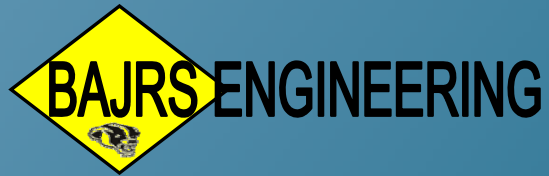


Copper Creek Master Plan

Brent McCrea
Scott Christensen
Amy Holt
Jared Erickson
Robert Ryzska



CE 472 – Senior
Design
April 2012



Overview

Purpose:

1. Develop a master plan that will include:
2. Hydrologic analysis to calculate 100-year flows
3. Proposed alternatives to convey the design flows to 6000 West, taking right-of-way requirements in account.
4. Cost analysis and recommendations of alternatives.

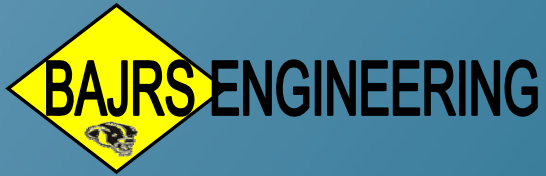
Objective:

1. To provide the following:
2. A final design and alternatives for the project including economic and environmental consideration
3. A poster reflecting a summary of project
4. A presentation summarizing project

Alternatives:

1. No Action
2. Open channel
3. Pipe

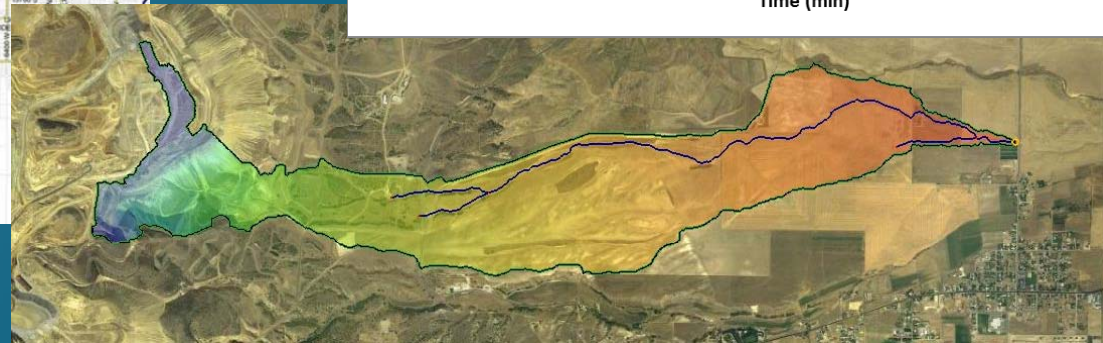
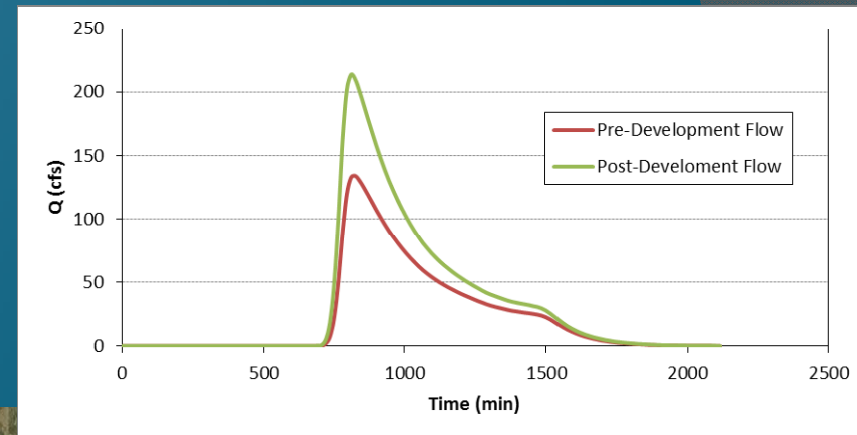
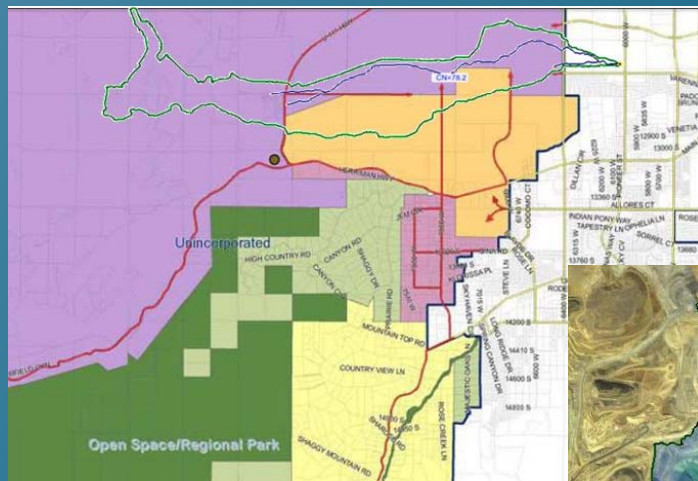


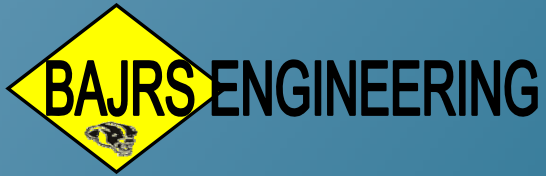


WMS – Hydrologic Analysis

- HMS model was used to predict 100 year storm event runoff
- WMS used to set up HMS model
- SCS Curve Number used as loss method

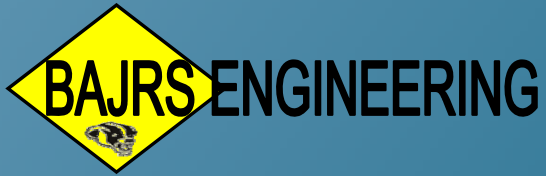
Condition	CN	Q_p (cfs)	Volume (ft ³)
Pre-Development	67.7	134	2883510
Post-Development	73.9	213.6	4141620





WMS – Hydrologic Analysis Cont.

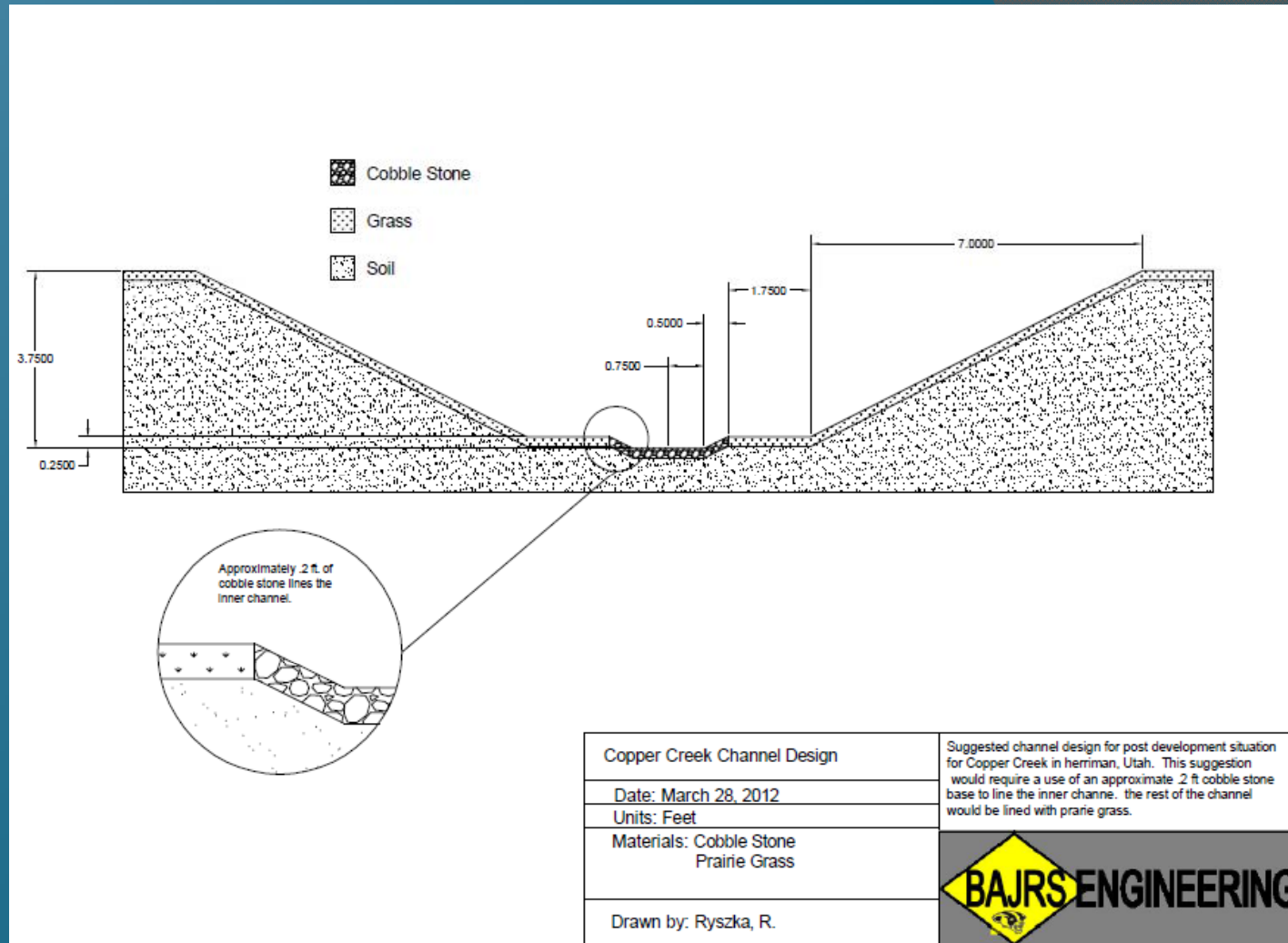


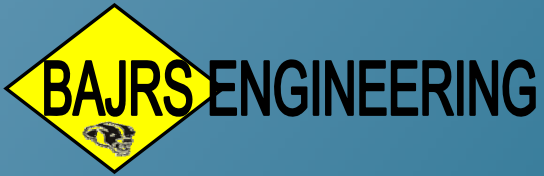


Channel Design

Inner channel
to hold 2-yr
flow; lined with
cobblestones.

Outer channel
to hold 100-yr
flow; lined with
grass.



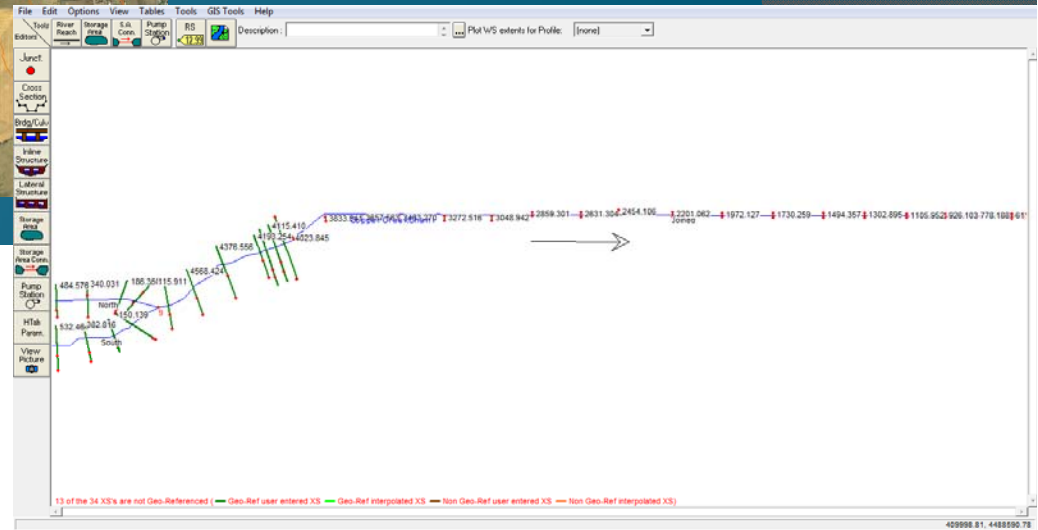
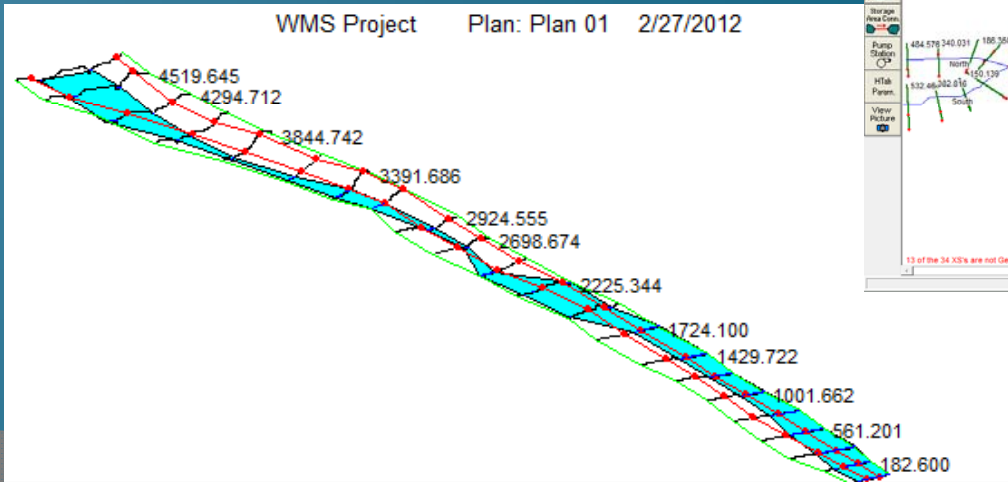


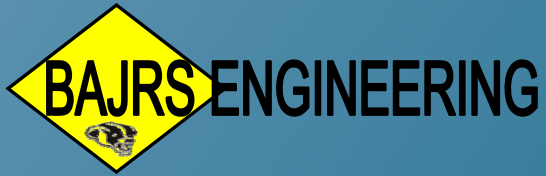
HEC-RAS

Hydraulic Analysis of Natural Channel



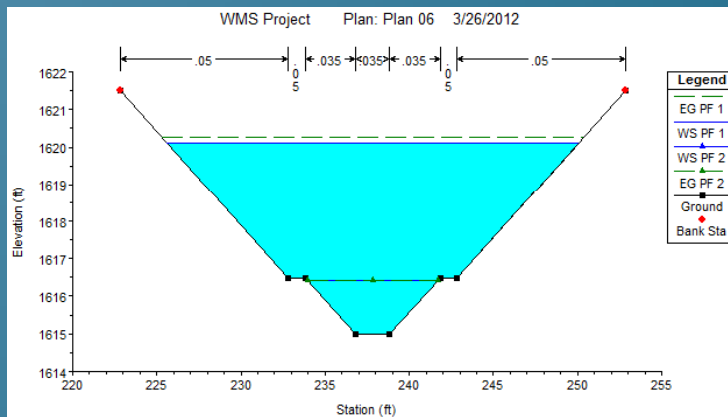
Top Left: Natural Channel in WMS
Right: After X-Sec extraction from WMS
Bottom Left: HEC-RAS model of natural channel flow





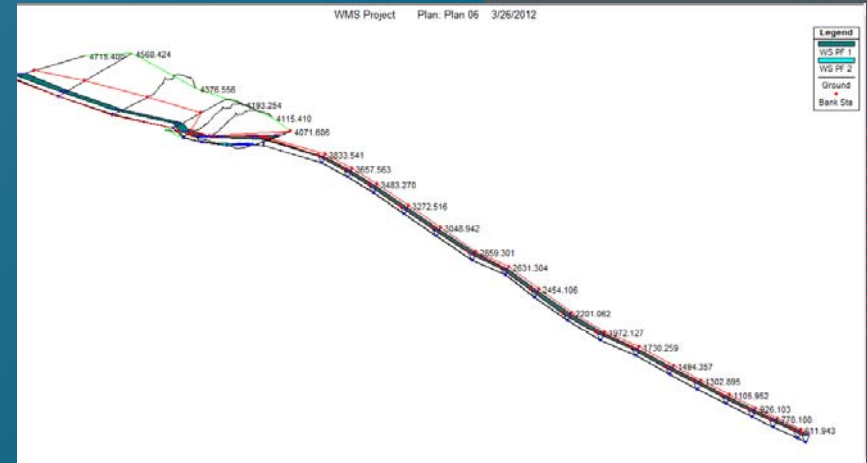
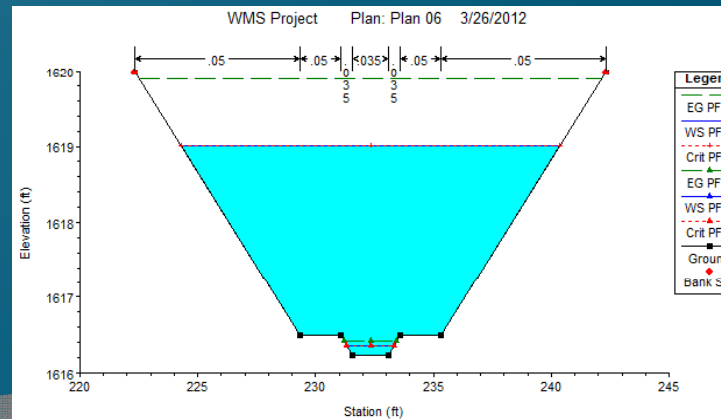
HEC-RAS

Hydraulic Analysis of Designed Channel

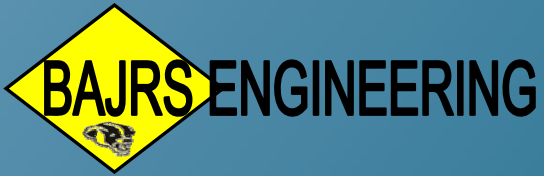


Larger X-Sec due to contraction of channel

X-Sec of main channel

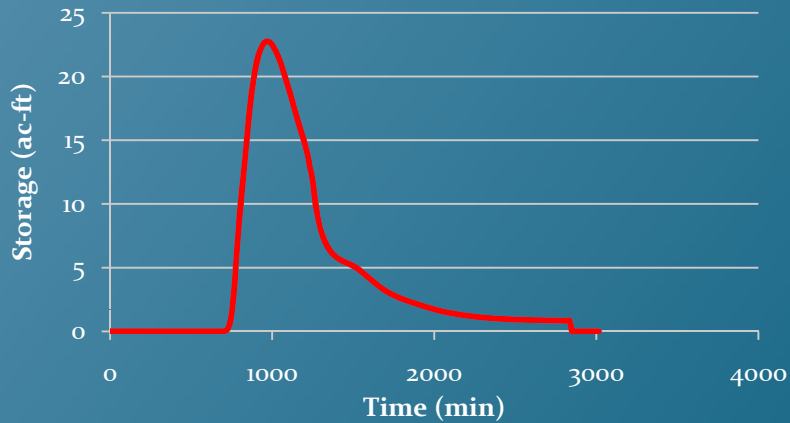


Entire channel after design

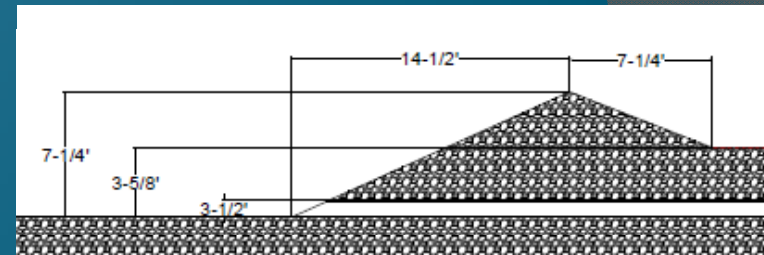
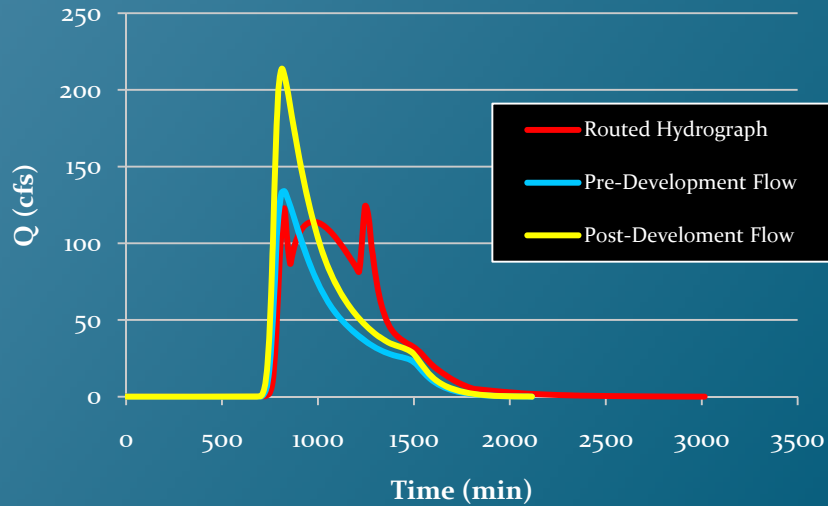


Detention Basin

Detention Basin Storage

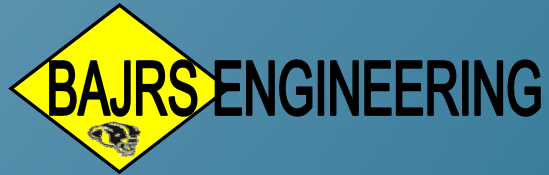


Detention Basin Outlet



Geometry					
Length	Width	Height(req)	Height (design)	Side Slope	
420	340	6.12	7.25	2	

Outlet Pipe	
Diameter (ft)	3.75
Height above Base Elev (ft)	0
Manning's n	0.015
Slope (ft/ft)	0.012727
Orifice Coefficient	0.6
Base Elevation (ft)	4935



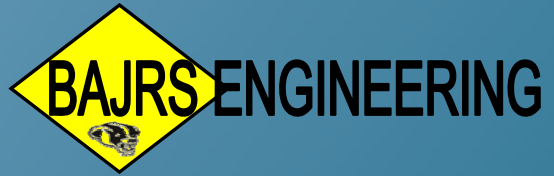
Conclusion

Cost Analysis

- Detention Basin
 - Volume of 991208 ft³
 - Estimated cost of \$288,000
 - Cost includes
 - Excavation
 - Grading
 - All finishing costs
- Open Channel
 - Volume of 138,600 ft³
 - Estimated cost of \$142,000
 - Cost Includes
 - Excavation
 - Site Prep and Survey
- Piped Flow
 - Estimated Cost of \$480,000

Recommendations

- Open Channel
 - Inner Channel to hold 2-yr flow
 - Outer Channel to hold 100-yr flow
- Detention Basin for post-development runoff



Questions?