

REQUEST FOR PROPOSALS

DAM BREAK INUNDATION ZONE STUDY AND MAPPING

West End Reservoir Dam

Town of Woodstock, VA

The Town of Woodstock, Virginia is requesting proposals from engineering firms to perform Dam Break Inundation Studies and prepare Inundation Zone Mapping for the town's West End Reservoir Dam. **ALL PROPOSALS MUST BE RECEIVED BY 4:00 P.M. SEPTEMBER 23, 2011.** The town is not responsible for delays in the delivery of the mail by the U.S. Postal Service, private couriers, or inter-office mail system. It is the sole responsibility of the offeror to ensure that its proposal reaches the town by the designated date and hour. Facsimile and email submittals are not acceptable.

I. BACKGROUND

The Town of Woodstock is requesting proposals for the development of dam break inundation zone mapping and incremental damage analyses for Little Stony Creek downstream of the town's reservoir. The reservoir, located in Shenandoah County approximately 4 miles north of Columbia Furnace, is a concrete dam that is over 30 ft high. The dam was constructed in 1957-1958 and impounds approximately 18 million gallons of water. Its spillway discharges to Little Stony Creek. The reservoir was constructed to supply drinking water to the Town of Woodstock, and while it no longer supplies water to the town, it still poses risks should the dam fail. The dam is currently rated as a Hazard Class 1 and appears in DCR inventory as number 17104.

A number of homes have been constructed along Little Stony Creek downstream of the impoundment. Many of these homes originally served as seasonal recreational housing, but in recent years more year round residents have been observed living in the homes.

The town has been awarded a grant from the Virginia Department of Conservation and Recreation (DCR) to assist with accomplishing this project. All work methods and products must comply with DCR standards, specifications, and requirements.

PROJECT DESCRIPTION

The Project shall consist of the development of an engineering analysis and report for WOODSTOCK RESERVOIR DAM, to be approved by the Department of Conservation and Recreation as meeting all standards of the Virginia Soil and Water Conservation Board's Virginia Impounding Structure Regulations (4VAC5 0-20).

II. SCOPE OF SERVICES

The scope of services is generally described in the following sections.

Field Investigation

The consultant will visit the site along with DCR and town representatives to ascertain the location of the dam as it relates to upstream and down stream hydrology. All primary and secondary roads, bridges down stream of the dam will be investigated. Any residence that may be in an inundation zone directly below the dam will be noted for later investigation.

Field Survey

The consultant will provide field surveying as required to supplement available mapping. Based upon review of the site and review of the modeling requirements, the following dam information and x-sections will be required.

1. Dam profiles from natural ground to natural ground
2. Dam x-sections at the widest point from water surface to toe of dam
3. Emergency spillway profiles from water surface to top of discharge point
4. Invert of outlet pipes and toe drains
5. X-sections at road crossings to include:
 - 100'+/- upstream of roadway
 - Toe of slope upstream and downstream of roadway
 - High side or centerline profile of traveled surfaceA minimum of three x-sections and sketches of downstream bridges.

Dam Inundation Zone Data Collection

The consultant will conduct a watershed assessment of the upstream and downstream drainage areas and collect field data required for hydraulic analysis and flood routing.

The information obtained from field assessment will be used to:

1. Determine field survey locations
2. Verify drainage areas and flow paths
3. Verify the presence or absence of structures that may be located within the inundation zones.

This data will be used in conjunction with mapping obtained from various sources such as USGS Topographic quad maps and GIS mapping provided by the Virginia Geographic Information Network.

Hydrologic and Hydraulic Analysis

A dam break analysis using an approved hydrologic/hydraulic computer model shall be conducted. The modeling effort must conform to the intended use of the chosen

computer model. Mixing the criteria of one procedure, listed in 4VAC50-20-320 (Acceptable design procedures and references) with criteria from another procedure, unless otherwise mentioned, is prohibited. Some computer models that are acceptable include HEC-1, HEC-HMS, HEC-RAS and the NWS Dambreak. Other computer models may be used if approved by the DCR Division of Dam Safety and Floodplain Management prior to submitting the results to the Town and DCR Regional Engineer. Present and planned land-use in the dam break inundation zones for which a development plan has been officially approved by the locality shall be considered when conducting the dam break analysis.

The consultant will develop a hydrologic model for the contributing watershed. The discharges generated from the watershed model will be routed through existing outlet structures to evaluate non-breach discharges and the associated water surface elevations within the impoundment. The hydrologic model will also include an analysis for the watershed that contributes flow within the inundation zone and for any watershed that contributes flow to the downstream channel that may affect upstream water surface elevations.

Breach Analysis

Based on survey and field data, breach model parameter values will be developed in order to generate breach discharges and create inflow hydrographs for downstream routing. Specific breach parameters values, such as failure time, will be optimized. Once these parameters are established, breach analysis will be performed as per the DCR Dam Safety Regulations:

As a minimum, the following shall be reflected using an approved hydrologic/hydraulic computer model:

1. Sunny day dam break with the starting water surface elevation at the normal or typical water surface elevation of the impounding structure.
2. Dam failure during the required spillway design flood.
3. An overtopping failure shall be modeled if the emergency spillway is unable to pass the spillway design flood without overtopping the crest of the dam.
4. A piping failure shall be modeled if the emergency spillway has enough capacity to pass the required spillway design flood without overtopping the crest of the dam.
5. Routing the spillway design flood through the dam without any failure.
6. Dam failure during the Probable Maximum Flood.

Mapping and Inundation Limits

Topographic information that shows at minimum five-foot contour elevations shall be used to develop the hydrologic/hydraulic computer model downstream of the dam. The consultant must develop reliable cross sections to input into the computer model. If

adequate topographic information is not available, the consultant must provide an alternative method, such as field run cross sections, for identifying potential damage locations that must be approved by the Town and the DCR Regional Engineer, prior to initiating the evaluation. Topography may be a component of the submitted inundation map; however, map clutter must be avoided. If the topography is not submitted on the inundation map, a copy of the topographical information used shall be submitted with the engineering analysis and paper copies of all hydrologic and hydraulic computer model runs to the Town and DCR Regional Engineer.

The consultant shall use sanctioned engineering criteria and sound professional judgment for the worst case storm conditions in the selection of:

- a. Dam failure parameters
- b. Rainfall distributions
- c. Flood routing procedures and coefficients
- d. Use of available topography and supporting field surveys
- e. Development of SCS Curve Numbers
- f. Development of spillway rating curves and area-capacity curves
- g. Determination of the Time of Concentration and/or lag time
- h. Other steps used during the modeling and analysis of flood conditions in the watershed and downstream of the impounding structure.

The judgments and the engineering criteria used by the consultant shall be reviewed and approved by the Town and DCR Regional Engineer for appropriateness. The Town and DCR Regional Engineer will provide specific guidance and/or recommendations via written correspondence should the judgments or the use of the engineering criteria be determined to be inappropriate.

The computer model shall be extended to a point downstream of the impounding structure where the water surface elevations of the spillway design flood with and without dam failure converge to within one foot of each other or to a point at which the Probable Maximum Flood with a dam failure creates a possible damage to a structure, whichever is the farthest downstream.

The map lines delineating the inundation areas shall be drawn in such thickness (solid, dashed or dotted lines in black) to identify the inundation limits as the main feature of the map. The lines shall not obliterate the location of houses or features which are shown as being inundated. Identify the appropriate scale and show the north arrow on each map sheet.

Inundation maps may have color in the background and shall be at a scale where impacted structures downstream may be clearly seen. Avoid color-coding of the inundation lines since the maps will often be copied on black and white reproduction

equipment. If the inundation area is too large to be shown on one map, an index map shall be included which shows the full extent of the inundation area and the outline of the detailed maps with an identifier for each map sheet. Impacted structures (homes, businesses, roads, utilities, etc) shall be clearly shown and if cross-hatching is used it must not obscure the structures. Inundation maps shall not be produced in a size larger than 11" by 17" and the final size must be folded to a size of 8" by 11". The inundation maps shall be submitted to the Town and DCR Regional Engineer electronically in a Windows compatible image format and as a set of paper maps. Acceptable digital image formats consist of JPEG, TIF, BMP, GIF, PNG, or EMF files. Adobe software constructed PDFs are also acceptable. Image resolution should be sufficient to view and read the necessary information noted above.

A narrative describing the accuracy and limitation of the information supplied on the inundation maps shall be provided to the Town and DCR Regional Engineer. Since local officials are likely to use the maps for evacuation purposes, the following note shall be attached to each map: "Mapping of flooded areas and flood wave travel times are approximate. Timing and extent of actual inundation may differ from the information presented on this map."

Hazard Classification

The consultant will develop the Hazard Classification for the impounding structure from the results of the Hydrologic and Hydraulic Analysis and field survey information. This classification will establish the required Spillway Design Flood (SDF) for the dam as required in Table 1 of the DCR Dam Safety Regulations. The determination/verification of the hazard classification is the key factor in determining the complexity of the Breach analysis, Incremental Damage Assessment (IDA) and the limits of inundation mapping. The hazard potential classification shall be proposed/verified by the consultant and shall be subject to reclassification by the Virginia Soil and Water Conservation Board, upon review of the information submitted by the Town and the Town's engineer, and any pertinent information regarding potential impacts downstream of the dam caused by a failure of the dam.

Incremental Damage Analysis

The consultant will perform an Incremental Damage Analysis (IDA) to possibly reduce the required Spillway Design Flood (SDF) based on the results of the Hazard Classification and the Breach Analysis. The analysis will determine if the required SDF can be reduced. If the IDA reduces the required SDF then the Breach Analysis task will be repeated with the new SDF value. The results from this analysis will be documented and included in a separate report. In the event the IDA is not applicable, or flood waters are great enough to negate an IDA, the engineer shall state so in the inundation report.

Inundation Report

As an end product, the consultant will provide four copies of a written report providing a summary of the findings and project mapping. The report will be presented in a three-ring binder complete with inundation mapping and selective supporting calculations. The report will include the results of the breach analysis and all of the parameters discussed above. A CD of the report, complete with reproducible inundation maps and flood routing data, input and output, shall be submitted with each report.

III. SCHEDULE

Engineering Proposals shall be received by the town no later than **4:00 P.M. SEPTEMBER 23, 2011.**

All work must be completed and the final reports and mapping submitted to the town within 12 months from the date of the engineering agreement or September 2012, whichever occurs first.

IV. PROPOSAL CONTENTS

Proposals should be as thorough and concise as possible so that the Town may properly evaluate the capabilities of perspective firms to provide the required services. Offerors are required to submit the following items for a complete proposal:

- a) A statement of the offeror's understanding of the work to be performed, and a listing of any tasks the offeror is not proposing to provide.
- b) Information about the offeror's background and experience relative to the services being requested by the town.
- c) A listing of previous clients that may be contacted as reference, for whom the engineer has provided similar services. The engineer must have a minimum of two (2) projects of similar size and complexity that have been completed within the last five (5) years. Include customer name and contact information with telephone number.
- d) Information as to the organizational structure and technical expertise of the firm with emphasis on the project manager, the technical resources available to that project manager, and the project manager's availability. Experience in working with the DCR Dam Safety program should be described.
- e) Agreement to carry Professional Liability Insurance in an amount not less than \$1,000,000/\$2,000,000, and offer a minimum of \$2,000,000 excess liability

insurance umbrella, or such other insurance as is satisfactory and may be approved by the town. All insurance coverages shall be written by companies licensed to do business in Virginia, shall be administered by a Virginia registered agent, and shall ensure prior written notification to the town prior to cancellation of the policy.

IV. SELECTION CRITERIA

To be considered for selection, the firm must submit a complete response to this Request for Proposal. Failure to submit all information requested may result in the rejection of the incomplete proposal.

An authorized representative of the offeror's firm shall sign proposals. Four (4) copies of the proposal must be submitted to the Town of Woodstock prior to the proposal deadline. Each copy of the proposal should be bound in a single volume. E-mail and facsimile responses are not acceptable.

The following criteria will be used in evaluating the responses to this RFP:

- a) Firm's experience with similar projects.
- b) Experience of the project manager with similar projects
- c) The firm's ability to deliver economical and effective services that adequately support the town with accomplishing this project.
- d) Track record for completion of previous projects on schedule and on budget.
- e) Experience with the DCR Dam Safety program.

The town will enter into a contract with the successful offeror for those services described herein. The town reserves the right to negotiate with the successful offeror for items/services other than those specifically stated in this RFP which in the best interest of the town and agreed to by the firm. The selected firm will be compensated for services in accordance with the payment schedule agreed to by the firm and the town.

V. REJECTION OF PROPOSALS

The town reserves the right, at any time prior to award of the contract, to reject any and all proposals, or any part thereof, to make no award, and/or to issue a new Request for Proposal, or make modifications, corrections or additions to the information contained herein.

VI. COSTS FOR PROPOSAL PREPARATION

Any costs incurred by offeror in preparing or submitting proposals are the offeror's sole responsibility; the town will not reimburse any offeror for any costs incurred as a result of the preparation of this Request for Proposal.

ETHICS IN PUBLIC CONTRACTING

By submitting their proposal, all offerors certify that their proposal is made without collusion or fraud and that they have not offered or received any kickbacks or inducements from any other offeror, supplier, manufacturer or sub-contractor in connection with their proposal, and that they have not conferred on any public employee having official responsibility for this procurement transaction any payment, loan, subscription, advance, deposit of money, services or anything of more than nominal value, present or promised unless consideration of substantially equal or greater value was exchanged.

ANTI-DISCRIMINATION

By submitting their proposal, offerors certify to the Town of Woodstock that they will conform to the provisions of the Federal Civil Rights Act of 1964, as amended, the Virginia Fair Employment Act of 1975, as amended, where applicable and Section 2.2-4311 of the Virginia Public Procurement Act.

1. During the performance of this contract, the contractor agrees as follows:
 - a. The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The contractor agrees to post in conspicuous places, available to employees and the applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
 - b. The contractor, in all solicitations or advertisements for employees placed by or on behalf of the contractor, will state that such contractor is an equal opportunity employer.
 - c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.
2. The contractor will include the provisions of the foregoing paragraphs a, b and c in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

Dam Break Inundation Zone Study and Mapping RFP

West End Reservoir Dam

Page 9

Larry Bradford
Town Manager