



**RFQ: 19-C-00022 DESIGN-BUILD SERVICES  
for the  
David L. Tippin Water Treatment Facility  
High Service Pump Station and Miscellaneous Improvements**



**DESIGN CRITERIA PACKAGE**

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CITY OF TAMPA  
NOVEMBER 2018

**1. Purpose**

The City of Tampa has prepared this Design Criteria Package for RFQ 19-C-00022 for Design-Build Services related to the David L. Tippin Water Treatment Facility (DLTWTF) High Service Pump Station and Miscellaneous Improvements (Project) to include: the evaluation, design and construction for the installation of a new high service pump station and header system; the installation of baffling and redundancy improvements within the existing on-site clearwells; the relocation of the existing backwash pumps to eliminate de-chlorination; and other improvements.

Design-Build services shall also include (in addition to the above), but not be limited to, demolition, removal of old equipment and piping, coordination with regulatory agencies, procurement of all necessary equipment and materials for complete, functioning systems, utility coordination, design plans, cost estimating and post-design services.

The intent of the contract is to obtain and execute multiple Guaranteed Maximum Price (GMP) proposals, upon written mutual agreement between the City and Firm, for various additional projects as identified in the DLTWTF Master Plan (July 2018) and relative to available funding and FIRM availability to accomplish an expansion of the DLTWTF treatment capacity to 140 MGD maximum daily flow.

1.1 The scope shall include, but not be limited to the following:

- Comprehensive design services to include:
  - Development of design plans and construction documents for the selected improvements and associated components
  - Preparation of complete construction documents
- Coordinating, applying for and obtaining regulatory permits
- Preparing plans and estimates for construction permits to be obtained by the City
- Preconstruction services with development of Guaranteed Maximum Price (GMP) for construction of selected improvements and associated components
- Installation and construction for the complete and working operations of the selected improvements and associated components
- Provision of construction phase services to include: attending meetings, responding to Requests for Information (RFI), reviewing submittals, and commissioning services
- Estimated Total Construction Budget: \$50,000,000

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In addition, the following pages contain a project overview of the existing treatment system process and description of design and construction requirements for the selected improvements and associated components at the DLTWTF.

1.2 This document provides the criteria for the design and construction of the selected improvements and associated components at the DLTWTF.

1.3 This package is not a specification or prescriptive checklist and is not intended to replace the professional judgment by a competent licensed professional engineer after coordination with the end-user and stakeholders of the City of Tampa.

**2. Background – Treatment System**

The David L. Tippin Water Treatment Facility was originally constructed between 1924 and 1926 with the capacity to produce 8 MGD of potable water to serve a population of about 74,000. It has expanded over the years and now produces approximately 80 MGD of potable water for customers within the Tampa Water Department (TWD) service area (population of about 620,000; 135,000 service locations). The current water use permit allows the plant to withdraw 82 MGD (average daily flow) and 120 MGD (peak flow) for treatment. The primary source of water for the plant is the Hillsborough River.

The facility utilizes three parallel treatment trains consisting of coagulation, flocculation, and sedimentation processes. Two trains employ conventional rapid mix, flocculation, and sedimentation; the third train utilizes the Actiflo process (see Figure 1 – David L. Tippin Water Treatment Facility Flow Diagram, DLTWTF Master Plan). Ferric sulfate, supplemented with a polymer, is used as the coagulant. The primary disinfectant is ozone. Disinfected water is filtered through dual media bed filters before chlorine and ammonia are added for secondary disinfection.

Finished water is pumped from the clearwells by (6) split-case horizontal pumps and (2) vertical turbine pumps located at the DLTWTF (see Figure 2 – Tampa Water Department Pumping Characteristics). The target discharge pressure is 70 psi, which is set to maintain a minimum distribution system pressure of 40 psi. The distribution system contains three re-pump stations (RPS) in the DLTWTF pressure zone. RPS are located relatively remote to the DLTWTF and provide the system with the ability to boost pressures during peak periods. Pumping capacity from DLTWTF combined with the capacities from the Northwest, West Tampa, and Palma Ceia RPS yield a pressure zone firm capacity of 160 MGD within the DLTWTF pressure zone.

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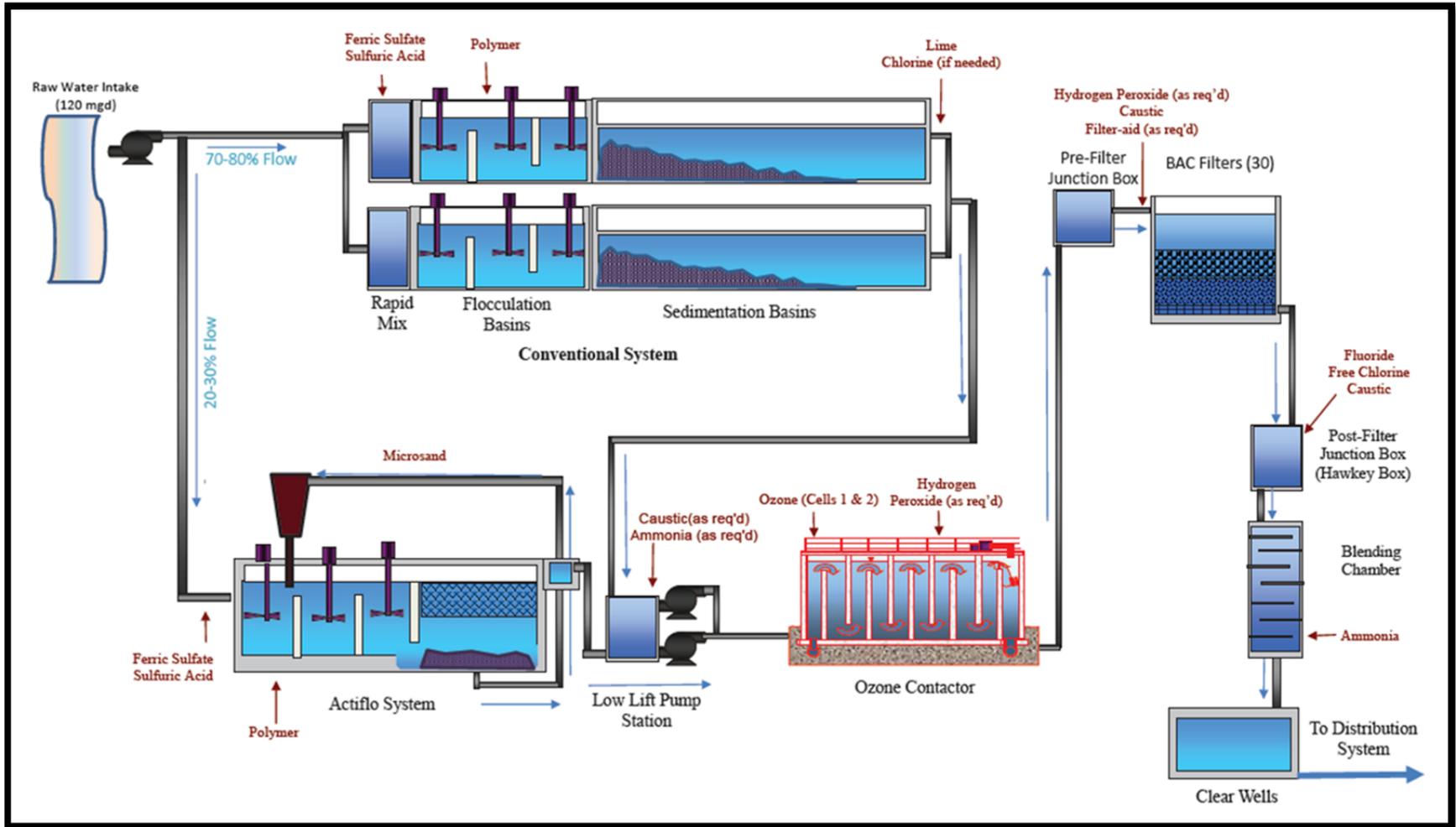


Figure 1 – David L. Tippin Water Treatment Facility Flow Diagram, DLTWTF Master Plan (July 2018)

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Pump Station (Pump Type/ Install Year)	#	Maximum Capacity		Rated Capacity		Rated TDH (ft)	Motor (Type)	Typical & Standby Power Capability	Total Pump Station Capacity			
		(gpm)	(MGD)	(gpm)	(MGD)				Max	Rated	Firm (MGD)	
									(MGD)	(MGD)	Rated	Modeled
<b>D.L. Tippin WTP - High Service Pump Station<sup>1</sup></b> #1-6, 1984, Dietzgen Pumps, #7-8, 1999, Ingersoll-Dresser 34KKL	1	NA	NA	13,900	20	NA	Constant	2 Utility Feeds & Generators	NA	164	134	134
	2	NA	NA	8,150	12	NA	Constant					
	3	NA	NA	7,850	11	NA	Constant					
	4	NA	NA	11,200	16	NA	Constant					
	5	NA	NA	15,800	23	NA	VFD					
	6	NA	NA	18,125	26	NA	Constant					
	7	NA	NA	18,350	26	NA	VFD					
	8	NA	NA	20,750	30	NA	VFD					
<b>Morris Bridge Repump Station</b> #1-4, 1973, Goulds Pumps 3420 #5, 1996, BW/IP Pump 17HQ #6, 1996, BW/IP Pump 20HQO #7, Proposed	1	14,000	20	11,100	16	152	VFD	2 Utility Feeds & Generators	101	78	62	66
	2	14,000	20	11,100	16	152	VFD					
	3	14,000	20	11,100	16	152	VFD					
	4	14,000	20	11,100	16	152	VFD					
	5	4,161	6	2,200	3	150	VFD					
	6	7,000	10	5,850	8	188	VFD					
	7	4,200	6	1,500	2	79	VFD					
<b>Northwest Repump Station</b> 1987	1	2,600	4	2,100	3	150	Constant	1 Utility Feed & Generator	15	12	6	8
	2	2,600	4	2,100	3	150	Constant					
	3	5,000	7	4,000	6	150	Constant					
<b>Interbay Repump Station</b> #1-4, 1998, Ingersoll-Dresser 8LR-14A NOTE: #5&6 cannot operate with #1-4	1	5,000	7	3,000	4	150	VFD	1 Utility Feed & Generator	30	16	12	15
	2	5,000	7	3,000	4	150	VFD					
	3	5,000	7	3,000	4	150	VFD					
	4	5,000	7	3,000	4	150	VFD					
	5	1,000	1	1,000	1	35	VFD					
	6	1,000	1	1,000	1	35	VFD					
<b>West Tampa Repump</b> 1991, Aurora Pump 90-12258	1	7,000	10	5000	7.2	50	Constant	1 Utility Feed	10	7	0	0
<b>Palma Ceia Repump</b> 2000, Aurora Pump 410-HSC-1200	1	6,500	9	5000	7.2	45	Constant	1 Utility Feed	9	7	0	0

1. Rated capacity of the DLTWTF pumps are unclear on the pump curves and are assumed values in this table.

Figure 2 – Tampa Water Department Pumping Characteristics

### **3. Design**

Improvements described herein are based on preliminary findings and recommendations provided in The David L. Tippin Water Treatment Facility Master Plan (July 2018). Designs shall give consideration to existing operation and maintenance of the treatment facility and other future projects identified in the master plan. Such considerations may include but not be limited to: necessary space requirements, possible shared components, structural impacts. All designs shall incorporate necessary components, temporary facilities, and construction sequencing to maintain normal, 24 hour operations of the treatment facility.

Project objectives are to:

- Eliminate or repair deteriorating assets
- Add operational flexibility
- Add operational redundancy of components
- Increase efficiency
- Prepare for future growth
- Provide facilities that are attractive and easy to maintain and operate

3.1 The design shall be based on providing improvements that will effectively optimize performance capabilities and improve water production and quality at the DLTWTF.

3.2 The Firm shall provide final plans and as-builts in AutoCAD Civil 3D or Rivet and PDF formats.

3.3 The scope for a new **high service pump station and header system** will include the following:

- Design development to ensure proposed system has:
  - Multiple pumping configurations to meet max hour plus one backup
  - Redundant electrical feeds to all pumps
  - SCADA to monitor physical characteristics of each pump and VFD operating status independently
- Improvements of the system will include:
  - VFD pumps in climate-controlled pump station
  - An inclusive sampling and monitoring station in a climate controlled facility, near the pump station
  - Elimination of aged transmission pipeline between existing high service pumps and the beginning of off-site transmission piping in 30th Street
  - Redundant connections (pipeline or chambers) to pump manifold or header

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3.4 The design development for the **baffling and redundancy improvements within the existing on-site clearwells** should ensure the proposed system:

- Eliminates pump suction cavitation and tank buoyancy issues to allow for the full use of clearwell storage
- Provides for multiple flow patterns through existing clearwells
- Reconfigures existing clearwells to allow each unit to be isolated and taken out of service individually without interrupting 24/7 treatment operations
- Adds baffles to existing clearwells to reduce short circuiting and increase water quality

3.5 The Project will also involve the relocation of the existing backwash pumps to eliminate the need for de-chlorinating backwash water; assessment of potential improvements to existing lightning dissipation array to decrease or eliminate the impact of lightning strikes; prepare DLTWTF for future growth by accounting for space to grow pumping capacity and clearwell storage; and extend and expand the utility trench.

3.6 Firm to present final design, site plan, site preparation, build schedule, material purchases and placement, utility agreements, building permits and all required approvals from regulatory agencies and local authorities.

3.7 Firm is to provide pricing proposal developed into a Guaranteed Maximum Price (GMP) document with all associated exhibits (scope, pricing, qualifications, schedule, etc.).

#### **4. Project Scope Requirements**

##### 4.1 Evaluation

- City to provide all available TWD as-built drawings and related data as available for the existing equipment and locations, as related to the selected improvements and associated components, respectively
- Firm will:
  - Verify accuracy of all TWD supplied drawings, verbiage and other information
  - Review previously approved system specifications, for the respective systems/facilities
  - Review existing conditions and project constraints
  - Meet with TWD staff as needed for design coordination
  - Review 2018 DLTWTF Master Plan
  - Review 2018 TWD Distribution Master Plan
  - Evaluate similar systems

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Findings from the evaluations of the above are to be presented in a Basis of Design Report (BODR). The BODR shall include 3D renderings, detailed recommendations, construction sequencing for each selected improvement and associated components.

4.2 Design

4.2.1. Material & equipment specifications

Specified materials and equipment shall be of superior quality, state-of-the art and manufactured for extensive service life with minimum operation and maintenance requirements. The new systems shall be specified to have as many common parts with the existing facilities to remain as possible to minimize required parts inventory. Specifying lesser materials solely for purposes of cost savings and increasing profit margins shall be considered unacceptable to the City. All materials and workmanship shall have a minimum 1 year warranty period from the date of final acceptance by the City. Any required warranty work shall be performed at no cost to the City. A list of spare parts shall be provided by the Firm.

When available and applicable, material specifications utilized by the City of Tampa shall be used by the contractor. The Firm shall be responsible for preparing a complete set of material and construction specifications consistent with any existing City of Tampa specifications. Approved final specifications shall be provided to the City in MS Word and pdf formats.

4.2.2 Drawings

The FIRM shall prepare and submit layout, detail and shop drawings to ensure proper construction, assembly, and installation of the work using those materials and equipment as approved by the City, to be installed in accordance with manufacturer requirements.

These drawings shall accurately and distinctly present the following:

- All working and erection dimensions
- Arrangement and sectional views
- Necessary details, including complete information for making connections between the work under this project and existing/proposed future work
- Kinds of materials and finishes
- Parts listed and descriptions
- Demolition sequencing (removal of materials, equipment, electrical controls, etc.)

All drawings shall be produced in 3D (i.e. AutoCAD Civil 3D or Rivet as compatible for rendering) and shall be accurately georeferenced. Drawings shall meet the current TWD Drafting standards.

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4.3 Plant Coordination of Operations: The improvements shall be designed as to minimize impacts to plant operations during planned construction.

4.4 Construction Plans – GMP Proposal Development

- All construction plans and specifications shall be of superior quality and extremely detailed
- Plans shall be based on field conditions observed by the FIRM
- Construction plans and specifications shall be prepared at 60%, 90% and 100% phases. Tampa Water Department staff will review the 60% and 90% plans and provide comments to guide necessary revisions. Opting out of the 90% review will be at the discretion of the Tampa Water Department based on quality of the 60% plans submittal
- Development of GMP proposal

The FIRM shall be prepared to provide at a minimum the following submittals:

- Hardcopies of all plans necessary for permitting & construction
- Electronically signed & sealed final plans for construction permitting
- 3 sets of plans for review at each phase of design
- 5hardcopy sets of signed and sealed as-builts
- Disk containing approved as-built drawings in AutoCAD Civil 3D format and PDF versions (one as unsigned-and-sealed and one as digitally signed-and-sealed) prior to final acceptance by the City and project close out

4.5 Required Meetings: The Firm shall attend meetings with City staff at specified phases of the project, including but not limited to design, permitting, preparation of GMP, and construction.

4.6 Permitting

City to provide all existing permit information that may require modification as a result of the proposed improvements.

All required actions for regulatory permitting shall be in compliance with all laws, rules, codes, ordinances, statutes, etc. including but not limited to supplying signed and sealed copies of plans, completing and submitting applications, payment of fees, responding to requests for additional information, attending meetings with regulatory agencies (as needed), submitting permit clearance application for completion, etc. shall be the responsibility of the Firm. All fees and costs associated with regulatory permitting shall be the responsibility of the Firm.

All required actions for construction permitting shall be in compliance with all laws, rules, codes, ordinances, statutes, etc. including but not limited to supplying electronically signed and sealed copies of plans, responding to requests for additional information, attending meetings with City of Tampa Construction Services Division (CSD) as needed, submitting certifications of

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completion, etc. shall be the responsibility of the Firm. The City will complete and submit the applications for construction permitting to CSD; in addition to paying all associated fees and costs.

**4.7 Construction**

Construction sequencing shall be closely coordinated with and approved by the City before commencing. The Firm will be responsible for providing detailed construction sequences and schedules.

**4.7.1 Programming, Instrumentation and Control**

All control wiring, equipment installation, programming, control narrative, etc. necessary to operate the new systems remotely & automatically shall be the responsibility of the Firm. The programming style shall be consistent with the existing style in place.

**4.7.2 Startup Services:** The Firm shall provide complete startup services by an engineer licensed in the state of Florida.

**4.7.3 Performance testing**

The Firm shall conduct a performance test prior to final acceptance. Determining the parameters of the performance test shall be negotiated during the design process and be approved by the Tampa Water Department prior to final plans approval.

**4.7.4 Restoration:** The Firm shall be responsible for restoring the site to original condition or better.

**4.5.5 Operation and Maintenance Manuals:** Operation and maintenance manuals specific to the installed equipment shall be developed and provided to the TWD.

**4.8 Training**

Training shall be provided to TWD staff by the Firm on the proper operation and maintenance of the installed equipment. Separate sessions are required for Maintenance Group and the Operations Group. Each session shall be tailored to cover relevant topics for each work group. Each session shall be video recorded and the Firm shall supply a disc with video recording for each session.

**5. FIRM Requirements**

**5.1 Construction**

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The contractor utilized for this Project shall have the suitable personnel and equipment, resources, financial stability and experience to accomplish the Project objectives.

The Firm will be responsible for primary construction management activities and general project oversight with consistent coordination with the City during the design and construction portions of the project. Construction management activities will include, but not be limited to:

- Identification of the designated staging location(s) with respect to Project need.
- Preparation of a general Quality-Control Plan to be submitted in format(s) acceptable to the City, in which personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out the Firm's quality-assurance and quality-control responsibilities will be identified.
- Engagement of qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for the Project.
- Development of Firm procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- Development and inclusion of a comprehensive schedule of work requiring testing or inspection, including the following:
  - Firm-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Firm-elected tests and inspections.
  - Owner-required tests include soil density, concrete for all structural or structurally related work.
  - Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- Maintaining testing and inspection reports including log of approved and rejected results, including work the City has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.
- Development and implementation of a safety plan for the protection of the Firm and City employees during construction activities.

## 5.2 Engineer

The engineer(s) of record for the various disciplines in this Project must have suitable resources and experience to accomplish the Project objectives.

## 6. Coordination with the City

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Representatives from the City of Tampa Water and Contract Administration Departments shall be copied on all written communications with the City and regulatory permitting agencies. These representatives shall also be made aware of communication with other staff or entities that may affect the outcome of achieving the Project objectives.