

SCOPE OF SERVICES

The selected Consultant will be required to provide some or all of the following services for each Task Order (TO):

The basic services to be performed include four elements 1) underwater acoustic surveying and land surveying, 2) underwater dam inspection, and minor maintenance and repairs 3) structural inspection and evaluation of dam and 4) assist DOTD in the preparation of drawings and bid documents:

A. UNDERWATER ACOUSTIC SURVEYING AND LAND SURVEYING

The scope of work consists of providing highly specialized high definition acoustic surveys of open water areas beneath and adjacent to dams, standard land surveys and the preparation of a Survey Report. It is anticipated that the majority of the work for any given Task Order will be covered under this element.

Acoustic Surveying Equipment Requirements

The acoustic equipment shall be a multi axis, steer beam imaging and profiling remote sensing system as manufactured by Kongsberg-Mesotech, Ltd, or DOTD approved equivalent. All acoustic data shall be correlated to a Real Time Kinematic (RTK) GPS positioning system and adjusted for vessel motion in heading, pitch and roll.

- Utilize underwater acoustic imaging system to scan the underwater vertical faces of the dam structure on each side.
- Scan the water bottom out to 500' from the dam vertical faces both in the lake and down stream.
- Investigate any sink holes observed or abnormalities with in close proximity of the acoustic inspection.
- Perform profile scans across any abnormalities to determine and map relief.
- Perform bathymetric profile survey of the water bottom through both the lake side and downstream side approaches to the dam structure.
- Perform profile scans of any observed sink holes or cavities, access permitting.
- If a dam gallery is encountered and found to be flooded or partially flooded, the flooded portion will be examined using the underwater acoustic imaging and profiling system, access permitting, and again imaging the vertical and horizontal faces and profiling abnormalities as dictated by the imaging results.

High Definition Scan

Perform High Definition Scan (HDS) of concrete dam structure above water line at the time of survey. On site control monumented with three permanent deep rod bench marks for 3D stability. Features of the dam structure shall be gathered using HDS techniques with survey data relative to Louisiana state plane coordinate system, North Zone, in US survey feet.

- HDS will be used to complement traditional surveying services to provide a 3D point cloud of data along the project corridor. Provide a surface model for design and hydraulic/structural analysis. The submittal will include a 3D model of the concrete dam structure along with traditional topographic map.
- HDS scanning shall be performed for the entire length of the dam structure. Concrete and steel features will be included in the scan data.

Horizontal Control

- Perform reconnaissance for, recover, and verify National Geodetic Survey (NGS) primary horizontal control (NAD 83) monuments within the vicinity of the project for datum check and qualification.
- Establish on site, in a secure location, three (3) permanent deep rod monuments (DRM) set to refusal.
- Compare and or constrain static GPS results obtained from the DRM to NGS monuments and results obtained through the On-line Positioning User Service (OPUS) maintained by the National Geodetic Survey.
- Set secondary horizontal traverse control at intervals not to exceed 1,000 feet for the project length.
- This effort includes: researching control data, GPS mission planning, data processing, traverse computations, field note reduction, and crew supervision.

Vertical Control

- Perform reconnaissance for, recover, and verify primary vertical control (NAVD88, 2004.65).
- Use differential leveling and or GPS techniques to establish vertical control on the project DRM and temporary benchmarks (TBM's).
- Set TBM's of a stable setting, set at intervals not to exceed 1000 feet for the project length.

Deliverables

Consultant shall provide four copies of the Survey Report describing the survey methodology employed in the field, including but not limited to, control, any calibrations, equipment used, a summary of all anomalies located, etc. Maps shall be stamped and signed by a surveyor licensed in the State of Louisiana, under whose direction the work was performed.

The survey report should contain the following:

- The results of the field survey and location of all anomalies.
- A set of drawings including a plan view showing all survey lines and transects, anomalies, and table listing coordinates of each anomaly.
- Sheets showing all cross sectional diagrams.

- A hard copy of the data sets.
- A copy of the field notebook records.

The drawing files shall be in MicroStation 2004, Version 8 (*.dgn) format. The plan view(s) shall be overlain in the Lambert Conformal Conic Projection, Louisiana State Plane Coordinate System South Zone, NAD83. Also include a table with benchmark locations (in State Plane and Geographic coordinates) and elevations (NAVD88) on which the survey is based. Show the state project name and number on all drawings.

Consultant shall provide four digital copies of the following electronic files (on separate CD disks):

- Complete Survey Report in pdf format.
- One full set of all survey drawings at a one to one scale in MicroStation 2004 and pdf formats.
- All data sets listing all points with horizontal coordinates (northings, eastings), corresponding elevations including all stations, PI's, survey transects and break lines and feature codes. Features shall be shown as break lines or cells and labeled in the drawing. This file listing shall be stored in a comma delimited ASCII format.
- Topographical and bathymetrical map drawing of upstream and downstream of any water control structure in MicroStation and pdf formats.

B. UNDERWATER DAM INSPECTION, AND MINOR MAINTENANCE AND REPAIRS

Underwater contractor (Contractor) shall perform both underwater and above water inspections of the dam and make adjustments to all underwater and gallery gates. In addition to the gate inspection, Contractor will also provide underwater inspection services to investigate any acoustically observed holes/anomalies identified in the acoustic survey.

Underwater Contractor shall perform a “general condition survey of 100% of the surface area both above and below the waterline on the upstream and downstream sides of each dam structure. In addition, if required, adjustments to all structure gates are to be performed.

Inspections

Contractor shall provide underwater inspection, evaluation, and remediation of all gates and water conveying structures. Contractor shall perform a visual inspection of all gates, both above and below the waterline, verify alignment of gate stems, stem guides, and actuators, inspect gates and frames for any damage, previous repairs, corrosion of steel surfaces, jacking/anchor bolts, thrust blocks, thrust block nuts, wedges, concrete anchors, and other components.

Contractor will provide a self contained dive vessel, dive inspection crew, and inspection apparatus to effect further investigation of any acoustically observed holes near the dam. Contractor will probe any designated holes and correlated features on both the upstream and downstream side of the dam. The inspection diver will determine the depth of any open holes and if there is any sediment backfill occurring. Where applicable, Contractor personnel will investigate the areas inside any dam gallery for evidence of sediment deposits adjacent to any observed holes. Contractor will also provide and inject dye (red approved for potable water) into the upstream holes for the purpose of evaluating leakage downstream.

Video and Still Photography Inspection observations will be obtained by utilizing surface supplied divers with video and two-way voice communications. Contractor will also include Remotely Operated Vehicle (ROV) at each site in the event an area is deemed impractical for diving. Both mediums will incorporate a high-resolution color digital video camera and will allow topside personnel to simultaneously view the inspections. The recorded information will also include; permanent video overlay annotation of the structure number, location, date, defect numbering to correspond with database; voice recordings of the diver; and inspection personnel giving details and measurements of findings.

The diver's video camera will be a low light fixed focused helmet mounted system incorporating a minimum 550 lines of resolution. Two helmet lights with a minimum of 500 watts of output will be utilized. The lights will be positioned and adjusted to compensate for the possible light absorbing effect of suspended particulate in the water. Refraction of light will cause the iris of the camera to close and reduce the field of view and quality of image. The camera lighting will be tested and adjusted, if necessary at each inspection location to assure the best imagery is obtained. This is critical in enabling proper condition assessment and comparison during re-inspections of suspect and damaged areas.

A.'Level I' general inspection and "swim-by" by the diver or imaging by sonar to generate a general visual assessment of the condition of the exposed areas of the gates, guides, seals, adjacent concrete surfaces, and tailrace toe. This phase of the inspection is designed to identify and locate any major damage or deterioration. Structure cleaning would not be required for this portion of the inspection.

B.'Level II' detailed investigation of selected areas of each location to identify signs of deterioration, such as corrosion, loss of section, missing or damaged steel components, concrete spalling, exposed reinforcement, structural damage, scouring, undermining, or any other sign or indication of a compromised structural integrity. To perform this phase of the inspection the structures must be cleaned of biofouling or corrosion or other surface adherents that would obscure the identification of structural issues. Additional data such as; Ultrasonic thickness, pit depth, and coating thickness (if applicable) measurements of critical components would be obtained. All information would be recorded and presented in a database format along with visual description of the observation provided on digital video and still images.

Field Recordings and Data Processing

Contractor shall provide a high tech video recorder which incorporates a 1 GHz host processor board with Wavelet compression capability to document all underwater inspections. This will allow all images to be downloaded and viewed on a computer for viewing or annotation and also for emailing of video clips. The video recording equipment should also allow obtaining high quality still images. This enhanced detail will be very beneficial during analysis and evaluation of potential defects during post process and during future inspections. Typical video inspections produce hours of raw video tape, observer logs, and readouts from associated instruments and sensors. Contractor's data collection system will consolidate logs, instrument readings, video images, and more into a single database. Defects will be numbered and their Images stored as digital computer file that will be linked with all other inspection data. Historical data and video images can then be quickly recalled for comparison with the current conditions.

Contractor shall have the ability to obtain data and to make proper assessments during real time data collection. Suspect areas will be reviewed during post processing video and still imagery with interpretations will be shared with the DOTD before draft and final reports are submitted. Reports shall include recommendations for repairs, maintenance, and operation procedures for any gate.

Gate Cleaning and Adjustments

All gates and associated hardware shall be thoroughly cleaned using appropriate above and below water equipment.

Once the gates have been cleaned, inspected, and determined to be in satisfactory condition, the divers will attempt to adjust the top, side, and bottom wedges at each gate. This work will be performed to allow for proper seating of the gate disc. A complete site safety review will be conducted before divers are directed to adjust gates.

In addition, adjustment and realignment of the stems and stem guides shall also be performed both above and below the waterline. This may incorporate drilling and installation of new anchor bolts and shims. In addition, stainless steel bolts will be maintained onsite to replace damaged or deteriorated gate anchor and wedge bolts.

Deliverables

Contractor shall submit a draft Underwater Inspection Report to the Prime Consultant and DOTD within 10 working days after the completion of field operations. The final report shall be submitted to the Prime Consultant and DOTD within five working days after receipt of comments.

C. STRUCTURAL INSPECTION AND DAM EVALUATION

As part of the on-going operation and maintenance of the dams under its jurisdiction, the DOTD desires to have its dams inspected by a qualified independent consultant. The independent consultant as used herein refers to the lead dam safety engineer who will have overall responsibility for the structural inspection. Representative experience submitted to qualify for selection shall include the experience of the independent consultant and any other staff that may be required.

The scope of work consists of performing consulting engineering services which include structural inspections of dams, reviewing reports and preparing Dam Evaluation Reports.

Qualifications

The independent consultant shall demonstrate expertise in inspecting and evaluating dams of all types, including earth, rockfill, concrete gravity, concrete buttress, and combination. The independent consultant shall have a minimum of 10 years of experience in the analysis, design, inspection, and evaluation of dams. The independent consultant shall demonstrate experience in working in the state of Louisiana and knowledge of the DOTD's Dam Safety Rules and Regulations. The independent consultant shall be a licensed professional engineer in the state of Louisiana and hold a current license from the Louisiana State Board of Registration for Professional Engineers and Land Surveyors or shall demonstrate the ability to acquire registration in Louisiana.

Inspection

Prior to the field inspection, inspection reports, instrumentation records, project modifications, drawings, and other available information shall be reviewed.

A field inspection of the project shall be conducted. The inspection shall include all accessible features of the project, including embankments, concrete sections, spillways, galleries, and intakes. Particular attention should be given to detecting evidence of leakage, erosion, seepage, instability, undue settlement, displacement, tilting, cracking, deterioration, and improper function of drains and relief wells. The adequacy and quality of maintenance and operating procedures as they pertain to the safety of the dam and operation of the control facilities should also be assessed.

Photographs and drawings should be freely used to record conditions in order to supplement and support written descriptions.

The field inspection should include review of the following:

- Concrete structures including concrete surfaces, structural cracking, movement – horizontal and vertical alignment, junctions and tie-ins with abutments and/or embankments, drains – foundation, joint, and face drains, water passages, seepage or leakage, monolith joints, construction joints, foundations, etc.

- Embankment structures including settlement, slope stability, seepage, drainage systems, slope protection, etc.
- Spillway structures including control gates and operating machinery, unlined spillways, approach and outlet channels, stilling basin and energy dissipation, etc.
- Outlet works including intake structure, operating and emergency control gates, conduits, water passages, etc.
- Drawdown facilities including safety and performance instrumentation, reservoir, downstream channel, operation and maintenance features, etc.

Deliverables

Consultant shall submit a draft Dam Evaluation Report to the Prime Consultant and DOTD within 20 working days after the completion of all field operations. The final report shall be submitted to the Prime Consultant and DOTD within 10 working days after receipt of comments.

The report will encompass information learned from the pre-inspection review and will report the results of the field inspection. The content of the report should include, but is not be limited to, the following:

- Executive Summary (Significant Findings)
- Description of Project Features
- Summary of Construction History, Operations, and Modifications
- Geologic and Seismic Considerations
- Instrumentation
- Field Inspection
- Structural Stability
- Spillway Adequacy
- Adequacy of Maintenance and Methods of Operations
- Conclusions
- Recommendations
- Certification

D. PREPARATION OF DRAWINGS AND BID DOCUMENTS FOR DAM MAINTENANCE

If after DOTD's review of the Acoustic Survey Report, Underwater Investigation Report and Dam Evaluation Report, DOTD deems maintenance of the dam is required, the Consultant in cooperation with the DOTD shall prepare construction drawings, technical specifications and a complete bid document for such work. The Consultant shall have experience in projects requiring earthen fill placement, rip rap placement, pressure grouting voids beneath concrete structures such as sills, concrete patch work, repair and

replacement of construction joint seals, repair of metal gratings and other steel structures, gate and hardware replacement, painting, etc.

Deliverables

Consultant shall provide four hard copies and four electronic copies of the final Bid Document, containing construction drawings, technical specifications and bid tabulation. The drawing files shall be in MicroStation 2004, Version 8 (*.dgn) format and a complete document provided in pdf format.

SUBMITTAL REQUIREMENTS

One original (**stamped original**) and four copies of the SF 24-102 must be submitted to DOTD. **Copies of the required certification card (indicating the date of expiration), must be included in the SF 24-102.** All submittals must be in accordance with the requirements of this advertisement and the Consultant Contract Services Manual. Any Consultant/Team failing to submit any of the information required on the SF 24-102, or providing inaccurate information on the SF 24-102, will be considered non-responsive.

Any Sub-Consultants to be used, including Disadvantaged Business Enterprises (DBE), in performance of this Contract, must also submit a SF 24-102, which is completely filled out and contains all information pertinent to the work to be performed.

The Sub-Consultant's SF 24-102 must be firmly bound to the Consultant's SF 24-102. In Section 9, the Consultant's SF 24-102 must describe the **work elements** to be performed by the Sub-Consultant(s), and state the approximate **percentage** of each work element to be subcontracted to each Sub-Consultant.

Name(s) of the Consultant/Team listed on the SF 24-102, must precisely match the name(s) filed with the Louisiana Secretary of State, Corporation Division, and the Louisiana State Board of Registration for Professional Engineers and Land Surveyors.

The SF 24-102 will be identified with State Project No. **700-99-0459**, and will be submitted **prior to 3:00 p.m. CST on Monday, May 5, 2008**, by hand delivery or mail, addressed to:

Department of Transportation and Development
Attn.: Mr. Edward Wedge, III, P. E.
Consultant Contract Services Administrator
1201 Capitol Access Road, **Room 405-T**
Baton Rouge, LA 70802-4438 or
Post Office Box 94245
Baton Rouge, Louisiana 70804-9245
Telephone: (225) 379-1989