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June 15, 2005

Mr. Thomas L. Frederick, P.E.
Executive Director
Rivanna Water and Sewer Authority
695 Moores Creek Lane,
Charlottesville, Virginia 22902

Re: Potential Dredging of
South Fork Rivanna Reservoir (SFRR)

Dear Mr. Frederick:

Rivanna Water & Sewer Authority (RWSA) is currently considering alternative concepts for expanding its water supply system. There are four concepts currently under consideration and one of those is dredging the SFRR to increase water supply storage. During the public comment meetings on these concepts, held in the fall of 2004 and spring of 2005, unsolicited proposals and expressions of interest in conducting the dredging and managing material disposal or use were received. A related idea was also presented to use the dredged sediment as fill for the proposed Runway 21 Extension at the Charlottesville-Albemarle Airport. Gannett Fleming (GF) has investigated these ideas and proposals, as requested, to the extent of rendering a professional opinion as to how these proposals might substantively alter the findings and recommendations in Gannett Fleming's December 1, 2004 Technical Memorandum entitled *Concept Development – Dredging the South Fork Reservoir (SFRR)*. This letter summarizes that review.

Background

The above referenced Technical Memorandum summarized the anticipated quantity of sediment to be removed to achieve an estimated increase in safe yield of 5.5 MGD, discusses parameters for accomplishing sediment removal and disposal, provides an order of magnitude range of estimated project cost for removal and disposal of sediment, and provides potential environmental impacts associated with this concept. This memorandum summarized key findings of this concept for comparison with the other three "short list" water supply concepts and provides much of the supporting documentation necessary to select a preferred water supply alternative under federal and state regulations.

The original design volume of SFRR was reportedly 1,700 million gallons (MG); including 1,250 MG of useable storage (for water supply purposes) and 450 MG of dead storage. Sediment accumulation has decreased these volumes to a currently estimated 1,155 MG; including a useable storage of 800 MG and dead storage of 355 MG. By the

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end of the planning period (2055), total storage is projected to decrease linearly to 400 MG including 200 MG of useable storage and 200 MG of dead storage.

Approximately 450 MG, or 2.2 million cubic yards (M CY) of useable storage has been lost to-date due to sediment accumulation since SFRR construction in 1966. An additional 600 MG (or 3.0 M CY) of useable storage is projected to be lost to sediment accumulation between now and the end of the planning period (2055).

Preliminary available sediment gradation data indicates a wide range of grain size. Completed dredging investigations assume that there is 50% sand and 50% fines and the material is not hazardous. It is likely that some portion of the sediment is mostly sand, some is mostly fines, and some is a mixture.

Dewatering of the material could occur at very different rates and may result in variable density of dry material. In addition, dewatered material that is loaded in a truck will "fluff" (increase in volume), then must be recompacted in a structural fill and may result in variable in-place volumes. No attempt to quantify these variables was made, and the in-place SFRR sediment volumes were used for the purposes of calculating transportation cost. Variations in disposal volume would simply result in small changes in stacked height and should have no impact to the amount of land needed.

Dredging quantities are projected in the referenced December 1, 2004 memorandum. Generally, there is approximately 2.2 M CY of material that would result from SFRR if completely dredged at this time, and another 3 M CY of material that could result from future sedimentation and dredging over the next 50 years.

Proposals received

In May 2004, Blue Ridge Sand, Inc. submitted an unsolicited proposal to RWSA for dredging a select portion of the SFRR. Since that proposal contains competitively sensitive information, no details are included in this evaluation. Since RWSA was not seeking proposals and had not budgeted for such a project, no action was taken. In the spring of 2005 as public meetings were held on alternative water supply expansion projects, Blue Ridge Sand, Inc. again expressed interest in dredging SFRR. Several communications provided some detail on potential approach but many technical and logistical issues remain.

Another private entity known as Dock Doctors, Inc. also submitted a very brief proposal to perform dredging at SFRR.

Proposal Review Comments

None of the proposals are sufficiently detailed to allow long-term feasibility to be confirmed for the volumes of sediment necessary to achieve the safe yield goal. None of the proposals established a higher degree of certainty in cost over time when compared to the December 1, 2004 Technical Memorandum, and none of them disclosed marketability in adequate detail. Many additional details must be identified and discussed to fully understand the methods proposed and potential cost. Primary issues include: specific site

identification for dewatering facilities, haul roads and disposal sites; material reuse purpose and quantity; contract period; required permits; financial stability of the company and its partners; and financial safe guards for RWSA to enter into such an agreement. See also related General Comments below.

It is important to note that if dredging is to be used to achieve the 5.5 MGD safe yield goal, an implementation plan must assure that all classes of sediment are removed, not just the sediment that is most easily marketed.

Potential cooperative benefit with Airport

At the request of RWSA in February 2005, GF contacted Jim Nixon of Delta Airport Consultants about the potential use/disposal of dredged SFRR material at the Charlottesville Albemarle Airport. Delta Airport Consultants is the consulting engineer assisting the Airport with expansion planning. GF prepared a data package related to accumulated sediment in SFRR and submitted to him in late February/early March. We asked Delta to identify any conditions that would be imposed if the airport were to accept this material. In May 2005, Mr. Nixon provided an email response. Paraphrased summary comments include:

1. Current airport plans include the need for 1.5 to 2.0 M CY of suitable embankment material (engineered and compacted fill material) for a runway extension project. Any material used as fill for this project must meet Federal Aviation Administration stringent (FAA) density requirements. The construction is planned for 2009/2010.
2. Large lay-down areas are needed so the soils can be dried. Material must be within 2 % of optimum moisture content during placement and compaction (a stringent requirement).
3. Typically sandy material is good fill material and silty clays are not.
4. Additional sampling to determine acceptability of the material may be required with regard to potential hazardous material content in the sediment.
5. The airport has no room for depositing material that is unsuitable for engineered fills unless current Albemarle County and US Army Corps of Engineer waivers for wetland and stream buffers are secured. Such waivers are not likely for this purpose.
6. The airport is currently paying \$9 to \$17 per CY for suitable embankment material.
7. A considerable amount of additional sampling and testing is required to assess what portion (if any) of the dredged material is suitable as embankment material.

General Comments

To aid understanding of these issues and consider the impact on current RWSA water supply expansion plans, GF provides the following comments related to dredging SFRR and use/disposal of the material.

1. Any dredging project performed by a contractor would require a formal agreement with RWSA. In essence, RWSA would be relying on the approach, technical experience and judgment of the private entity. Such a contract would include performance and maintenance bonds to guard against risks and provide

protection for RWSA. It is likely to be difficult for long term bonds to be posted, especially in large sums of money; consequently, it may require several years of contract experience to begin to understand the long-term resource commitment associated with a dredging program.

2. As a public body, RWSA must competitively bid any project considered and therefore, can not accept an unsolicited proposal. Current Commonwealth of Virginia regulations allow local municipal agencies to adopt regulations that provide for procuring contracts under conditions that consider "best value" criteria other than a responsive low-bid. If RWSA is interested in this process, it should seek legal counsel on the process.
3. Approximately 2.2 M CY of material has accumulated in SFRR. An additional 3.0 M CY is projected to accumulate over the next 50 years. Planning a project for removing the currently accumulated material may be possible. There are numerous uncertainties associated with the future sediment accumulation and potential dredging that can not be accurately estimated at this time.
4. It is probable that only a portion of the existing sediment may be useable as embankment material at the airport. If for instance, as much as 30% of the currently accumulated material (2.2 M CY) were useable, approximately 0.7 M CY would be available for embankment at the airport. This is about one-third to one-half of the projected need for the airport project. It is highly unlikely that sufficient useable material exists at SFRR to provide the entire amount of material needed by the airport in 2009/2010.
5. If most or all of the accumulated material must be dredged to make 0.7 M CY available. The remaining 70% still requires disposal. The airport has indicated it can not be disposed of at that location.
6. Assuming the airport is willing to pay for this material at their current rates stated above; the value could be as high as \$6M to \$12 M. However, to meet the tight FAA specifications for structural fill, the suitable structural fill material would have to be separated from the unsuitable material in the sediment after it is removed from the reservoir. These "gradation" costs, including the testing costs for quality control, would be in addition to the costs provided in the Technical Memorandum for dewatering and transportation. As a result, most of what the airport would pay for the material would not be net revenue, because it would be offset by added processing costs.
7. A decision to serve the airport with structural fill from dredged spoil would also likely have adverse consequences on water rates in the short-term. In the Technical Memorandum it was discussed that 0.1 M CY could be removed annually over 50 years and would achieve the water supply goal. However, to provide the airport approximately 0.7 M CY (based on 30% suitable for structural fill) by 2009/2010 might require up to 0.45 M CY per year to be dredged between 2006 and 2010. This necessitates a larger dewatering facility adjacent to SFRR, or more advance dewatering operations, and would burden the RWSA's capital improvement fund at the same time that large expenditures for the repairs to the Ragged Mountain Dam would also be mandated.

8. If hazardous constituents are identified in the sediment, removal and reuse or disposal may become significantly more complicated and costly or even prohibitive.
9. In March 2005, Gannett Fleming issued an opinion that any water supply alternative that might include the concept of Dredging South Fork Rivanna River Reservoir is disproportionately expensive when compared with other practicable and environmentally-acceptable alternatives.
10. None of the current unsolicited proposals offer sufficient evidence that this recommendation should change.

Recommendation

After reviewing the unsolicited dredging proposals, as well as the feasibility of dredging sediment from the SFRR for the airport expansion runway project in 2009/2010, there remain a number of uncertainties that continue to lead to a probable conclusion that dredging as a water supply alternative would likely be logistically difficult and disproportionately expensive. Specific to the use of structural fill at the Charlottesville/Albemarle airport, it could provide some revenue, much of which would be offset by additional preparation and processing costs. In addition, it would "front load" more expenses in the first 5 years of a 50-year program in a way that would be adverse to RWSA's financial planning.

Gannett Fleming continues to conclude that future discussion of the costs and benefits of dredging as a program for the SFRR would better serve the community if studied in the context of maintenance of the reservoir, considering water quality, recreational, and aesthetic objectives, as opposed to water supply objectives. Since this letter summarizes the feasibility of the proposals named above only for water supply purposes, further studies would have to be done to consider other objectives. If the community remains interested in dredging the SFRR as a concept, a wider consideration of all the community's objectives for SFRR should be explored to determine if dredging has a legitimate role in the reservoir's future. It would be recommended that this wider consideration be explored before acting favorably toward the use of dredged spoil at the airport, or toward any other dredging proposal.

I trust this review provides sufficient information to guide RWSA on this matter. Please contact me if you would like to discuss the commentary provided.

Sincerely,
GANNETT FLEMING, INC.



AARON D. KENO, P.E.

Vice President
Fairfax Office Manager