

**RESOLUTION 20-179**

**A RESOLUTION TO AUTHORIZE THOMAS AND HUTTON ENGINEERING TO PROVIDE ENGINEERING SERVICES FOR THE WASTEWATER TREATMENT PLANT FOR EXISTING HEADWORKS UPGRADES AND PROPOSED EQUALIZATION BASIN**

**WHEREAS**, the City of Spring Hill Board of Mayor and Aldermen approved a Professional Services Agreement with Thomas and Hutton Engineering (formerly Dempsey Dilling and Associates) for variety of professional engineering, design, and municipal support services; and

**WHEREAS**, the Spring Hill Wastewater Treatment Plant is in need of improvements consisting of existing headworks upgrades and proposed equalization basin; and

**WHEREAS**, Thomas and Hutton Engineering has provided the City with a proposal for Engineering Services for the Wastewater Treatment Plant Improvements for the existing headworks upgrades and the proposed equalization basin identifies nine tasks to be completed: Surveying (Subconsultant-Sawyer Land Surveying), Civil Engineering Design, Electrical Engineering Design (Subconsultant-WWR Engineers), Design Development Report with Hydraulic Analysis, Plans and Specifications Development, Submittal to TDEC, Opinion of Probable Construction Costs, and Bidding Assistance. TDEC submittal fees estimated at \$2,500 and Geotechnical Study estimated at \$15,000 are considered additional services.

**NOW, THEREFORE, BE IT RESOLVED**, that the Board of Mayor and Aldermen of the City of Spring Hill authorize Thomas and Hutton Engineering to provide engineering services for Wastewater Treatment Plant Improvements for the existing headworks upgrades and the proposed equalization basin as stated in the attached proposal letter dated August 27, 2020 at a cost of \$540,000 for the engineering design fee and \$285,000 for the construction engineering and inspection fee for a total cost of \$825,000.

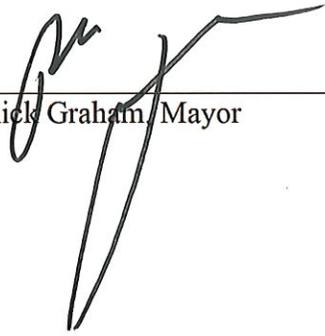
**Passed and adopted by the Board of Mayor and Aldermen of the City of Spring Hill, Tennessee on this 16<sup>th</sup> day of November, 2020.**

ATTEST:

  
\_\_\_\_\_  
April Goad, City Recorder

LEGAL FORM APPROVED:

  
\_\_\_\_\_  
Patrick Carter, City Attorney

  
\_\_\_\_\_  
Rick Graham, Mayor



**DEMPSEY, DILLING & ASSOCIATES**

*an affiliate of*

**THOMAS & HUTTON**

ENGINEERING | SURVEYING | LANDSCAPE ARCHITECTURE | GIS | CONSULTING



Mr. Victor Lay, City Administrator  
City of Spring Hill  
199 Town Center Parkway  
Spring Hill, Tennessee 37174

November 9, 2020

**RE: WASTEWATER TREATMENT PLANT IMPROVEMENTS  
EXISTING HEADWORKS UPGRADES AND PROPOSED EQUALIZATION BASIN  
ENGINEERING SERVICES PROPOSAL**

Dear Mr. Lay:

As requested, Dempsey, Dilling & Associates (DDA), an affiliate of Thomas and Hutton, is pleased to submit a proposal to provide engineering services for the Wastewater Treatment Plant (WWTP) Improvements. Our proposal is based on providing engineering services for design and development of construction bid documents (plans and specifications), consisting of existing headworks upgrades and proposed equalization (EQ) basin. The following tasks and engineering disciplines will be provided as part of the contract proposal.

**TASKS**

1. Surveying (Subconsultant-Sawyer Land Surveying-Mark Sawyer)
2. Civil Engineering Design
3. Structural Engineering Design
4. Electrical Engineering Design (Subconsultant-WWR Engineers-Ron Carter)
5. Design Development Report with Hydraulic Analysis
6. Plans and Specifications Development
7. Submittal to TDEC
8. Opinion of Probable Construction Cost
9. Bidding Assistance

**SCOPE OF WORK**

1. A field topographic survey of the portion of the existing WWTP site, which will contain the proposed expanded headworks structure and EQ basin, will be performed. The survey shall obtain contour elevations, existing structures and components location, within the general area of the proposed structures, existing piping invert elevations, and underground utilities based on as-built drawings and field located valving.
2. Services provided within the civil engineering task shall consist of developing the preliminary site layout, site and grading plans, hydraulic calculations, headworks equipment review and recommendations, headworks structure design, and EQ basin design.
3. Structural engineering shall perform sizing of footers, floor slab, walls, partitions, walkways, handrailing and pipe penetrations. Construction joints, expansion joints, reinforcement steel sizing, and reinforcement steel layouts shall also be included within this project task. A concrete design mix, testing parameters, and concrete placement specifications shall also be developed.

4. Electrical engineering shall consist of designing and specifying all electrical components/power supply requirements for the headworks screens and grit removal systems as well as any required electric actuated valves for the ERQ basin. The electrical work will evaluate existing electrical components and integrate the proposed required components accordingly.

5. The Design Development Report (DDR) shall be written and submitted to the Tennessee Department of Environment and Conservation (TDEC). The DDR shall compile all design assumptions, basis, parameters and calculations for the headworks upgrade and EQ basin design. The DDR will contain the hydraulic analysis for the existing average daily flows (ADF) and peak daily flows (PDF) to determine the required sizing of both the headworks upgrades, EQ basin, pump size and line sizes.

6. Plans and Specifications shall be developed as to allow the City to publish an advertisement for bidding solicitations purposes. Plans and specifications will be a complete set of construction drawings as well as front end bid documents and technical specifications.

7. Plans and Specifications with hydraulic calculations will be submitted to TDEC for review and approval for construction.

8. Opinion of Probable Construction Cost will be developed to allow the City to review and perform budgetary planning. Based on project quantities, we will hire a consulting contractor with experience in this type project and who has provided these services on past projects for our structural engineering division.

9. Bidding Assistance will be provided to answer all contractor questions and develop addendums as necessary. DDA will attend the bid opening to record bids and will conduct a thorough review of submitted bids and front-end documents. DDA will provide an award recommendation letter to the City upon completion of the reviews and reference confirmations.

#### OPINION OF PROBABLE CONSTRUCTION COST

The Facilities Plan estimated cost of construction, for both the headworks upgrade (\$1,853,000) and proposed equalization basin (\$4,525,801) totals \$6,378,801. In addition, there will be required pumping and piping as to allow the equalization basin to be drained and sent to either the front of the existing process or back to the main lift station. It is estimated this piping and possible pumping work will cost approximately \$750,000. Therefore, the total cost basis of this project is estimated to be approximately \$7,128,801. Due to recent shortage of building materials and COVID-19, it is recommended a contingency of at least 15% be added for budgetary purposes. These costs referenced in the Facilities Plan will be verified by an outside consulting contractor upon completion of design.

#### FEES

Engineering Design Fee: DDA, an affiliate of T&H, proposes to perform the above described engineering services, as part of our current contract with the City of Spring Hill, for a lump sum cost of \$540,000 which represents a fee rate of 7.6%. Please note the attached DDA-Spring Hill Contract Terms and Conditions are an integral part of this contract proposal. DDA's monthly billing will be based on the percent completion of the above referenced services. The headworks design is estimated to take 3 months and the equalization basin is estimated to take 6 months. These components can be designed concurrently however it is recommended to bid as a combined project.

TDEC submittal fees will be the responsibility of the City of Spring Hill and are estimated to be \$2,500. The required Geotechnical Study shall be considered additional services and will be invoiced in accordance with the attached Terms and Conditions. It is estimated the Geotechnical Study will cost approximately \$15,000 to perform for this project.

Construction Engineering and Inspection Fee: CEI Services is estimated to be \$285,000 (4% of the estimated construction) for a period of 12 months. CEI Services shall include onsite inspection during construction activities, shop drawing reviews, monthly progress meetings, pay request reviews and recommendations, contractor and City staff correspondence concerning project questions and issues, change order development if required, record drawings development, final project inspection and deficiencies list, follow-up final inspection, project closeout documents and recommendation of acceptance project.

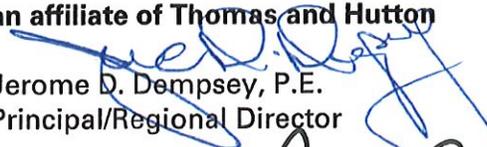
**PROPOSED SCHEDULE**

1. November 2020: Approval of DDA Contract and Authorization-To-Proceed
2. December 2020: Preliminary Site Layout
3. December 2020: Topographic Survey and Geotechnical Study
4. February 2021: Design Development Report and Hydraulic Analysis
5. February 2021: Headworks Expansion Design
6. May 2021: Equalization Basin Design
7. May 2021: Final Plans and Specifications
8. May 2021: TDEC Submittal
9. June 2021: Advertise for Bid
10. July 2021: Accept Bids
11. August 2021: Award Project to Contractor and Issue Notice-To-Proceed
12. July 2022: Project Completion (12 months)

If the City of Spring Hill agrees with this proposal, we ask that both original copies be signed by an authorized representative. Please retain one copy and return one copy to DDA as authorization to proceed. Please note the attached Terms and Conditions are an integral part of this proposal.

Again, DDA appreciates the opportunity to work with the City of Spring Hill on this project. Should you have any questions or comments please give me a call.

Sincerely,  
**DEMPSEY, DILLING & ASSOCIATES**  
an affiliate of Thomas and Hutton

  
Jerome D. Dempsey, P.E.  
Principal/Regional Director

Accepted By:  City of Spring Hill, TN  
(Print Name)

\_\_\_\_\_  
(Signature)

Date: 11/16/2020

## **PROJECT DESCRIPTION**

The project scope will consist of providing professional engineering services for upgrades to the existing WWTP headworks and for a proposed equalization basin. The scope of work for the WWTP Improvements expansion design will include equipment review and recommendations, hydraulic calculations, hydraulic profile, and site design work at the proposed equalization basin. The design of both the headworks upgrade and equalization basin will include surveying, process design, civil engineering, structural engineering, and electrical engineering services.

The design of each component (headworks upgrade and equalization basin) will be based on Phase I flows as summarized in the *Wastewater Treatment Plant Facilities Plan* (WWTPFP) dated March 2019. As part of the WWTPFP development, the following flows were determined:

### **2013 Plant Expansion Design Flows:**

Average Daily Flow (ADF): 5.0 MGD

Peak Daily Flow (PDF): 11.5 MGD

Peak Hourly Flow (PHF): 14.0 MGD

### **2018 Average Flows (WWTPFP):**

ADF: 3.56 MGD (71% of Design Capacity)

PDF: 8.57 MGD (75% of Design Capacity)

PHF: 12.0 MGD (86% of Design Capacity)

### **Phase I Expansion Design Flows:**

ADF: 7.5 MGD

PDF: 17.25 MGD

PHF: 21.0 MGD

### **Phase II Expansion Design Flows:**

ADF: 10.0 MGD

PDF: 23.0 MGD

PHF: 28.0 MGD

## **HEADWORKS**

The existing influent headworks structure contains two parallel 2.5 MGD ADF channels which were constructed in the last expansion during 2013. Flow enters the headworks from the influent pump station through a 24-inch DI pipe which contains a magnetic flow meter, for measuring and recording the influent flow. The parallel concrete channels feed flow to each of the two fine screen and grit removal equipment setups. A separate center bypass channel, with a manual bar screen, is provided to allow each screen and grit chamber to be taken out of service for maintenance and repairs.

The screening equipment consists of two fine bar-type cylindrical roto type screens. The first screen is manufactured by Lakeside which was initially installed at the WWTP during the year 2000 expansion. The second screen is manufactured by Huber and was installed during the year 2013 expansion, both of which are mechanically cleaned and utilize 0.25-inch openings. The Lakeside screen is model no. 47FS-0.250-93 and the Huber screen is the Rotamat model no. Ro1/1200/6 with Ro8t screw conveyor. Screenings from the mechanically cleaned screens are conveyed and dewatered via an integral mechanical device. Dewatered screenings are captured in an auger-type conveyor and transported to an adjacent dumpster. Influent flow then passes through the screens to enter the grit removal tank.

The grit removal equipment consists of two Smith & Loveless Model No. 7.0 Pista-Grit vortex type removal devices, serial no. 03-1577-G and 03-2439-R. Each Pista-Grit removal equipment installation contains a dewatering conveyor and a 250-gpm concentrator pump (top mounted Model 4B2H). Grit is periodically removed from each grit hopper via the referenced pump and discharged to a solids separation or classification device. Each grit classification device consists of one, common, vortex grit separator mounted over a screw-type separator. Excess water from the classifier flows via gravity back to the influent channel. The dewatered grit is transported via a conveyor to the adjacent dumpster.

The proposed engineering services for this project will include replacement of the two (2) existing cylindrical bar screens with new perforated filter screens and adding a third new perforated filter screen in an expanded headworks structure. Therefore, a total of three new screens are proposed for this project and a space for a future screen. One additional grit removal system is also proposed for this project. A single Pista-Grit removal tank, pump and removal system will be required for the initial expansion and should be sized the same as the two existing systems (2.5 MGD, ADF and 7.0 MGD, PHF).

### EQUALIZATION BASIN

The proposed equalization basin will be designed as to allow future conversion to an oxidation basin capable of processing an additional 2.5 MGD of flow. The equalization basin volume will be approximately 3.4 MG and will be designed as to allow it to be converted to a future five-stage bardenpho oxidation basin process matching the existing biological process. To better understand the existing oxidation basins and the future basin's internal sub-basins needed, the five-stage biological process is described as follows:

First stage of this type treatment process consists of influent flow being mixed with the Returned Activated Sludge (RAS), returned from secondary clarification and is referred to as the anaerobic stage. This first stage is sometimes called the fermentation stage of the treatment process which provides stress conditions, due to the absence of dissolved oxygen (DO) and nitrates (NO<sub>3</sub>), which allows large quantities of phosphorous to be released and ultimately removed in the subsequent aerobic stages.

Second stage is the first anoxic stage where the flow is mixed with NO<sub>3</sub> from the nitrification zone and denitrification takes place where NO<sub>3</sub> levels are usually 3-5 MG/L.

Third stage is the aeration-nitrification stage, where oxygen is added and BOD is converted to carbon dioxide, and ammonia to NO<sub>3</sub>, generally BOD levels are less than 10.0 MG/L, ammonia is at 1 MG/L, and NO<sub>3</sub> are 3-5 MG/L.

Fourth stage is the second anoxic stage where NO<sub>3</sub> is reduced to nitrogen gas, NO<sub>3</sub> are typically in the range of 1.0 MG/L.

Fifth stage is the re-aeration stage where the DO is increased in the mixed liquor to prevent phosphorous from being released in the secondary clarification process.

### DRAIN PIPING/PUMP

The design will include drain piping and/or pumping as to allow draining of the equalization basin. The drain components will allow the stored peak flow volume to be conveyed back to the head of the treatment process or to the effluent lift station. The exact configuration will be determined during the engineering design.

**PROFESSIONAL ENGINEERING SERVICES CONTRACT TERMS AND CONDITIONS**  
**DEMPSEY, DILLING & ASSOCIATE, an affiliate of Thomas and Hutton**  
**CITY OF SPRING HILL, TENNESSEE**

**Access to the Site/Job Site Safety**

Unless otherwise stated, Dempsey, Dilling & Associates, an affiliate of Thomas and Hutton (DDA) will have access to the site for activities necessary for the performance of the services. The Client/Owner (City of Spring Hill, TN) understands that DDA is not responsible, in any way, for the means, methods, sequence, procedures, techniques, scheduling of construction, or job site safety. DDA will not be responsible for any losses or injuries that occur at the project site.

**The Owner's Responsibilities:**

Provide DDA with all available information, which is pertinent to the project.

Guarantee access to the work and make all provisions for DDA to enter upon public lands as required to perform work essential to the development of the project.

Give thorough consideration to all reports and other documents presented by DDA and inform DDA of all decisions within a reasonable time so as not to delay the work of DDA.

Furnish DDA with any standards to be required to follow.

Furnish approvals from all government authorities having jurisdiction over the project and such approvals and consents from others as may be necessary for the completion of the project.

Provide all legal, accounting, independent cost estimating and insurance counseling services as may be required for the project.

Give prompt written notice to DDA whenever it is observed or otherwise becomes apparent that any substantial changes in the scope of work or physical conditions, of the existing geographical features, have occurred which would significantly impact the project.

**Fees**

Hourly rate charges will be as follows:

<u>Classification</u>	<u>Standard Hourly Charge</u>
Principal Engineer	125.00
Engineer	100.00
Engineering Intern	90.00
Sr. CADD Designer	65.00
CADD Technician	50.00
Construction Representative	50.00
Administrative Assistant	50.00
Clerical	40.00

Outside services contracted for a specific project, such as professional or technical consultants, laboratory testing, reproduction, photography, etc., will be invoiced at the amount of the sub-consultant's statement plus 15% for overhead and profit (if applicable).

Other expenses which are properly chargeable to the work will be invoiced as follows:

- a) Travel by private vehicle: standard IRS mileage rate
- b) In-house printing, reproduction and photography.

Lump sum fees, when applicable for certain projects, shall be understood to be an estimate and shall not be exceeded without written approval of the Client/Owner. DDA's hourly fee rates may be adjusted during the extent of this contract according to annual review by DDA.

### **Termination of Services**

This Agreement may be terminated by the Client/Owner or DDA should the other fail to perform its obligations hereunder. The Client/Owner and DDA may also, at any time, terminate the Contract for the Client/Owner's or DDA's convenience, with or without cause. Upon receipt of written notice from the Client/Owner or DDA of such termination for the Client/Owner's or DDA's convenience, DDA shall cease work. In the event of termination by either party, the Owner/Client shall pay for all services rendered to the date of termination and all-reimbursable expenses. The Client/Owner or DDA shall have the right to terminate this Agreement by giving written notice of such termination and specifying the effective date thereof, at least sixty (60) days before the effective date of such termination.

### **Payment**

DDA will invoice the City of Spring Hill on a monthly basis. Payment is expected within 30 days of the date of invoice. Any invoices which exceed 30-days in payment shall be assessed a 5% fee per 30 days it remains unpaid. Should an invoice be paid in a time less than 30 days then a prorated fee will be paid to DDA.

### **Insurance**

DDA shall secure and maintain professional liability insurance in the amount of \$1,000,000.00 as will protect it from claims of bodily injury, death or property damage, which may arise from the performance of service under this Agreement. DDA will provide the City of Spring Hill a certificate of insurance for their professional liability coverage.

### **Ownership of Documents**

All documents, including, but not limited to, drawings, specifications, reports, calculations and computer software documents, programs and spreadsheets prepared by DDA pursuant to this Agreement are instruments of service in respect to any project. They are not intended or represented to be suitable for reuse by Client/Owner or others on modifications or extensions of this project in the future or on any other project. Any reuse without prior written approval by DDA for the specific purpose intended will be at the Client/Owner's sole risk and without liability or legal exposure to DDA. Client/Owner shall defend, indemnify and hold harmless DDA and its sub-consultants against all judgments, losses, damages, injuries, and expenses, including reasonable attorney's fees, arising out of or as a result from such reuse, to the extent permitted by law. Any verification for another purpose or adaptation of documents will entitle DDA to additional compensation at rates to be agreed upon by Client/Owner and DDA. Except as otherwise provided herein, documents, drawings, and specifications prepared by DDA and furnished to Client/Owner as part of the services under this Agreement shall become the property of the Client/Owner, provided, however, that DDA shall have the unrestricted right to their use. DDA shall retain any copyright and ownership rights in its design, drawing details, specifications, databases, computer software, and other proprietary property. Intellectual property developed, utilized, or modified in the performance of the services under this Agreement shall remain the property of DDA.

**Changes**

The Client/Owner may request changes in the Scope of Services of any project to be performed hereunder. Such changes, including any increase or decrease in the amount of lump sum compensation, which are mutually agreed upon by and between the Client/Owner and DDA shall be incorporated into the agreement for each particular project. Any changes made to the construction documents by the Client/Owner or the Client's/Owner's representatives are strictly prohibited without the knowledge and written consent of DDA. DDA shall be released from any liability resulting from damages, injuries, and or death resulting from the unauthorized alteration of construction documents.

**Applicable Laws**

This Agreement shall be governed by the laws of the State of Tennessee.

**Opinion of Construction Cost**

Any opinion of probable construction cost or estimates prepared by DDA represents DDA's judgment as engineering design professionals and is supplied for general guidance to the Client/Owner. Since DDA has no control over the construction marketplace, economic factures, elapsed time between opinion of probable construction cost and actual bidding, DDA does not guarantee the accuracy of such opinions as compared to contractor bids or actual cost to Client/Owner.