

Ragged Mountain Dam – Interim Cost Estimate

Original Conceptual-Level Estimate (July 2004).....	\$33,787,000
Original 25% Contingency (Included Above).....	\$6,758,000
Escalated Estimate per USACE (Dams) Index (Escalated to 2010)	\$46,758,000
RWSA CIP Budget (March 2008).....	\$37,890,000
August 2008 Interim Cost Estimate (2008 Dollars, No Contingency).....	\$63,871,000
August 2008 Interim Cost Estimate (2010 Dollars, No Contingency).....	\$71,225,000

Major Cost Increase Factors

1. **Cost Escalation:** Construction materials and fuel costs have experienced very large increases nationwide since the original July 2004 project cost estimate was prepared. (RWSA CIP Budget - \$37.9M vs. USACE Index to 2010 - \$46.8M: ~ \$8.9 Million)
2. **Foundation Depth:** Suitable foundation rock in the valley bottom and slopes is twice as deep (20 ft → ~ 40 ft) as what was assumed for the July 2004 project cost estimate. As foundation depth increases, both excavation-related costs and concrete dam-related costs increase due to quantity increases. (~ \$13.5 Million)
3. **Abutment Areas:** Suitable foundation rock in both the left and right abutments is deep necessitating concrete corewalls in these areas to provide an impervious barrier to prevent loss of impounded waters through natural overburden material which was not originally anticipated. (~ \$11.0 Million)
4. **I-64 Embankment Modifications:** Changes to VDOT policy and staff since 2004 have resulted in additional remediation measures for the highway embankment and thus increased cost. (~ \$4.3 Million to \$15.4 Million)

Potential Project Options

1. **New RMD:** Proceed with the new RMD project as originally planned and adjust the CIP budget for the estimated increased cost. Further design will likely afford opportunities to reduce cost but only to a limited degree. This option should include re-evaluating the SFRR pipeline and pump station costs.
2. **New RMD at LRMD Site:** Evaluate whether or not use of the existing LRMD site is technically and/or financially more favorable for the new RMD and accept temporary loss of the existing Ragged Mountain Reservoir during construction.
3. **Phased or Shorter New RMD:** Construct a phased (allow for future expansion) or ultimately shorter (smaller) new RMD and thus smaller reservoir and accept a shorter immediate planning horizon (< 50 yrs) for water supply or investigate other options to makeup supply shortfall such as dredging SFRR or future raise of new RMD.
4. **LRMD Rehabilitation:** Rehabilitate the existing Lower Ragged Mountain Dam (LRMD) and breach the Upper dam (URMD) to address more immediate dam safety concerns and allow more time to determine best course of action for expanding supply for long term needs.
5. **Re-evaluate 2004 Alternatives:** As a minimum, reconsider James River alternative and/or re-evaluate other select alternatives considered in the 2004 study.

Implementation Strategy

1. **Position Paper:** With the assistance of Bill Ellis, prepare a paper stating the potential impacts to the existing DEQ Individual Water Protection and USACE Section 404 Permits as a result of the significant increase in estimated construction cost for the new RMD alternative. Paper may also want to consider other potential project options.
2. **Regulatory Agency Meetings:** Meet with Dam Safety, DEQ and USACE representatives to apprise them of recent project developments before they are approached by public entities. Discuss potential impacts to the permits relative to current project status.
3. **Information Dissemination:** Develop and implement a strategy to educate the boards, elected officials, and public as to recent project developments.