safety condition.
- Annie asked for a brief explanation of what was being proposed for the Harvest House alternative
  - Craig detailed the alternative focused on removing the spill flow from Taft Drive by expanding the creek through relocation of the tennis courts and housing structures located along Cordry Court. Property acquisition was evaluated but not included in the recommended plan due to a low BCA ratio.
- Craig summarized the alternatives that had been proposed for 95th Street. At the previous progress meeting the project team discussed maintaining the current bridge alignment since the existing bridge is in good condition which would lead to a low prioritization ranking. Restoration could be implemented upstream of 95th Street to convey flows from the sump location, located north of the bridge, to the existing bridge location. Another alternative could be developed to add additional conveyance at the existing sump conveying flood flows underneath 95th Street with base flows continuing along the existing stream alignment. This alternative would require restoration downstream of 95th Street including property easements or acquisition to convey these flood flows back to the existing alignment.
Weld County / St. Vrain
  - Dan detailed the recent developments of Boulder Creek eroding the left bank further upstream diverting flows into the gravel ponds. Two alternatives were being developed for the St. Vrain / Boulder Creek confluence area. The first alternative would allow Boulder Creek to breach the banks and create a wetland area confluence where the two ponds currently exist. The second alternative would be to restore the eroding banks along Boulder Creek and maintain the existing confluence area. Craig showed the project team a preliminary rendering of the Boulder Creek restoration, which would restore the eroding channel banks in Reach 1. Dan noted his preference is what the rendering showed, by repairing the eroded banks.
  - Shea asked for the existing alignment to be added to the exhibits to see the differences in sinuosity between existing and proposed conditions. Dan will keep the project team informed of any decisions made about the area.

3) CONCEPTUAL DESIGN
  - Craig outlined the seven areas chosen to represent the watershed in the Conceptual Design phase. The existing alignment will be shown on each of the renderings to differentiate between existing and proposed alignment and sinuosity. Shea pointed out these areas may not be the top prioritization for the master plan; they just represent the variety of the projects possible throughout the watershed.

4) PLAN FOR PUBLIC MEETING
  - The team decided the Recommended Plan would be used in the public meeting allowing input from the public before developing the Conceptual Design.
  - The team discussed the Boulder Creek FEMA PMR Open House meeting being held on September 16, 2015. Since this is strictly a floodplain meeting this was a good opportunity to raise awareness for the master plan public meeting, but this meeting would not be used in lieu of the public meeting.
  - The public meeting will be scheduled as soon as possible to allow time for the mailing list to be sent out in advance of the meeting. The seven renderings representing the variety of projects throughout the watershed will be prepared for the public meeting.
  - Shea will schedule the public meeting once a meeting place is agreed upon and notify the project team, tentatively scheduled for the week of September 28th – October 2nd.

5) PRIORITIZATION
  - Craig described the prioritization process based on a weighted grading scale for each project. The weighted categories will differ between each reach to accommodate the priorities for each area throughout the watershed.
  - Annie questioned whether prioritization was necessary given the differences in the proposed alternatives and the multiple entities that would be implementing different aspects of the plan. Shea asked for each prioritization to be separated by community within the report. The prioritization process will be a qualitative assessment between the different alternatives rather than the strict quantitative assessment, such as the one ICON completed on Coal Creek.
  - Kristine suggested the alternatives be grouped into tiers to allow flexibility when choosing the order the implementation order.
  - The group requested the ICON take a first stab at prioritization and the group could comment from that point forward.

6) NEXT STEPS
  - Annie mentioned an upcoming WRAB meeting. Craig noted that he anticipated that the Draft Conceptual Design Report will be finalized before the Water Resources Advisory Board (WRAB) meeting on October 19 by approximately one week. He noted this may not give time to provide the completed draft document to WRAB in an information packet, usually due a few weeks prior. The schedule for WRAB will be discussed further with the City following this meeting.

-END OF MEETING--

To the best of my knowledge, these minutes are a factual account of the business conducted, the discussions that took place, and the decisions that were reached at the subject meeting. Please direct any exceptions to these minutes in writing to the undersigned within ten (10) days of the issue date appearing herein. Failure to do so will constitute acceptance of these minutes as statements of fact in which you concur.

Minutes prepared by: Jeremy Deischer  September 3, 2015
ICON Engineering, Inc.
c) That the controlling jurisdictions take steps to require that permanent BMPs for all new
development, redevelopment, and publicly funded projects provide to the maximum extent
practicable a Water Quality Capture Volume (WQCV) as recommended in the Urban Storm
Drainage Criteria Manual – Volume 3, after accounting for volume reductions achieved
using volume control practices as recommended under Item 1.b above.

d) That jurisdictions having land use control powers in this watershed continue to implement
their floodplain management regulations, including regulation of the 100-year floodway and
floodplain.

Recommend that these jurisdictions adopt a policy, if not already done so, of preserving
the defined floodplains as open spaces to the maximum extent possible and that at least 1-foot
freeboard be provided for the lowest floor above the 100-year flood elevation shown on the
latest flood hazard area delineation or FIRM maps for all human occupied structures built
adjacent to, or within, the defined 100-year floodplains. NOTE: Freeboard requirements in
Boulder County Land Use Code apply for structures that have some portion within the
designated 100-year floodplain (no reference to adjacent).

e) That all jurisdiction having land use control powers in this watershed continue to participate
in FEMA’s flood insurance Community Rating System and public education programs.

2. List on the plan view and profile sheet of the conceptual design, where appropriate, the
recommended wetland mitigations that will be needed to implement recommended improvements,
if any.

3. Using input from stakeholders and the public, work with Sponsors and other affected local
jurisdictions to prioritize the recommended facilities and actions that are listed in the Final
Report and clearly articulate them in that document.

4. Describe the recommended type and schedule of maintenance activities for all improved
facilities recommended in the Final Report.

5. Consider the various functions of all natural waterways in the study watersheds and their
floodplain, including flood conveyance, riparian habitat, open space, aesthetics, recreation,
urban development, water quality, utility crossing, transportation and other features.

6. Acknowledge in the Final Report, that land-use changes to the contributing watersheds affect
the flood hazard nature (i.e., runoff rates, volumes and depths), the transport of sediment, and
the water quality of the receiving natural waterways.

EXECUTIVE SUMMARY

Include an Executive Summary in the Final Report written in plain, non-technical language, which
is directed primarily at the general public and elected officials. This summary should, at the
minimum, contain the following as well as other items listed in UDFCD’s checklist for preparation
of the final major drainageway plan conceptual design report:

1. A brief summary of the planning process including numbers of progress and public meetings.

2. A brief description of the decisions made by project sponsors during this project.

3. A brief summary of all design criteria specifically developed for this plan.

5. A map showing the area and all recommended improvements.

6. Tabular and narrative summaries of costs showing costs for capital improvements, engineering/administrative/contingencies, and land values, all sorted by drainageway, reach, tributary, and by jurisdiction. The reach length (miles), tributary catchment area (square miles), and their totals should also be included in the table.

Incorporate the following notes on each drawing:

“This drawing is for master planning purposes and represents preliminary and conceptual engineering. Alternatives will be considered by local agencies and the Urban Drainage and Flood Control District provided the alternative offers an equivalent intent of the plan, including hydraulic capacity, water quality, stream stability and natural waterway features. The alternative must comply with all requirements of the local jurisdiction and the Urban Drainage and Flood Control District. In addition, there may be State and Federal requirements that will need to be considered and met. This drawing does not provide a final design and shall not be used for construction purposes.”

“Many activities that occur in or affect ditches, drainages, creeks, ponds or wetlands require a Section 404 Permit Authorization from the US Army Corps of Engineers. During preliminary design, and prior to final design or starting work, contact the Corps’ Denver Regulatory Office at 303-979-4120 for appropriate permit authority to avoid compromising and delaying the completion of the project.”

ADDITIONAL DIRECTION

1. Unit costs should be updated to reflect the most current costs available using the UD-MP Cost worksheet.

2. Include an Acknowledgements section listing all participants and stakeholders in this study. Include in the list their name, organization and function in the planning process.

3. Show all maintenance access routes along all reaches. To the extent feasible, the alignment of these routes shall be coordinated with existing and planned recreational trails identified using input provided by Sponsors, special districts and other local stakeholders.

4. Summarize cost estimates of improvements by jurisdiction where those improvements are located, by the reach in which the improvements are located and overall project totals.

5. Report estimated costs for maintenance of all facilities, including detention ponds, storm sewer outfall points, grade control structures, etc. reported in the Final Report.

Meeting Minutes

<table>
<thead>
<tr>
<th>Attendees:</th>
<th>Boulder County</th>
</tr>
</thead>
<tbody>
<tr>
<td>Julie McKay,</td>
<td>Boulder County</td>
</tr>
<tr>
<td>Varda Blum,</td>
<td>Boulder County</td>
</tr>
<tr>
<td>Anne Pagano,</td>
<td>Boulder County</td>
</tr>
<tr>
<td>Dave Webster,</td>
<td>Boulder County</td>
</tr>
<tr>
<td>George Gerstle,</td>
<td>Boulder County</td>
</tr>
<tr>
<td>Shea Thomas (phone),</td>
<td>UDFCD</td>
</tr>
<tr>
<td>Craig Jacobson,</td>
<td>ICON Engineering</td>
</tr>
</tbody>
</table>

1) INTRODUCTIONS

- Introductions of the attendees were made.
- Shea Thomas joined the meeting by phone.

2) 95th Street

- Craig provided an overview discussion for the 95th Street crossing of Boulder Creek.
- Craig discussed the geometry of the 95th Street crossing and flooding aspects experienced in 2013 and for larger storm events. He explained how the existing bridge was perched and due to the low points in the roadway, the bridge itself only passed a small percentage of the 100-year discharge (3,000 cfs of 13,000 cfs).
- Craig noted that the original direction received from the County was that 95th Street did not require 100-year conveyance capacity from a transportation perspective. Subsequently, the County requested that ICON review 100-year alternatives for the area.
- Craig explained that ICON’s current concept alternative incorporated: raising the roadway elevation above the 100-year level; adding a new 100-year bridge crossing; and providing stream restoration both upstream and downstream of 95th Street.
- Stream restoration would follow the topography of the area, extending through the 95th Street pond and across Boulder Valley Farms property where property may be needed.
- With this plan, the irrigation diversion would still follow the current alignment upstream of 95th Street, and flow through the existing bridge.
- At the last progress meeting, Julie noted that the roadway had also nearly overtopped earlier in 2015. Although the master plan does provide a recommendation for an ultimate solution in the area, the County was concerned with more regular flooding that may occur prior. She also noted that implementation of the master plan improvements would take time, given the need for additional property downstream of 95th; coordination with City of Boulder Open Space upstream of 95th, and the fact that the existing bridge was still relatively new.
- END OF MEETING--

To the best of my knowledge, these minutes are a factual account of the business conducted, the discussions that took place, and the decisions that were reached at the subject meeting. Please direct any exceptions to these minutes in writing to the undersigned within ten (10) days of the issue date appearing herein. Failure to do so will constitute acceptance of these minutes as statements of fact in which you concur.

Minutes prepared by:
Craig D. Jacobson   September 20, 2015
ICON Engineering, Inc.
The priority of project 4H (Stream restoration through Doniphan, Wittemeyer Ponds, Bailey-Kenosha Ponds, and Open Space) will be raised to high priority due to the highly erosive slopes in the area.

4H: Kenosha Road Bridge

The priority of Kenosha Road Bridge alternative was discussed. This structure was assigned a high priority by ICON due to the small existing bridge width providing minimal conveyance capacity compared to other roadway crossings. After discussion with the project team, the high priority will be maintained for consistency.

4J: 109th Street

The Boulder County comment asking about removal of the bridge entirely was discussed. The team discussed how the crossing at 109th wasn’t a high priority for access in the area. Craig explained previous discussions with Boulder County led the project team to believe there wasn’t a desire to remove the structure entirely. Shea recommended including text in the report to evaluate the removal of the bridge in the future but maintaining the alternative of improving the bridge structure. The same note about evaluating whether to remove the bridge will be included at the Kenosha Road Bridge alternative.

4K: Stream Restoration through Wheeler Ranch

The team discussed a comment asking to consider making the confluence of Boulder and Coal Creek plans compatible. Craig did not believe the Lower Boulder and Coal Creek Master plan included any recommendations for the confluence of Boulder Creek and Coal Creek. Although improvements to Coal Creek are outside of the scope of this study the project team will review the previous master plans for Coal Creek to verify whether any recommendations were provided for the confluence area.

5A: Alexander Dawson Open Space

ICON will revise the stream alignment on the exhibits to eliminate the meander going outside of the floodplain limits.

5B: 95th Street

The team discussed a comment from Boulder County about the alternate alignment proposed upstream of 95th Street bisecting the pond. Craig described how the full restoration to a natural channel would remove the pond. Marianne added she was in favor of filling the pond to restore the natural floodplain with the alternate alignment. The report does not include a conceptual design for the alternate stream alignment but does include the 100-year bridge crossing as well as a cost estimate for the interim condition design.

5H: Stream Restoration from Upstream of 95th St. to White Rocks Trail

This project will be changed from high priority to medium.

6B: 75th Street

A comment was received from Boulder County questioning the replacement of the bridge. The team discussed the comment and decided to stay consistent with other roadway crossings and not suggest adding any culverts. Increasing the roadway elevation in conjunction with the bridge improvement would remove the low spot in the roadway that currently exists away from the bridge crossing.

7I: Stream Restoration from Valmont to 61st St.

This project will be raised in priority from medium to high priority.

9E: Boulder Slough Diversion

The comment about the Boulder Slough was from Scott Holwick explaining the different ditches that convey flow through the Boulder Slough. ICON will coordinate with Scott after the Boulder Slough has been further explained in the report.

9F: Sediment Maintenance along Boulder Creek

Shea’s comment was wondering if the source of sediment to be removed in project 9F was known. Craig explained his belief was the sediment was carried into the City of Boulder from the canyon as he did not know of any significant bank erosion within the City of Boulder. Katie agreed the source was most likely from the canyon as well as tributary’s entering Boulder Creek as the creek moved downstream towards the city limits. Shea suggested clarifying in the report where the sediment was coming from.

Misc Comments:

UP Rail Trail Alignment

Marianne and Boulder County provided revisions to the description of the UP Rail Trail as well as comments on the figure that will be revised.

Debris Removal around infrastructure guidelines

Boulder County commented if there was a suggested standard or guideline as to distance to infrastructure for a removal zone. Craig explained he didn’t believe there was a good guideline to include in the report as any specified distance wouldn’t account for debris that would be carried downstream into this threshold. Craig noted clarification would be added to the report about the need to inspect these areas for debris around infrastructure.

Stream Centerline Alignment on renderings

Scott provided a comment about the existing stream centerline not being an accurate depiction. The team will coordinate with Scott to clarify and address this comment.

Gravel Pit Spillway Report Clarification

Marianne provided a comment to the clarify the report text that the City of Boulder Open Space and Mountain Parks charter requires the department to restore ecological systems to a natural system. The gravel pit spillways proposed, while alleviating flooding concerns, do not restore the natural floodplain. A section will be added to the report addressing restoration of the floodplain gravel pits is an option although not always desirable since it often requires eliminating the pond.

Description of Previous Reports

Mark Wilcox will add descriptions of the other reports referenced in Section 4.3.

Stream Alignment

Shea asked for clarification regarding the text description of relocating Boulder Creek further west in Reach 3. Craig explained the intent is to add separation between the creek and reservoir by returning the creek to a more historic alignment through the use of an oxbow. The report will be clarified to better explain what is being proposed.
Next Steps:

- ICON will revise the report to incorporate the comments received in the next few weeks.
  Shea noted she planned to present this report for adoption to the UDFCD board on December 19th.

- END OF MEETING--

To the best of my knowledge, these minutes are a factual account of the business conducted, the discussions that took place, and the decisions that were reached at the subject meeting. Please direct any exceptions to these minutes in writing to the undersigned within ten (10) days of the issue date appearing herein. Failure to do so will constitute acceptance of these minutes as statements of fact in which you concur.

Minutes prepared by: Jeremy Deischer
ICON Engineering, Inc. November 19, 2015

BOULDER CREEK MDP
SIGN-IN SHEET
Date: September 16, 2015

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<th>Contact Information</th>
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<td>Don Prince</td>
<td>1605 17th St.</td>
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<td>Yes</td>
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# BOULDER CREEK MDP
## SIGN-IN SHEET

**Date:** September 29, 2015

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<td>Les Williams</td>
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<td>Dan Rogers</td>
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</table>
Boulder Creek Project
2 messages

J. Erik Hartroft, AIA <erik@hapdesign.com>
Reply-To: erik@hapdesign.com
To: contact.boulder.creek@gmail.com

We own property adjacent to the Boulder Creek open space near the intersection of Kenosha Road and 115th Street, just northwest of Erie. I tried to use the interactive map, (Google Chrome browser) but no map or interactive tools were available on the link. Please keep my email on the list for updates. Thanks.

J. Erik Hartroft, AIA, LEED® AP
HARTROFT ASSOCIATES, P.C.
Architecture - Planning - Interiors

950 Spruce Street, Suite 1A
Louisville, CO 80027
p. 303.673.9304
f. 303.673.9319

erik@hapdesign.com
www.hapdesign.com

Lower boulder creek master plan
2 messages

Don Rogers <drogers51@gmail.com>
To: contact.boulder.creek@gmail.com

Are you going to take in any public input before you present the drafts of your master plan? If there is to be public input, at what point is that going to occur?

Thank you.

Donald Rogers

Craig Jacobson <contact.boulder.creek@gmail.com>
To: Don Rogers <drogers51@gmail.com>

Hello Don,
Yes we will be soliciting public input as part of the Master Plan process. We are in process of selecting dates for initial information meetings (likely in early March), and follow up meeting in the months after that. I will add you to the mailing list for when dates and new information is available. Please let me know if there are more questions. Thank you.

Craig D. Jacobson, P.E., CFM
Associate Principal
ICON ENGINEERING, INC.
8100 S. Akron Street l Suite 300 l Centennial, CO 80112
Office l 303-221-0802 l Website l www.iconeng.com

Craig Jacobson <contact.boulder.creek@gmail.com>
To: erik@hapdesign.com

Mr. Hartroft,
Thank you for your interest in the Master Plan. I am sorry the interactive map did not work. Maybe give it another try at a later point. I will add you to the contact list for further updates on the project. Thank you.

Craig D. Jacobson, P.E., CFM
Associate Principal
Boulder Creek Master Plan Comment Response

Hello John Mansell,
Thank you for your comment related to the Boulder Creek Master Plan study. Your comment regarding the home elevation is noted and will be passed on to the County. Please note that the 100-year floodplain represented on the exhibit map was derived from the current FEMA flood insurance study. This master plan study will consider flooding potential, but is not the mechanism to modify current floodplain limits shown on FEMA's mapping. I would suggest contacting Boulder County's floodplain administrator, Varda Blum, vblum@bouldercounty.org with a question you may have regarding how your property relates to the current FEMA flood limits. Please let me know if you have further questions. I will add you to the list for additional communication regarding the Master Plan Study. Thank you.

Craig D. Jacobson, P.E., CFM
Associate Principal
ICON ENGINEERING, INC.
8100 S. Akron Street | Suite 300 | Centennial, CO 80112

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Boulder Creek Master Plan Comment Response

Hello Alan Buelte!
Thank you for your comment related to the Boulder Creek Master Plan study. Your comment regarding the fallen tree will be passed on to the City of Boulder Staff. Please let me know if you have further questions. I will add you to the list for additional communication regarding the Master Plan Study. Thank you.

Craig D. Jacobson, P.E., CFM
Associate Principal
ICON ENGINEERING, INC.
8100 S. Akron Street | Suite 300 | Centennial, CO 80112
Office | 303-221-0802 | Website | www.iconeng.com

Knapp, Katie <KnappK@bouldercolorado.gov>

Thanks, Craig.
Hello Western Disposal Services,
Thank you for your comment related to the Boulder Creek Master Plan study. Your comment regarding the flooding is noted and we will let you know if we need more information. Please contact me if you have further questions. I will add you to the list for additional communication regarding the Master Plan Study. Thank you.

Craig Jacobson, P.E., CFM
Associate Principal
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Office | 303-221-0802 | Website | www.iconeng.com

To what degree does this affect us?

Craig D. Jacobson, P.E., CFM
Associate Principal
ICON ENGINEERING, INC.
8100 S. Akron Street | Suite 300 | Centennial, CO 80112
Office | 303-221-0802 | Website | www.iconeng.com

Given you proximity to the Creek, we welcome your participation and input regarding future planning activities. The master plan may consider future needs and changes to the riverine system as well as adjacent infrastructure such as 75th Street. I will add you to the list for additional communication regarding the Master Plan Study. Thank you.
Hello Bill Jancsko,

Thank you for your comment related to the Boulder Creek Master Plan study. The purpose of the study is primarily to provide planning guidance for Boulder Creek itself. However, your comment regarding the tributary creek is important and will be passed on to the County. I would suggest contacting Julie McKay, jmckay@bouldercounty.org with further question. I will add you to the list for additional communication regarding the Master Plan Study. Thank you.

--

Craig D. Jacobson, P.E., CFM
Associate Principal

ICON ENGINEERING, INC.
8100 S. Akron Street | Suite 300 | Centennial, CO 80112
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Boulder Creek Master Plan Update

Craig Jacobson <contact.boulder.creek@gmail.com>  Thu, Mar 5, 2015 at 9:40 PM
To: contact.boulder.creek@gmail.com
Bcc: robersh@yahoo.com, actuelleit@msn.com, erik@hapdesign.com, Donald Rogers <drgers51@gmail.com>, troutbeet@gmail.com, olymawar@msn.com, stokick@lighlaw.com, 4bless@gmail.com, arthucker@yahoo.com, ds261x@gmail.com, gxuid@yahoo.com, jms569@msn.com, huttonk@bouldercolorado.gov, tex2891@aol.com, Kevin Bowar <kbowar@westenddisposal.com>, Mark Fuller <mark.fuller@centurylink.net>, bjancosko@timepiececapital.com, david@rosewoodconstruction.com, cpark@flatsurv.com

Hello Everybody.

Thank you for your interest and feedback regarding the ongoing Boulder Creek Master Plan Project. Beginning next week, project sponsors will be hosting a series of public information meetings. Details regarding the meetings are shown below, as well as on the project website:

http://www.iconeng.com/project/boulder-creek/

We look forward to seeing you there. Thank you.

Craig D. Jacobson, P.E., CFM
Associate Principal

ICON ENGINEERING, INC.
8100 S. Akron Street | Suite 300 | Centennial, CO 80112
Office | 303-221-0802 | Website | www.iconeng.com
Hello Susan,

Thank you for your email. I'm sorry the interactive map did not save for you. We have not had other public meetings other than the initial meetings. I anticipate that another round of meetings will be forthcoming after the project sponsors have an opportunity to review the current DRAFT report. The DRAFT Alternatives report is now available on the project website: [http://www.icong.com/project/boulder-creek/](http://www.icong.com/project/boulder-creek/) in the deliverable section.

We did incorporate an alternative for the slough in the vicinity of 14th Street, to address the flooding that occurred in 2013. I believe this may relate to your concerns below.

Please let us know if you have other thoughts or questions. I have also relayed this email to Katie Knapp with the City of Boulder. Please look for additional information regarding upcoming meetings or activities via the mailing list.

Craig D. Jacobson, PE, CFM
Principal
ICON ENGINEERING, INC.

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Craig D. Jacobson, PE, CFM
Principal
ICON ENGINEERING, INC.

WE HAVE MOVED TO...

7000 S. Yosemite Street | Suite 120 | Centennial | CO | 80112

OFC 1 303-221-0602 | Web | www.icong.com | Email | cjacobson@iconeng.com

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Craig Jacobson <contact.boulder.creek@gmail.com>

Boulder Creek Master Plan - Draft Alternatives Analysis

2 messages

Craig Jacobson <contact.boulder.creek@gmail.com> Thu, May 28, 2015 at 11:26 AM

To: roberts@yahoo.com, acbuettel@msn.com, erik@napdesign.com, Donald Rogers <drogers51@gmail.com>, Robert McCormack <rmccormack@gmail.com>, olymarx@msn.com, shubick@zillow.com, Button Lee <4bslee@gmail.com>, Arthur Hacker <artheracker4@yahoo.com>, Dave S <dave61x@gmail.com>, gxid@yahoo.com, jms569@mson.com, "Farmers Ditch Co." <hutchon@bouldercolorado.gov>, knappk@bouldercolorado.gov, charles.howe@colorado.edu, averly.ellis@aboodahabia@gmail.com, kim.caflia@surroundarchitecture.com, ash@scottcox.com, linenfelsen@bouldercolorado.gov, roljin@yahoo.com, sajamath@yahoo.com, mark.jordah<mark@conservationconcepts.net>, baylor2000@comcast.net, bradd@cityofwheatridge.com, may@ccwcd.org, dnm247@gmail.com, robert.queen@jacob.com, susan.iott <suiott@hotmail.com>, kvaram@varamcompanies.com, tex201@ad.com, kevin.bowar <kebwow@wesendisposal.com>, mark.fuller<mark_fuller@centurylink.net>, tjanecoski@timepiececapital.com, david.rose@davidrosewoodconstruction.com, cparker@flatsur.com, toddmakecoffee@gmail.com

Hello Again,

Thank you for your past interest and participation in the Boulder Creek Master Plan. We are pleased to announce that a DRAFT Alternatives Analysis Plan is available for review on the project website at:


Please let us know if you have comments. We will continue to communicate with you regarding any upcoming public meetings for the project.

Thank you.

---

Craig D. Jacobson, PE, CFM
Principal
ICON ENGINEERING, INC.

WE HAVE MOVED TO...

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OFC 1 303-221-0602 | Web | www.icong.com | Email | cjacobson@iconeng.com

---

Craig Jacobson <contact.boulder.creek@gmail.com> Thu, May 28, 2015 at 11:34 AM

To: Sheal Thomas <xthomas@ufcd.org>, jmckay@bouldercounty.org, knappk@bouldercolorado.gov, dan.wolford@co.longmont.co.us

Just FYI, I did send this out to our contact list for the master plan, in case anyone gets questions on it, or you wish to forward it on to anyone else.

Thanks
Boulder Creek Mitigation

Katherine Clifford <katie.clifford@colorado.edu>  
Mon, Jun 29, 2015 at 10:59 AM

Hi,

I am teaching a hazards class this summer at CU and was hoping to do a "scavenger hunt" of flood mitigation strategies. I was planning on having them look for:
- caution or information signs
- mitigated roads
- mitigated pedestrian bridges
- raised buildings
- flood walls
- protective berms
- flood water spillways and retention plans
- building relocation
- warning sirens

I was wondering if there was a document that detailed all the different CURRENT mitigation actions on Boulder Creek? I have found documents about new proposed improvements, but less outlining the current ones that could be seen by someone today. Any help of suggestions for this project would be great.

Thanks,

Katie Clifford
Ph.D. Student
Department of Geography
University of Colorado
katie.clifford@colorado.edu

Hi Katie,

Thank you for the email, I will pass this on to some of our agencies working with us on the project and see if they have suggestions that come to mind. Interesting project and learning experience!

Craig

Craig D. Jacobson, PE, CFM
Principal
ICON ENGINEERING, INC.

WE HAVE MOVED TO...

700 S. Yosemite Street | Suite 120 | Centennial | CO | 80112

Craig Jacobson <contact.boulder.creek@gmail.com>  
Wed, Jul 1, 2015 at 7:34 AM
To: katie.clifford@colorado.edu

Hi Katie,

Thank you for the email, I will pass this on to some of our agencies working with us on the project and see if they have suggestions that come to mind. Interesting project and learning experience!

Craig

Craig D. Jacobson, PE, CFM
Principal
ICON ENGINEERING, INC.

Knapp, Katie <KnappK@bouldercolorado.gov>  
Tue, Jul 7, 2015 at 10:43 AM
To: Craig Jacobson <contact.boulder.creek@gmail.com>, Shea Thomas <sthomas@udfcd.org>

I don’t know of a map with this info, but I will contact her to let her know what we have.

From: Craig Jacobson [mailto:contact.boulder.creek@gmail.com]
Sent: Wednesday, July 01, 2015 7:37 AM
To: External-McKay-Julie; Knapp, Katie; Shea Thomas
Subject: Fwd: Boulder Creek Mitigation

[Quoted text hidden]
Boulder Creek Master Plan Update

Craig Jacobson <contact.boulder.creek@gmail.com>  Thu, Sep 10, 2015 at 5:04 PM
To: robersh@yahoo.com, actbueltel@msn.com, erik@hapdesign.com, Donald Rogers <drogers51@gmail.com>,
Robert McCormack <troubrobert@gmail.com>, olynmaw@msn.com, showlck@igIhaow.com, Burton Lee <bsllie@gmail.com>, Arthur Hacker <arthacker4@yahoo.com>, Dave S <ds261x@gmail.com>,
gxid@yahoo.com, jms569@msn.com, "Farmers Ditch Co." <hurston@bouldercolorado.gov>,
knapp@bouldercolorado.gov, Charles.Howe@colorado.edu, Avery Ellis <Abzoodahja@yahoo.com>,
kim.cattau@sumoundarchitecture.com, ash@stcottcox.com, linenfelser@bouldercolorado.gov, rolfin@yahoo.com,
sajama97@yahoo.com, Mark Jordahl <mark@conservationconcepts.net>, baylor2000@comcas.net,
bradd@cityoflafayette.com, Randy Ray <ray@ccwcd.org>, Rausch Eng <dmrv247@gmail.com>,
robert.queen@ae.com, Susan lott <sise@nsp7@hotmail.com>, Gvanta@varcomcompanies.com, David Rose <david@rosewoodconstruction.com>, Chadpetrone@yahoo.com, jimmcowartpe@gmail.com, tex2891@aol.com, Kevin Bowar <kbowar@westerndisposal.com>, Mark Fuller <mark.fuller@centurylink.net>,
bjancosko@timepipecapital.com, carker@flatsurv.com, Todd Straughan <todd@makescoffee@gmail.com>,
jbrodal@transwest.com
Bcc: Shea Thomas <sthomas@udsfc.org>, Knapp@bouldercolorado.gov, jmkay@bouldercounty.org,
Dan.Wolford@ci.longmont.co.us, daungst@ci.weld.co.us, Craig Jacobson <cjacobson@iconeng.com>

Hello,

Thank you for your interest and feedback regarding the ongoing Boulder Creek Master Plan Project. We wanted to inform you of an upcoming public information meeting on September 29th. Details regarding the meeting are shown below, as well as on the project website at:

http://www.iconeng.com/project/boulder-creek/

We look forward to seeing you there. Thank you.

Craig D. Jacobson, PE, CFM
Principal
ICON ENGINEERING, INC.
7000 S. Yosemite Street | Suite 120 | Centennial CO 80112

INTERACTIVE MAP COMMENTS (AS OF 10/20/2015)

COMMENT 1
"Response" : "Email sent 2-6, copied Julie McKay",
"description" : "This feeder creek flooded to within 10 feet of our house. The sewers backed up into all our basements all the way down to the creek. The entire lower end of the golf course turned into one big lake. Will there be any help on this?",
"email" : "bjancosko@timepipecapital.com",
"name" : "Bill Jancosko",
"phone" : "303-931-1025"

COMMENT 2
"Response" : "None Required",
"email" : "",
"name" : "",
"phone" : "",
"title" : ""

COMMENT 3
"Response" : "Email 2-6 Thank you",
"description" : "To what degree does this affect us?",
"email" : "mark_fuller@centurylink.net",
"name" : "Mark Fuller",
"phone" : "303.579.3238"

COMMENT 4
"Response" : "Email Response on 2-6, Copied Varda",
"description" : "This house is outside the 100y flood zone according to USGA. During the flood, water on this side of the creek rose about 12 feet but would have needed an additional 12+ vertical feet to reach this home.",
"email" : "tex2891@aol.com",
"name" : "John Mansell",
"phone" : "3034441237"

COMMENT 5
"Response" : "Email 2-6, Thank you",
"description" : "The flood washed out around the dam on the KOA lake",
"email" : "kbowar@westerndisposal.com",
"marker-color" : "#FFA6A6",
"name" : "Western Disposal Services",
"phone" : "303-210-0972"

COMMENT 6

"Response" : "Email Response on 2-6, Copied Varda",
"description" : "This feeder creek flooded to within 10 feet of our house. The sewers backed up into all our basements all the way down to the creek. The entire lower end of the golf course turned into one big lake. Will there be any help on this?"
"email" : "bjancosko@timepipecapital.com",
"name" : "Bill Jancosko",
"phone" : "303-931-1025"