Proposed Scope of Upgrades to Flint WTP

Phase II - Segment I

1. Introduction

The City of Flint plans to utilize their existing WTP to provide water on a continuous basis. The city plans to treat water from the Flint River until construction of the proposed KWA supply is complete and the WTP can then be used to treat water from Lake Huron. The following proposed improvements are needed to place the WTP into service next spring. These improvements will remain in service once the KWA is in service.

2. Scope of Work

The proposed upgrades have been categorized into Phase II – Segment I and are to be completed as soon as practical so that the WTP can be utilized to treat water from the river in the spring of 2014. Engineering services will include final design, plans, contract documents, bidding assistance. Since time is of importance, specifications and schematic drawings will also be provided for pre-procurement of long lead item equipment and are outlined within each section below. Contract administration and construction phase services are not included within the initial scope of services.

- Design Progress Meetings: Meet with City staff to provide project status updates and to discuss specific design issues and details in order to facilitate timely design decisions. Meetings will include design team personnel from each discipline as required, City operations staff and administrative staff. Five (5) design progress meetings are included.
- Prepare and update opinion of probable construction cost at for each project bidding document submittal (40%, 80% and Final Draft). Prepare final opinion of probable construction cost prior to bidding.
- Quality Assurance/Quality Control: A Quality Control Plan (QCP) will be developed and implemented specifically for this project. At each project submittal stage, the document deliverables will be checked and reviewed by experienced personnel to ensure that the design meets applicable standards and normal engineering practice.
- Deliverables:
  40% Bidding Documents (Drawings and Technical Specification Outline)
  80% Bidding Documents (Drawings and Technical Specifications)
  Final Draft Bidding Documents (Drawings and Technical Specifications)
  Final Bidding Documents (One printed and one electronic set of Drawings and Technical Specifications
- Bidding Phase
  Conduct pre-bid meeting.
  Respond to contractor inquiries.
  Prepare construction document addenda, as necessary.
  Review bids and supporting bid documentation. Prepare bid report summarizing bids, contractor references, and contractor qualifications; make recommendation for contract award.

Specific Work Tasks:

Item 1 – Chemical Systems / Ozone

The Michigan Department of Environmental Quality (MDEQ) requires 30 days of redundant storage of the chemical used in this treatment process. To bring the rehabilitated plant into regulatory compliance with the chemical storage requirements for primary use, additional storage facilities will need to be constructed for liquid oxygen and nitrogen.

One liquid oxygen and one liquid nitrogen storage tanks and unloading stations identical to the existing units will be installed north of the existing facilities. Details are listed as follows:

- Liquid Oxygen
  Capacity – 9000 gallons
  Diameter – 10 ft (maximum)

  Liquid Nitrogen
  Capacity – 540 gallons
  Diameter –5.5 ft (maximum)

Pre-procurement documents for the liquid oxygen and nitrogen tanks will be provided.

Item 2 – Electrical

The City of Flint Water Treatment Plant (WTP) represents a combination of administrative, process, and maintenance facilities which all require electrical power. At the completion of Phase I of the water treatment plant rehabilitation projects, much of the electrical distribution equipment such as motor control centers (MCCs), power/lighting panels, transformers, and electrical power feeders will have been upgraded. There is, however, significant additional work required to address remaining electrical equipment that has reached a point of obsolescence.

Switchgear in the sub-station was installed around 1960. It is antiquated and difficult to maintain. Very little work has been done to the station since its original installation. The plant has two 46 kV primary feeds into the sub-station. Replacement of the distribution switchgear with current technology equipment would allow a higher degree of load protection, be serviceable by numerous sources, and have replacement parts availability. When the switchgear is replaced, the plant will have to stay in operation. Brief interruptions of power of selected plant processes could be accommodated during cut over to new equipment.

Proposed Substation Upgrade

- Coordinate upgrades to Consumers 46kV primary feeders to provide a single overhead 46KV primary service
- Replace the two Consumers 2.5kVA substation transformers and overhead structure with two 2.0 to 2.5 kVA 46KV pad-mounted transformers.
- Replace the City's substation switchgear in the substation building.

Pre-procurement documents for the pad mounted transformers and switchgear will be provided.

Pump Station No.4 contains the largest electrical loads in the plant. Four low service pumps and five high service pumps represent a combined total of approximately 4000 horsepower. Additional loads from HVAC, lighting, controls, and chemical feed are about 60 kVA. This represents a total load of 531 amps @ 2400 volts. The existing switchgear in Pump Station No.4 is antiquated and difficult to maintain. Current technology equipment will allow a higher degree of load protection.

Proposed Pump Station No. 4 Improvements

- Replace 2400V switchgear
- Provide one 15 MGD medium voltage VFD

Pre-procurement documents for the medium voltage VFD and switchgear will be provided.

As a base load facility capable of producing water at any time the Flint WTP must have the ability to deal with power outages. In order to meet these electrical need in the event of a loss of power to the plant site or the loss of one of the substation transformers a new standby diesel generator is proposed to be located adjacent to the new substation.

Proposed Standby Power Improvements

- One 2.0 to 2.5 mVA generators and fuel tank.

Pre-procurement documents for the generator set will be provided.

There are four 2400V to 480V transformers in Plant 2 that are antiquated and difficult to maintain. Replacement parts are no longer available and reliability is questionable.

Proposed Plant 2 Improvements

- Replace two 300kVA 2.4KV transformer/switchgear.
- Replace two 100kVA 2.4KV transformer/switchgear.

Pre-procurement documents for the transformers and switchgear will be provided.

<u>Item 3 – Mid-Point Chlorination</u>

Mid-point chlorination facilities are proposed to increase reliability of the disinfection process and improve Ct. For this initial stage the existing chlorine equipment in Pump Station No. 4 will be used and a new chlorine solution line will be installed from Pump Station No. 4 to the filter influent channel in Plant 2. A chlorine scrubber system will be installed in Pump Station No.4 to protect against a leaking chlorine ton container.

Proposed Chlorine Improvements

- New chlorine solution line to filter gallery.
- Chlorine system improvements.
- Dry scrubber system.

Item 4 – Low and High Service Pump Station No. 4

As a result of decreased demands, pumps at Pump Station No. 4 are "over-sized" and do not efficiently operate. Some of the pumps experience vibrations in the shafts and steady bearings. The existing pump station will be rehabilitated to replace "over-sized" pumps and obsolete equipment and provide needed maintenance.

Proposed Pump Station No. 4 Improvements

- Install one new High Service Pump (15 MGD @190 feet TH, vertically mounted pumps with 800 HP 2400/4160 V inverter duty motors, with 20 feet of shaft and steady bearings)
- Replacement of existing piping, valves, supports, and bearings
- New intermediate platforms, ladders, & stairs
- New ventilation (for exhausting heat from VFD's)
- Demolition of existing equipment to accommodate new equipment

Pre-procurement documents for the pump, motor, control valves and isolation valves will be provided.

Item 5 – Raw Water Piping Connection

The proposed KWA raw water pipeline will connect to the existing 72" PCCP finished water supply line near Center and Pierson Roads. (East of this connection, the 72" PCCP will be utilized by GCDC-WWS for distribution of finished water in the GCDC-WWS service area.) Raw water from Lake Huron will be conveyed to the WTP site via the 72" PCCP pipeline. On the WTP site, the 72" pipeline will be tapped for a 42" pipe and for a 36" pipe to convey raw water for treatment. Connections to the existing pipe will be made at this time to avoid future plant shutdowns for connections.

Proposed Pump Station No. 4 Improvements

- 48-inch pipe connections
- 36-inch pipe connection
- 54-inch pipe connection

Pre-procurement documents for the valves and connection fittings will be provided.

3. Schedule

The work included in this work authorization is anticipated to be performed in accordance with the following schedule, based on the Notice-To-Proceed (NTP) date of November 1, 2013. For the purposes of this proposal, we anticipate a 3 month design phase and 1 month bid phase. Schedule revisions may be necessary as information becomes available and work priorities change.

Project Milestone	Date
Project Kickoff Meeting	November 6, 2013
Equipment Procurement Documents	December 6, 2013
Submit 40% Bidding Documents	December 18, 2013

Submit 80% Bidding Documents	January 10, 2014
Submit Final Draft Bidding Documents	January 31, 2013
Submit Final Bidding Documents	February 7, 2014
Bid Advertising	February 10, 2014
Pre-Bid Meeting	February 17, 2014
Bid Opening	TBD by City
Recommendation of Contract	TBD by City
Contract Award issued by City	TBD by City

4. Compensation

The Reimbursable Compensation method with a maximum not-to-exceed limit will be used for this contract. Labor rates shall be based on personnel classifications according to the attached rate sheet. Reimbursable expenses shall be invoiced at the actual cost times a factor of 1.0 for processing and handling. The estimated maximum not-to-exceed fee for this project is $542,800 which includes a $15,000 allowance for surveying and $15,000 allowance for geotechnical services.

Any other work beyond the Scope of Services herein will require a subsequent Work Authorization with prior approval from the City.