



## **MEETING AGENDA**

### **Cherry Creek Stabilization Plan**

**Thursday April 22, 2010, 1:30 – 3:00pm at UDFCD**

**Purpose:** Develop an approach to evaluate stabilization measures in the most instable reach of Monaco to Iliff.

**Problem:** Steep cut banks and mass wasting. Need to reconnect channel with the floodplain overbanks.

**Goal:** Develop an Alternatives Analysis approach for integrating drops with bank stabilization techniques. The Approach that is established for this reach will be applied to the entire project corridor for evaluating drop structures and bank stabilization techniques.

#### **1. Hand Outs/Exhibits**

- a. 11x17 plan and profile showing alternatives of small drops versus large drops
- b. 11x17 Figures 1- 4 of cross sections showing raising invert versus large scale bank grading
- c. 11x17 Bank stabilization techniques cost table, cross section and 3 figures of techniques
- d. 90x36 work map at 1"=100' scale of Monaco to Iliff showing topography and jurisdictional boundaries
- e. 90x36 work map at 1"=100' scale of Monaco to Iliff showing landfills and floodplains
- f. 40x24 work map at 1"=300' of HEC-RAS cross section locations
- g. HEC-RAS cross sections every 200' from Monaco to Iliff

#### **2. Considerations for Locating Drop Structures**

- a. *Floodplains* - cannot cause a rise in regulatory Water Surface Elevations
  - i. Developing floodplain model to determine how high channel invert can be raised
  - ii. For now, assume invert can be raised to the existing invert established during 1976 FHAD
- b. *Outfalls* - cannot raise channel above existing and designed storm outfalls
- c. *Property Ownership* – previous studies did not recommend structures on Denver Water property
  - i. UDFCD has approval to complete the necessary channel work
  - ii. No property ownership constraints identified for this reach
- d. *Infrastructure* – protect existing utilities and bridge crossings
  - i. Denver Water will be lowering the exposed 12" water line
  - ii. Xcel gas line crossing upstream of 12" water line
  - iii. Metro already lowered their crossing upstream of Monaco with two new inverted siphons.
- e. *Environmental* – many landfills along channel banks with exposed debris
  - i. Assume excavation can occur with debris hauled to DADS
- f. *Habitat* – protect mature vegetation
  - i. Community outreach important for this reach regarding impacts to trees
  - ii. Identify high value vegetation to be protected
  - iii. Much of the vegetation on Denver Water Board property are low value vegetation
- g. *Access* – drop structures need access for construction and maintenance
- h. *Funding* – UDFCD has limited funding for Cherry Creek improvements
  - i. Many small drop structures would take many years to construct
  - ii. May form partnership opportunities with Denver Water
  - iii. May form partnership opportunities with Cherry Creek Stewardship Partners
  - iv. Maximize the use of previous work to avoid throw-away costs
- i. *Phasing* – consider other programmed work in the area for phasing improvements
  - i. Work with Denver Water now to build improvements in conjunction with their work
  - ii. Large scale earthwork grading will be considered on Denver Water land
- j. *Permitting* – develop a regional plan for 404 permitting
  - i. Consider an individual permit to cover all work proposed over next 10 years
  - ii. Permit to cover Quebec to Iliff at a minimum

**3. Previous Studies (Recommend 31.9 feet of drop)**

- a. Drop 14 – 6.4 feet upstream of Monaco
- b. Drop 15 – 8.7 feet upstream of Pedestrian Bridge
- c. Drop 16 – 8.8 feet upstream of Quebec
- d. Drop 17 – 8.0 feet downstream of Denver Water property

**4. Existing Conditions**

- a. 8200 lineal feet
- b. 0.39% slope (stable slope appears to be 0.30% with mature vegetation)
- c. 31.9 feet of fall
- d. Thalweg elevation similar to 1991 profile (no noticeable degradation or aggradation)
- e. Visible lateral migration

**5. Alternatives**

- a. Drops
  - i. Large Drops - 1991 Master Plan which contains 4 proposed drops ranging in height from 6.4 to 8.8 feet in height plus an existing approximate 11 foot height drop at Iliff.
  - ii. Small/Medium Size Drops – 15 drops ranging in height from 1.5 to 3.7 feet. (Best to start downstream and work upstream, otherwise must toe into existing invert. Consider not raising invert at Iliff since much money was spent on the existing tall drop. Integrate drops with existing channel bottom elevations.
- b. Banks
  - i. A “tool box” of bank stabilization techniques can be used individually or in combination depending on site specifics regarding zone location, severity of slope, and vegetation type.
  - ii. Example cross sections from the Monaco to Iliff reach were shown illustrating the significant difference in bank protection needs for the Small/Medium Drops concept compared to the large drops. Major earthwork to lay back banks or heavy bank armoring to significant heights would be required if the channel bottom elevation is not raised per the small drop alternative.
  - iii. Raising the channel invert with a series of smaller drops may facilitate the use of “softer” bank protection techniques such as Brush Mattresses, Facines and/or Log Cribs.
  - iv. In some deeply incised reaches such as immediately downstream of Iliff, very steep banks in landfill areas may only be protectable in their current form with retaining walls, grouted rock or loose rock riprap.
- c. Meander Planform
  - i. Existing planform is not stable
  - ii. Modification to channel planform to match stable channel geometry
    - 1. Increase wave length
    - 2. Increase radius of curvature
    - 3. Reduce amplitude (belt width)