



DATA SHEET
Agenda Item No. 15.A.

Meeting Date: April 5, 2018

Agenda Item:

Consider approval of agreements for professional services for Lake Ralph Hall:

- A. Contract and Task Order No. 1 with Freese & Nichols, Inc. related to design of the Dam & Spillway for Lake Ralph Hall.

Placement:	<input type="checkbox"/> Consent	<input checked="" type="checkbox"/> Individual Consideration	<input type="checkbox"/> Executive Session
Vote:	<input type="checkbox"/> Non-Weighted	<input checked="" type="checkbox"/> Weighted Capital	
Recommending Department: Engineering & Construction			

Background:

On May 5, 2016 the District approved a contract and Task Order No. 1 with CH2M Hill Engineers, Inc. (CH2M) for planning and for the start of preliminary design services for development of Lake Ralph Hall. A key element of work under this task order was to review the conceptual design for the dam, spillway, outlet works, and stabilization of the North Sulphur River channel downstream of the Leon Hurse Dam. Freese and Nichols, Inc. (FNI) was engaged as a sub-consultant to assist CH2M in the evaluation and refinement of the original conceptual design. This evaluation was completed and the Water Supply Committee was briefed on August 31, 2017.

At last month's Board meeting FNI presented an overview of the conceptual design and informed the Board the next step would be to proceed with further development of the preliminary design.

Staff has negotiated a proposed Contract and Task Order No. 1 with FNI to perform the following tasks:

- Geotechnical field investigation and Data report
- Hydraulic design of the dam and spillway and Final report
- Physical model study
- Evaluate local soil borrow sources near the site, and
- Development of a 30% Preliminary Design Package

The cost to perform the work identified in Task Order No. 1 is not to exceed \$2,047,795.00.

Financial:

Funding for the Lake Ralph Hall project is included in the Regional Treated Water System FY 2018 Capital Budget with project number 5RH. This funding was received in December 2015 from the Texas Water Development Board through the SWIFT deferred payment program.

Recommendation:

Staff recommends approval of Contract and Task Order No. 1 with Freese & Nichols, Inc.

Enclosures:

1. Task Order No. 1.
2. The proposed contract is a standard District professional services agreement and is not enclosed. If you would like a personal copy of the contract, please contact Kurt Staller.

Submitted By:



Kurt Staller, Acting Director, Engineering and Construction

Date: March 30, 2018

Freese and Nichols, Inc.

ATTACHMENT A-1

Task Order No. 1

This Task Order is part of the AGREEMENT between Freese and Nichols, Inc. (the "ENGINEER"), and Upper Trinity Regional Water District (the "OWNER"), for a project generally described as:

DESIGN OF THE LEON HURSE DAM AND SPILLWAY

The purpose of this Task Order is as follows:

ARTICLE I SCOPE OF SERVICES

The ENGINEER agrees to furnish the OWNER the following specific services:

BASIC ENGINEERING SERVICES

Basic Services for task order #1 will include the preliminary hydraulic, geotechnical, civil, and structural design of the various components of the project in a manner consistent with that configured in the Conceptual Design Report and described below. Preliminary design is defined as approximately 30% completion of the overall project as described below the facilities will generally include:

- Approximately 13,000-foot-long zoned earthen embankment dam with a top elevation of about 565 feet and a maximum height of about 100 feet. The dam will include:
 - The use of materials from required excavations and borrow areas within the reservoir
 - Positive seepage cutoff for the dam and the foundation through a combination of open cutoff trench and a soil bentonite slurry trench
 - Internal filter and drainage system for the embankment, including combinations of an internal sand chimney filter drain, finger drains, blanket drain, and/or a toe drain and collection system
 - Erosion protection, including a soil cement surface on the upstream face and grassing on the downstream face, plus miscellaneous erosion protection in the embankment groins and adjacent to the low flow outlet system and the spillway
- An uncontrolled service spillway located on the south side of the river, consisting of an approximately 140-foot-wide, 8 cycle reinforced concrete labyrinth weir on a roller compacted concrete (RCC) foundation with a concrete chute and stilling basin for energy dissipation and an armored exit channel that allows flood discharges to be returned to the river channel. The spillway structure is estimated to include a 20' wide 2 span bridge over the spillway crest.
- An uncontrolled emergency spillway, consisting of an earthen open cut channel approximately 1,700 feet wide at about elevation 555.6, or just above the 100-yr flood. The emergency spillway will discharge into Baker Creek. Potential

erosion concerns during engagement will be addressed during design. No improvements to Baker Creek channel are anticipated.

- A pump station intake and low flow outlet structure with gates to be designed for flows that will meet downstream release needs as well as the maximum capacity of the pump station. The gates will have trash racks and a stop log system. The intake structure will be designed with dual chambers and will consider measures to facilitate maintenance of the screens to reduce zebra mussel infestation. Treatment of the screens or chemical facilities are not anticipated or included. The pipes from this structure will be part of the service spillway RCC foundation and will allow for low flow releases to the downstream channel as well as connect to the pump station. The intake and pipes will also be used for passing flows during portions of construction. The design will terminate at an agreed upon location on the pipe between the downstream vault and the pump station.
- Channels and structures for flow diversion during construction of the dam including details for needed construction sequencing. Detailed design of the needed coffer dams will be the responsibility of the contractor.
- Improvements to about 7000 feet of the downstream channel that will consist of about 10 feet of fill in the channel, a structure upstream of FM 904 to return the flows to the original channel, and a grade control structure for the south mitigation channel, which will be designed by others. This will include design of a stable pilot channel with vegetation and possible small in channel grade control structures in a manner consistent with the requirements of the needed mitigation from the 404 permit.
- Design will consider constructability, regulatory compliance and long term maintenance of the embankment, spill way, low flow outlet and appurtenances.

This scope of services is based upon the following assumptions:

1. Earthen embankment, principal spillway, emergency spillway, and low flow outlet will generally be as described above but some modifications may occur.
2. The design of the intake structure will be coordinated with the design of the pump station, which will be performed by others.
3. The preliminary design efforts will be coordinate with the other ongoing project related efforts being performed under separate agreements by separate design or planning teams. These will be coordinated through regular program level meetings.

4. The design of the channel improvements will include coordination with the designer of the adjacent mitigation efforts in order to be consistent with permit requirements. In addition to the grade control structures mentioned above, it will include routine erosion protection along the channel. The design of any new hydraulic drop structures needed will be an additional service.
5. FNI will identify and work to avoid possible conflicts, such as roads and utilities, associated with the dam and reservoir. Resolving conflicts and relocations, such as roads and utilities, associated with the dam and reservoir are not included under this contract.
6. All needed survey for the design will be provided by others. The survey should include the dam area between FM1550 and FM64 and all property to the east, included Highway 904. The data should be available as a 1-meter grid DEM with 1' contour lines generated.
7. The Stormwater Pollution Prevention Plan (SWPPP) will be prepared by others for the overall program.
8. All federal environmental and state water rights permitting efforts are performed by others.
9. UTRWD will provide for an independent peer review team tasked to review and comment on the key aspects of the design. An introductory workshop early in the project will also be included.
10. A FEMA Conditional Letter of Map Revision (CLOMR) will not be required for the reservoir since the Sulphur River is not mapped currently.

The work will consist of five tasks performed simultaneously.

Task A -- Project Management

1. Attend a kickoff meeting with the District and other team members to clarify project goals, communications, schedules, and to exchange initial information to begin the project.
2. Meet monthly with the District as regular project meetings during the design process for approximately 6-8 months of the design phase. Additional technical meetings are described in other tasks.
3. Attend meetings for coordination with the design of other consultants working on other portions of the project that are no more frequent than bimonthly.
4. Attend by conference call other project meetings with team members as needed for the development of the project.
5. Provide monthly reports on design status, budget, and schedule during the design process.
6. Provide monthly invoices for the work to date.
7. Perform internal quality assurance and quality control processes for the duration of the project.

Task B -- Hydraulic Analysis and Design

1. Perform the hydraulic design of the service and emergency spillways and the top elevation of the dam to be compliance with TCEQ requirements for flood passage. The design flood will be 100% of the Probable Maximum Flood. Flood routing from an earlier phase will be utilized, but the rainfall values will be updated to include the latest TCEQ standards. Utilize Computational Fluid Dynamics (CFD) modeling of the spillway, stilling basin, and transition to the downstream channel to set the parameters and configuration of those elements

- sufficiently to perform the physical model study of the spillway, which will be performed by the Utah Water Research Laboratory. The model study will be performed under special services, authorized and initiated under Task Order #1, and completed in the Final Design Phase.
2. Perform the hydraulic analysis and preliminary design of the intake structure, outlet into the stilling basin, and the portion of the connection pipeline to the pump station.
3. Prepare a draft report describing the design flood determination and related hydrologic and hydraulic analysis. After review by the District and peer review team and incorporation of comments, prepare a final report for submittal to TCEQ. This early submittal is to facilitate and accelerate TCEQ approval of the project in a future design Phase.
4. Prepare technical memorandums of the portions of the preliminary hydraulic design of the spillways and intake structure that are not covered by the hydrologic and hydraulic report for TCEQ.

Task C -- Embankment Design

1. Perform the civil and geotechnical design of the dam embankment to be compliance with TCEQ requirements. This will include the zonation, internal drainage, erosion protection, and instrumentation as described above for the project. It will also include the preliminary layout of the access road system as described above for the project.
2. Evaluate local borrow sources near the site for possible use as aggregate and material for the filter drain, the slurry trench and soil cement in addition to possible on-site sources. Identify any that may be recommended for field investigations that would be performed in a later phase.
3. Prepare drawings of the proposed embankment, equivalent to approximately 30% complete
4. Prepare technical memorandums describing the preliminary embankment design.

Task D -- Downstream Channel Design

1. Perform the civil and geotechnical preliminary design of the downstream channel from the spillway exit channel to FM 904, as described above, including developing recommendations for a stable pilot channel and vegetative requirements for the overbank sections.
2. Prepare drawings of the proposed channel improvements, equivalent to approximately 30% complete
3. Prepare technical memorandums describing the preliminary channel design.

Task E -- Deliverables

1. Prepare the deliverables for Task Order 1, which will be referred to as the 30% Preliminary Design Package and will include:
 - a. Drawings - Prepare required drawings for the preliminary design of the listed facilities. All drawings will be produced on AutoCAD Version 2017 (or later). Submittals will be in pdf format and 11x17 hard copies.
 - b. Geotechnical Data Report (GDR) as described in the Special Services section for geotechnical field exploration.
 - c. Probable Construction Cost Develop an opinion of

- probable construction costs (OPCC) based on the 30% submittal.
- d. Interim Memorandums – Several Design Memorandums will be prepared to document key design efforts to date for each of the various components of the Preliminary Design Phase. These will eventually be incorporated into the Design Report in the Final Design Phase but will be made available as part of the 30% Submittal. Some may be in draft form, depending on the timing of the analysis.
- e. Review Comments - District will consolidate their submittal review comments, including peer review comments and provide to Engineer at the Review Meeting.
- f. Review Meeting - Meet with the District and their Peer Review Team and obtain District's comments on the 30% Submittal. Resolve comments and address prior to submitting the 60% Design submittal. A final version of the 30% submittal will not be made.
- 2. Final Hydrology and Hydraulics Report – This will be completed separately from the 30% package for submittal to TCEQ

SPECIAL SERVICES

Special Services are those services known to be required for completion of the project that the OWNER agrees are to be furnished by the ENGINEER or by a subconsultant that cannot be defined sufficiently at this time to establish the maximum compensation. The services are not included in the scope of work of Basic Services or the amount of compensation for Basic Services. The Special Services for this assignment are described in Exhibit SC.

Geotechnical Field Investigation and Data Report

- 1. Travel to the site to select locations for exploratory borings. Engineer will check visually for underground utility markers, other existing construction, and accessibility. Engineer will coordinate with subcontractor to clear necessary trees and vegetation to access borings at the site. Engineer, in coordination with the Surveying subcontractor, will locate and stake the borings.
- 2. Call the Texas811 utility system, UTRWD, and other appropriate providers to mark utilities within an appropriate radius of the boring locations.
- 3. Subcontract with a drilling contractor to drill a total of 118 borings in accordance with the schedule.
 - a. Samples at all locations will be collected intermittently using continuous flight or hollow-stem augers and either split-spoon (Standard Penetration testing) or steel tube samplers.
 - b. Bedrock, in selected borings, will be sampled by coring with an NX core barrel. Perform THD cone penetrometer tests on rock in the field at selected locations.
 - c. Perform packer tests in the bedrock in selected borings to determine the rock permeability.
 - d. Install 12 piezometers to track groundwater in selected boring locations. Provide surface completions for each piezometer with upright, lockable steel covers and a 3'x3' concrete pad. A water well driller licensed in the State of Texas will be utilized and the piezometers will be registered with the State of Texas.

- 4. Water levels will be observed and recorded during drilling and at completion. The boreholes that will not be converted into piezometers will be backfilled with cement-bentonite grout to the ground surface at completion of field activities.
- 5. Provide an Engineer or Geologist to direct the drilling, log the borings, record field test data, and handle and transport the samples. Engineer or Geologist will develop the piezometers and perform lag tests as necessary.
- 6. Select samples for laboratory testing, assign tests, deliver samples to a subcontracted laboratory selected by FNI, and review test results. Testing is expected to include classification tests (liquid and plastic limits and percent passing a #200 sieve or gradation), moisture content, unit dry weight, moisture-density tests, crumb dispersion tests, pinhole, or double hydrometer tests, permeability tests and strength tests (triaxial tests, direct shear tests and consolidation tests). If appropriate, swell at overburden tests will also be performed.
- 7. Develop a possible mix design for Roller Compacted Concrete (RCC). This will include review of possible aggregate source, selection of a reasonable source, and development of a mix design based on that source aggregate. Samples will be tested to determine durability, permeability, strength, and other design criteria for the RCC structure. Develop recommended RCC strength and durability parameters for design.
- 8. Prepare a geotechnical data report (GDR) of the geotechnical investigation to include:
 - a. Appendix with the boring locations, boring logs, laboratory test results, and a key to the symbols used.
 - b. Discussion of subsurface conditions and soil properties indicated by the field and laboratory work, and the implications for design.
 - c. Foundation design parameter recommendations for the service spillway, low flow intake tower and impact basin at the site.
 - d. Soil strength and permeability design parameter recommendations needed to perform seepage and stability analyses on the dam

Physical Model Study

- 1. The physical model study will be performed by Utah Water Research Laboratory. The model study and the effort to coordinate the work, attend up to two site visits in Utah are included as special services.

ADDITIONAL SERVICES

Additional services to be performed by the ENGINEER, if authorized by the OWNER, which are not included in the above-described Basic Engineering Services, are described as follows:

- A. Any additional services that may be required by the OWNER for completion of the project that are not included in the Basic or Special Services.

**Article II
Compensation**

BASIC SERVICES

Compensation by the OWNER to the ENGINEER for all Basic

Services enumerated in Task Order No. 1 will be on an actual raw salary cost times a 3.0 multiplier basis as generally described in Exhibit CO. A budget allowance has been made for this item and will not be exceeded.

Task A – Project Management	\$ 178,976
Task B – Hydraulic Analysis and Design	\$ 242,327
Task C – Embankment Design	\$ 116,248
Task D – Downstream Channel Design	\$ 62,907
Task E – Deliverables	\$ 390,589

The total compensation for Basic Services authorized by Task Order No. 1 is not-to-exceed \$991,047.

Special Services

Compensation by the OWNER to the ENGINEER for all Special Services which may be required by the OWNER, shall be enumerated on an actual raw salary cost times a 3.0 multiplier basis as generally described in Exhibit CO. A budget allowance has been made for this item and will not be exceeded without prior written authorization from the OWNER. No work will be undertaken on this item without specific written authorization from the OWNER.

Not-to-exceed \$1,006,748

Additional Services

Compensation by the OWNER to the ENGINEER for all Additional Services, which may be required by the OWNER will be enumerated on an actual raw salary cost times a 3.0 multiplier basis as generally described in Exhibit CO. A budget allowance has been made for this item and will not be exceeded without prior written authorization from the OWNER. No work will be undertaken on this item without specific written authorization from the OWNER.

Total budget allocation for Additional Services for Task Order No. 1:

Not-to-exceed \$ 50,000

Total Compensation Summary

Basic Services	\$ 991,047
Special Services	\$ 1,006,748
Additional Services	\$ 50,000
Total Authorization	<u>\$ 2,047,795</u>

Other Provisions

The following provisions shall apply to this Task Order:

Compensation for Services will be on an actual raw salary cost times a 3.0 multiplier basis specified when the task order authorizing the Additional Services is approved by the OWNER.

This Task Order No. 1 will become part of the referenced AGREEMENT when executed by both parties.

IN WITNESS WHEREOF, the parties execute below:

For the OWNER, Upper Trinity Regional Water District dated this _____ day of _____, 2018.

By: _____

Title: _____

For the ENGINEER, Freese and Nichols, Inc dated this _____ day of _____, 2018.

By: _____
John L Rutledge

Title: Vice-President

DRAFT

