



JONES & HENRY ENGINEERS, Ltd.

Proposal for the
Lake Huron Water Initiative
S.4004 Intermediate Pump
Station and Reservoir/Balancing
Tank(s)
Genesee County Drain
Commissioner

June 6, 2013

Fluid thinking...





Jones & Henry Engineers, Ltd.

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June 5, 2013

Matthew Raysin, P.E.
Division Engineer
Genesee County Drain Commissioner's Office
G-4610 Beecher Road
Flint, Michigan 48532-2617

Subject: Lake Huron Water Initiative
RFP – S.4004 Intermediate Pump Station and
Reservoir/Balancing Tank(s)

Dear Mr. Raysin:

The Genesee County Drain Commissioner's Office – Division of Water and Waste Services (GCDC-WWS) is planning the Lake Huron Water Initiative (LHWI). The LHWI includes facilities to transport raw water from Lake Huron to the Genesee County area where it will be distributed to Genesee County and the City of Flint plus other entities in the area for treatment and distribution as potable water. The Initiative includes an Intake (already bid), a Lake Huron Pump Station, Intermediate Pump Station and Reservoir/Balance Tank(s), and 73 mile long raw water transmission mains. GCDC-WWS has selected a Program Manager to assist with implementing the design and construction since the schedule is critical. Multiple design professionals (DP) are being requested to submit proposals to provide preliminary design, detailed design, and bidding services for different parts of the project after being selected based on previously submitted qualifications.

Jones & Henry is pleased to have been selected to submit a proposal for design services for Construction Contract S.4004 – Intermediate Pump Station and Storage Reservoir/Balancing Tank(s). Our proposal is based on the Design Professional Request for Proposal, dated May 14, 2014; Addendum No. 1, dated June 4, 2013; plus information on the projects on the Program Manager's Extranet site. Included in our proposal is a description of the project, an approach to the design professional services, our team, our schedule, and our fee estimate.

We have included a detailed description of our project to ensure our understanding is consistent with the work already performed. The description will be the starting description for the Project Design Report (PDR).

Our approach follows the approach outlined in the RFP. We have modified the approach to reflect the specifics of our project. We have included an initial task of evaluating the Reservoir/Balancing Tank(s) options of an open earthen reservoir versus prestressed concrete tank(s). We have included in the schedule, workshops where we will present preliminary information on various critical issues, including the storage evaluation and pump station layout. This will assist in expediting the design.

We have included an initial schedule which highlights our basic services and will be expanded to include additional management tasks once we meet and coordinate program management. The schedule follows the overall schedule in the Program Manager's Extranet. We understand the importance of scheduling and coordination with the other DP. Therefore, we have retained a professional scheduler to assist us in



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implementing our services plus provide GCDC-WWS and the Program Manager the information to coordinate the activities of all of the DPs.

Our fee has been presented in the format as requested. Our fee is based on our historic design fee information on similar projects plus the program management requirements of the project.

Jones & Henry appreciates this opportunity to present the proposal to the GCDC-WWS for consideration. We look forward to reviewing our proposal with you and commencing the Intermediate Pump Station and Reservoir/Balancing Tank(s) design.

Sincerely,

JONES & HENRY ENGINEERS, LTD.

A handwritten signature in blue ink that reads "Steven L. Wordelman".

Steven L. Wordelman, P.E.
Client Principal

A handwritten signature in blue ink that reads "Clifford M. Gordon".

Clifford M. Gordon, P.E.
Project Manager

SLW/bjm



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Resumes



Project Understanding

Intermediate Pump Station and Storage Reservoir/Balancing Tank(s) (Contract S.4004) are proposed between Lake Huron and Flint to boost the pressure in the raw water transmission main in order to limit operating pressures at the Lake Huron Pump Station. The proposed 65-MGD Intermediate Pump Station (IPS) is to be constructed on a site near the intersection of Hull and Martin Roads. Ten million gallons (10 MG) of storage will also be provided at this site, adjacent to the pump station. Chemical storage, a chemical feed system, and standby power are to be provided at the pump station.

Reservoir Design

The design of the Intermediate Pump Station and Storage Reservoir/Balancing Tanks(s) will include a 10 MG storage facility designed for all water to flow through it, to promote mixing and turnover. The system may also include a chlorine feed system in order to allow for the periodic dosing into the pipeline. This dosing could occur in either a monthly high concentration slug or be continuously injected into the pipeline.

One option for a reservoir, is the use of storage tanks. The design standards included in Exhibit 05-A indicates that tanks for water storage set at or above grade may be used in some instances to provide limited water storage for operations (balancing tanks). If storage tanks are selected, these tanks shall be constructed of pre-stressed concrete and have a maximum side water depth of thirty (30) feet. Two 5 MG tanks or one 10MG tank will be considered.

Another reservoir option is the use of earthen construction. If earthen construction is selected, the reservoirs will be constructed, where possible, to balance the excavation from the reservoir area with the berm area in order to obtain the appropriate amount of raw water storage at each location. The earthen reservoirs will generally consist of the following:

- Rectangular shape
- Access road (gravel or natural grass area) shall be provided around the perimeter of the reservoir, inside any fencing, for vehicle access for inspection and maintenance
- Minimum of three (3) feet of freeboard above the maximum water level at the total design storage volume of the reservoir
- Drainage ditch/swale, if needed, to prevent stormwater runoff from entering the reservoir
- Reservoir site shall be completely enclosed inside a security fence
- Lighting shall be provided to facilitate night inspection and/or maintenance activities and should be connected to a motion detector system.
- If security cameras are provided at the site, cameras overlooking the storage reservoir should be considered also.
- Interior slope of the reservoir berm (maximum) – 3 horizontal to 1 vertical
- Width of top of berm (minimum) – 8 feet
- Exterior slope of reservoir berm (maximum) – 3 horizontal to 1 vertical



- Reservoir liner:
 - Minimum two (2) feet clay liner if appropriate clay is used or as otherwise approved by the Owner and MDEQ
 - Membrane liners

J&H's proposal is based on the use of pre-stressed concrete tanks. If earthen construction is selected, the scope of the project will need to be changed.

Pump Station Design

Preliminary design of the pump station recommends three pumps handling the design flow of 65 mgd with a fourth pump on standby. A peak flow of 65.1 mgd (including loss allowance) is estimated for three peak months of the year and 25 mgd (estimated average daily flow or ADF) for the other nine months of the year. Design standards recommended in Exhibit 05-A indicate that during actual design, additional/smaller pumps may need to be utilized to reduce the pumping flow rate to match desired demand and system operations. This may reduce the power requirements for each pump and could affect the total power requirements. In addition, adding additional pumps may allow for varying the size and flow rate of the pumps to provide a range of flows depending on which pumps are operated. This may help compensate for not using variable frequency drives.

In general, the design should provide positive pressure on the line in all locations. The criteria recommended for raw water provides that the energy line be a minimum of approximately 5 psi (11.5 feet) above the ground surface.

Design Conditions

Max Day:

65 mgd
C=100
Discharge Pipe diameter 60"
TDH= 429 feet
3 pumps operating simultaneously

Avg. Day

25 mgd
C=100
Discharge Pipe diameter 60"
TDH= 212 feet
1 pump in operation

Equipment and accessories will be based on working pressures of 200 psi with allowances for surge protection.

Electrical

DTE Energy will be providing the primary electrical service to the site. The main feed will be 4160 V. A second electrical feed will be provided as either a second independent feed from DTE Energy or an on-site generator(s).



The onsite 4160 V distribution will consist of a dual fed bus with a tie switch for redundancy. Dual transformers from each side of the bus will be provided with an automatic transfer switch for 480 V and lower voltage loads.

SCADA System

The SCADA system will be implemented such that each Lake Huron Water Initiative (LHWI) location can “talk” to the SCADA system at a separate base location. The SCADA system will include distributed control with each facility acting as a standalone system with automatic shutdown capability when a failure occurs.

The system will be comprised of a central control facility at the Genesee County Water Treatment Plant with a PLC based control at the Intermediate Pump Station and Reservoir.

As requested the PLC at the Intermediate pump station will match the existing PLCs used by Genesee County, as manufactured by Allen-Bradley. Also, the SCADA System will incorporate an operation and control system similar to the existing SCADA System at the GCDC Henderson Pump Station. The SCADA System at the Intermediate Pump Station will also be capable of automatic, semi-automatic or manual operating control modes.

Industrial computer touchscreens will be used to monitor the pump station operations and to change any desired set-points. The industrial computer touchscreens will be password protected. The following systems will be included for the control and monitoring of the Intermediate Pump Station and Reservoir:

- Pump performance, status and control
- Intermediate reservoir level(s)
- Chemical system control and pacing
- Residual chlorine
- Discharge pressure
- Discharge flow
- Alarms
- Station unauthorized access
- CCTV surveillance data
- Power usage

Remote indication of the receiving reservoir level is required for the full automatic operation of the Intermediate Pump Station.

Site Development

The site will be developed with roadways and sidewalks to allow access for full operation of all facilities. Landscaping will be provided to maintain an acceptable appearance, but minimize maintenance. Potable water and sanitary facilities will be provided through an onsite well and septic system. Run-off detention will be provided as required.



Security

Because of the location of the intermediate pump station (in an isolated rural area) and because the facility will be relatively close to the road, several security measures were recommended during the preliminary design. The following options are proposed:

- Fencing around the perimeter of the Intermediate Pump Station and reservoir.
- Lighting to facilitate night inspection and/or maintenance activities. Lighting will be connected to a motion sensor system.
- Intrusion alarm for access ladders associated with the tank(s), pump station, and any chambers.
- Security cameras at the site, associated with the storage tanks, pump station and chambers.



A. Detailed Scope of Work

Jones & Henry (J&H) will adhere to the specific tasks as proposed by the Project Management Team. Scope of work will include:

Task A- Preliminary Design Phase

A1 - Project Management - includes project management and administration, meetings, coordination, reporting, and project scheduling.

A2 -Site Investigations- Includes review of data provided by PM, supplemental survey and geotechnical investigations, utility investigations, site visits, and other tasks to obtain information required for design.

J&H anticipates conducting a workshop with the PM and Owner shortly after the kickoff meeting and prior to the 30% Design completion. The purpose of the workshop will be to review preliminary design issues and J&H proposed approach regarding:

- Site Layout
- Definition of type of storage
 - Open earthen reservoir
 - Pre-stressed concrete tanks
- Pump station
 - Layout
 - Max-day and min-day pumping
 - Pump sizes
 - Emergency supply
 - Redundancy
- Others
 - Backup power supply (type)
 - On-site sanitary facilities
 - Operation of facility
 - Maintenance
 - Security

A3 - 30% Design - Includes development of 30% design, with major emphasis on site layout and pump station layout, collection of permitting documents and quality assurance/quality control (QA/QC) of said documents, as well as the development of a 30% design project cost estimate.

Task B- Final Design Phase

B1 -Project Management -Includes project management and administration, meetings, coordination, reporting, and project scheduling.

B2- 60% Design- Includes development of 60% design, commencement of permitting applications and quality assurance/quality control (QA/QC) of said documents, as well as development of a 60% design project cost



estimate. The 60% design will include refinement of the layout process, plus commencement of structural, electrical, I/C, and mechanical.

Shortly after incorporating the 60% design review and Value Engineering recommendations, J&H proposes an additional workshop with the PM team and all relevant DPs to address the procurement specifications of critical equipment. The objective will be to obtain uniformity in the procurement of similar equipment such as:

- Pumps & Motors
- Generators
- Meters
- MCC
- SCADA systems
- Valves and piping

B3-90% Design- Includes development of 90% design and permitting documents and quality assurance/quality control (QA/QC) of said documents, as well development of a 90% design project cost estimate.

B4-100% Final Design -Includes development of 100% design and permitting documents and quality assurance/quality control (QA/QC) of said documents, as well development of a 100% design project cost estimate.

Task C-Bidding Phase

C1 -Project Management -Includes project management and administration, meetings, coordination, reporting, and project scheduling.

C2- Bid Phase Assistance -Includes assistance in answering bid questions and developing addenda, bid review, and recommendation of award.



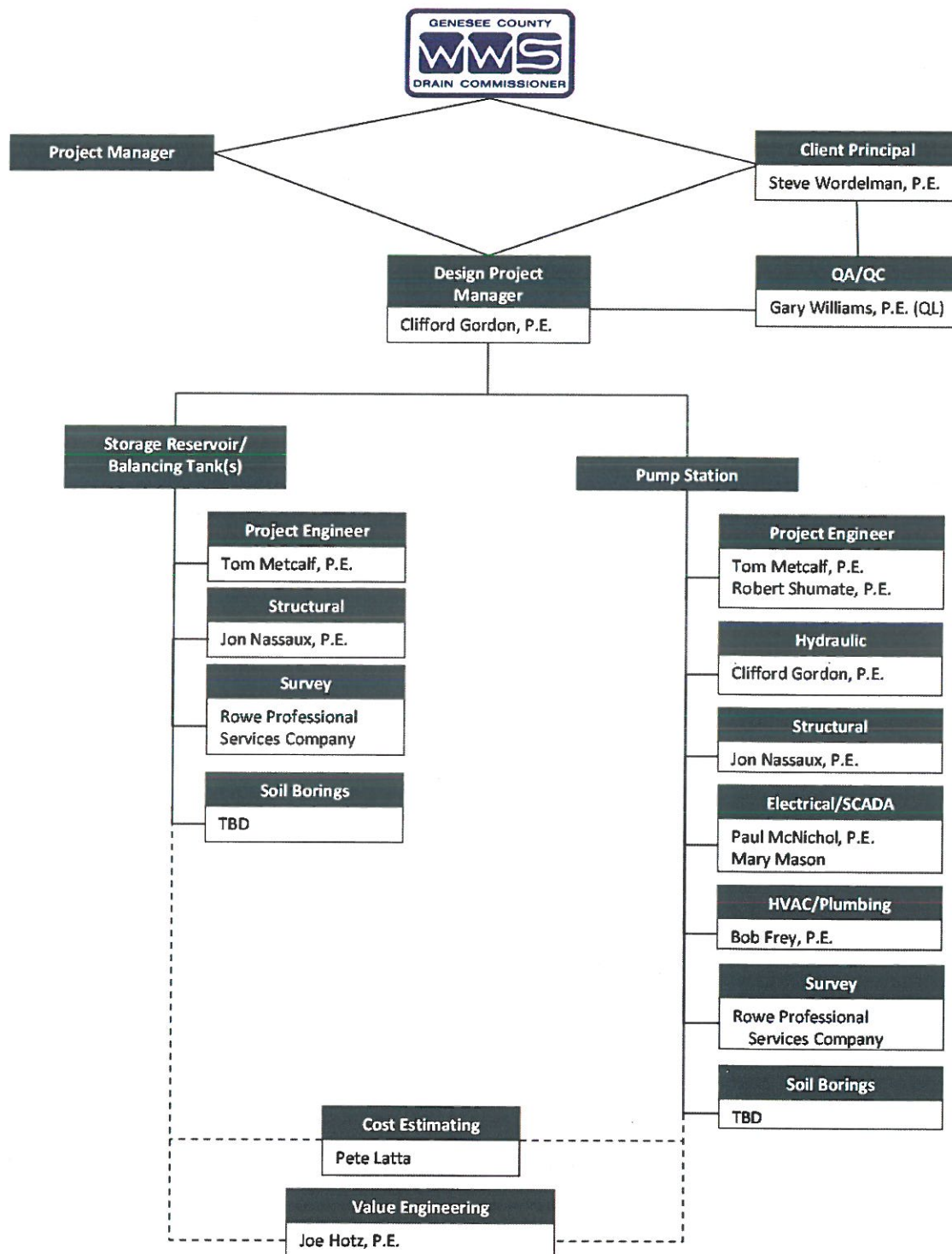
B. Engineering Estimate

The engineering fee is presented on the forms provided as part of the Request for Proposal. The fee is based on the scope as defined in the various documents contained in the Request for Proposal. The only subcontractor identified at this time is the scheduler, Swint Consulting Service. Swint's hours are not included in the engineering hours, but are shown on the schedule. An allowance is included for geotechnical, survey, and environmental, as the scope is not defined yet to obtain full proposals. The determination of subcontractors and obtaining proposals will be coordinated with the PM and Owner. Two geotechnical allowances are included, depending upon the final selected storage approach. The design fee is based on tanks.

No time for an individual to be part of a VE Team has been included since the time and durations of the workshops has not been defined. The proposed VE team member is experienced in pipeline work. His billing rate would be \$145 per hour.



Organizational Chart





C. Schedule

The design schedule follows this section. The schedule has been prepared using Primavera. The schedule includes subtasks with start/finish dates and budget labor units by task and by week. The critical path is shown, as well as proposed workshops.

Coordination/Review meetings with the PM and Owner are not shown at this time, but will be incorporated after authorization to proceed. Procurement of material is also not shown at this time as it requires coordination with other contracts, but can commence any time after completion of 30% design. The total hours include the project management, preparation of plans and specifications, cost estimating, preparing and responding to VE comments (but not actual VE participation) and the schedulers hours even though this task will be subcontracted.