



Hazen and Sawyer
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November 7, 2023

Sidney Forsyth, PE
Director
Cartersville Water Department
148 Walnut Grove Road, SE
Cartersville, GA 30120

Re: WPCP Expansion to 25 mgd: Preliminary Engineering and Industrial Support Services

Dear Sidney:

As requested, Hazen and Sawyer (Hazen) is pleased to submit the following letter proposal to provide preliminary engineering and industrial support services for the City of Cartersville Water Pollution Control Plant (WPCP) Expansion to 25 mgd Project. If acceptable, this work will be performed under our Agreement for General Engineering and Consulting Services with the City of Cartersville, dated September 1, 2016.

Project Understanding

The City of Cartersville Water Pollution Control Plant (WPCP) is a 15-mgd (maximum month) wastewater treatment facility. The facility is currently treating an average monthly influent flow of approximately 8 mgd, and the maximum 30-day running average has exceeded the 15-mgd threshold (but not yet in a calendar month). The Cartersville Water Department (CWD) is expecting several Significant Industrial Users (SIUs) that will increase flows and loads beyond the WPCP's treatment capacity. To accommodate this growth and current flow pressures, CWD plans to expand the treatment capacity of the facility to 25 mgd (maximum month) utilizing a Construction Manager-at-Risk (CMAR) project delivery method for the construction of the project.

Due to the rapidly approaching startup schedule of the SIUs, CWD needs an immediate capacity analysis update, and because the SIUs are discharging 'non-traditional' pollutants, CWD needs assistance in determining local limits for these different pollutants. As part of this project, CWD also requests Hazen's assistance to coordinate with SIUs during the negotiation phases to discuss limits with the goal of balancing the need to keep the WPCP functioning while not hindering economic development goals. In addition, the Headworks Analysis that was completed in 2018 needs to be updated. Additionally, because of the new pollutants, CWD will need to operate the WPCP differently once the SIUs come online. In that regard, CWD will need new operational guidelines including process descriptions, key performance indicators, troubleshooting procedures, and training as the industries come online.

In anticipation of the new industries and the increased flows and loads, CWD previously commissioned Hazen to prepare a conceptual level Facility Plan outlining unit process improvements required to meet the anticipated increased flows and loads, assuming permit limitations would adjust proportional to the increase in flow. The Facility Plan included the following recommendations:

New Influent Pumping Station

- Construct a new influent pumping station (IPS) sized for peak hour flow utilizing variable speed submersible pumps.
- Construct a new masonry building to house new electrical gear associated with the new IPS and other nearby facilities.
- Install new forcemain(s) from the new IPS to a new headworks facility located on the east side of Walnut Grove Road.
- Re-route existing influent sewer lines, recycles, and plant drains to new IPS.
- Demolish existing screw lift pump stations and corresponding screenings and grit removal structures after new IPS is placed into service.

New Preliminary Treatment (Headworks)

- Construct a new headworks sized for peak hour flow. The headworks facility will consist of fine screens, grit removal, and flow measurement. It will be located on the east side of Walnut Grove Road.
- Provide flexibility to direct screened and degritted flow to equalization or bypass equalization and flow directly to bioreactors.
- Provide new or provisions for future odor control for the new headworks.
- Install new power utility feed for the facilities on the east side of Walnut Grove Road. Construct a new electrical building with backup power to serve the headworks, equalization, and other facilities on the east side of Walnut Grove Road.
- Provide controlled access from Walnut Grove Road.

New Influent Equalization Tank(s)

- Construct new equalization tank(s) sized to attenuate peak flows to maximum day flow.
 - Covered, circular, pre-stressed concrete tank(s) filled by gravity are assumed.
- Provide new or provisions for future odor control for new tank(s).

New Flow Distribution Structure

- Construct a new flow distribution structure to accept flows from the new headworks and the new equalization tank(s).
- Proportionally split flow two ways: (1) to new Bioreactors 4 and 5 sized for 10-mgd total or (2) to existing bioreactors (15 mgd). Provide flexibility to split flows proportionally based on which bioreactors are in service.

- Options to mix RAS with preliminary effluent in this box will be investigated during detailed design.
- Alternatively, RAS will be split separately from the preliminary influent flow.

New Bioreactors 4 and 5

- Continue to utilize existing Bioreactors 1, 2, and 3 as is with minor modifications for influent streams and flow splitting.
- Construct new Bioreactors 4 and 5; size each for 5-mgd treatment capacity (10 mgd total).
- New bioreactors will be plug-flow reactors and will have anaerobic, anoxic, and aerobic zones.
- Basins will be up to 24-feet deep equipped with fine bubble diffused air.
- Vertical shaft mixers will be utilized to mix the anaerobic and anoxic zones.
- Construct a new blower and electrical building to serve Bioreactors 4 and 5.
- Provide new nitrified recycle pumps in Bioreactors 4 and 5.

Final Clarifiers and Return Activated Sludge System Upgrades

- Construct a new final clarifier flow distribution box to split flow from Bioreactors 4 and 5 to new Final Clarifiers 4 and 5.
 - Note: Flows from Bioreactors 1, 2, and 3 will continue to Final Clarifiers 1, 2, and 3.
 - Flow splits will consist of fixed weirs with isolation gates.
- Demolish existing emergency equalization basin.
- Construct two new 135-ft diameter final clarifiers, similar to Final Clarifier 3 (depth, diameter).
 - Each new clarifier will have provisions for RAS metering and piping in/out.
- Construct a new scum PS to collect and convey scum from all new Final Clarifiers.
- Construct new RAS PS.
 - New RAS PS will consist of a wetwell with submersible, non-clog centrifugal pumps (similar to existing RAS PS) and collect and mix RAS from all final clarifiers.
- Construct new RAS forcemain to either Pre-Mix tanks influent/Bioreactor 4 & 5 influent OR to flow distribution box upstream of bioreactors.

Filter System Improvements

- Utilize existing filters as is for flows from Final Clarifiers 1, 2 and 3.

- Construct new rapid mix/flocculation/filters sized for 10-mgd maximum month treatment capacity. It is assumed new filters will be similar in treatment technology and design concept to the plant's existing filters.

New Ultraviolet Facility to Replace Chlorine Disinfection

- Construct a new Ultraviolet (UV) Facility sized to handle combined flows from all final clarifiers (i.e., 25-mgd maximum month).
- Construct new non-potable water pumps in channel downstream of UV disinfection.
- Provide sodium hypochlorite system to add chlorine residual to non-potable plant water.
- Construct new effluent flow measurement utilizing a Parshall flume.
- Construct new effluent pipeline and outfall/diffuser.
- Determine if post-aeration is needed at higher flow.
- Demolish existing chlorine contact basins and associated chemical feed facility.

Solids Handling Improvements

- Add a new belt filter press (BFP) in the location adjacent to BFP 1 in the existing Dewatering Building.
- Add new polymer feed system and BFP feed pump/piping.
- Modify and extend conveyors to collect dewatered sludge from the new BFP.

New Biosolids Dryer

- Evaluate and recommend dryer technologies based on desired end-product use, site constraints, and cost considerations.
- Modify existing conveyors to allow dewatered cake to be transferred to a cake receiving bin located in a new dryer facility.
- Construct a new dryer system. For this proposal, a paddle dryer system is assumed with direct truck loadout capabilities and silo storage.

Chemical System Improvements

- Add new alum storage tanks and feed pumps adjacent to the existing alum storage and feed system.
- Provide new piping to feed mixed liquor upstream of Bioreactors 4 and 5 and the new filter structure.

New Septage Receiving Station

- Provide a new septage receiving station to replace the existing septage receiving station.

Electrical

- Evaluate site electrical and provide provisions to feed new facilities.
- Evaluate back-up power requirements and recommend alternatives.

Scope of Work

The purpose of this Project is to support CWD through preliminary engineering and 30% design of the project and through selection of a CMAR Contractor. Detailed design and construction phase services, if requested, will be performed under a separate proposal.

To accomplish this, Hazen will provide the following services:

- Task 1: Project Management
- Task 2: Assistance with CMAR RFP Development and Selection of CMAR Contractor
- Task 3: Preliminary Engineering
- Task 4: 30% Design
- Task 5: Permitting Assistance
- Task 6: Field Services
- Task 7: Industrial Support

Task 1: Project Management

The project management task includes activities involved with the detailed planning and subsequent monitoring and control of the project.

- **Progress Reports.** Monthly invoices and progress reports will be prepared and submitted to CWD. Each progress report will give a summary of activities completed during the reporting period and activities anticipated for the next reporting period. The report also will identify action items required by Hazen and/or CWD and/or the CMAR Contractor, provide updates of the project schedule, and report engineering changes under consideration by the project team. Deliverables: Monthly invoices and progress reports.
- **Kick-Off Meeting, Progress Meetings, Workshops, and Design Review Meetings.** A kick-off meeting will occur within two weeks of Notice to Proceed. Workshops and design review meetings will be conducted over the course of the project. Monthly in-person progress meetings will be held throughout design. Key discussions and/or decisions made in these meetings will be documented by Hazen and distributed to CWD and the CMAR Contractor (if applicable) in the form of meeting minutes. Deliverables: Meeting minutes and/or other documentation and tracking of action items identified, and results.

- **Quality Assurance and Quality Control (QA/QC)** – Hazen will perform QA/QC reviews as the work progresses.

Task 2: Assistance with CMAR RFP Development and Selection of CMAR Contractor

This task includes development of the RFP document and assistance with the procurement and selection of the CMAR Contractor. Documents developed for the CMAR RFP will be like those used by CWD on the Water Department Administrative Complex Project. Preliminary engineering documents will be included for reference in the RFP. Hazen will work with CWD to define the CMAR scope of work to be included in the RFP. Hazen will also assist as needed on the development of the CMAR Contractor contract or agreement to be included in the RFP. It is assumed that the CMAR's Contract Documents will be like those used by CWD on the Water Department Administrative Complex Project.

Hazen and CWD will conduct a pre-proposal meeting and site tour for potential CMAR Contractors. Hazen will receive and address with CWD any questions to be included in addenda to the RFP. Hazen and CWD will establish the criteria for evaluation of the proposals. If needed, Hazen will provide a technical evaluation of the CMAR proposals. Hazen will assist with preparation and conducting interviews of proposers if needed.

Task 3: Preliminary Engineering

The Conceptual Level Facility Plan that Hazen and CWD previously developed will serve as a basis for the expansion to 25 mgd. Concurrent to CWD's procurement of a CMAR Contractor, Hazen will progress work on the preliminary design.

Task 3 involves Hazen's coordination with CWD through meetings and workshops to plan the desired improvements to provide the selected CMAR Contractor with adequate information to develop accurate opinions of probable construction cost as early as possible for the work. Accordingly, the following items will be addressed during preliminary engineering:

- Determination of major equipment and facility type and sizing requirements.
- Determination of levels of redundancy for all major equipment.
- Hydraulic profile and preliminary top of structure and base slab elevations.
- Site requirements including, but not limited to:
 - Preliminary site plan.
 - Roadway concepts and truck traffic routing plans.
 - Flood elevations (taken from best available FEMA floodplain maps).
 - Buffer requirements, if required, to address environmental conditions and abutting land use.
 - Structures that are abandoned or to be removed/demolished.
 - Potential subsurface pipe and utility conflicts that may interfere with construction.
- Likely building foundation requirements.
- Power and instrumentation and controls considerations.

Hazen will plan and conduct up to four (4) interactive workshops with CWD to present concepts and discuss options. The following workshops are anticipated:

- Influent PS, Headworks, and Equalization
- Filters, UV, NPW, and Effluent
- Bioreactors, Final Clarifiers, and Solids
- Electrical, Instrumentation and Controls, Structural, Architectural, and Building Mechanical

Topics will include treatment technology selection, size and redundancy concepts, preliminary facility layouts and concepts, and maintenance of plant operations (MOPO) requirements. Prior to each workshop, Hazen will develop an agenda (including list of decisions needed) and develop a PowerPoint presentation to facilitate the discussion. Hazen will provide meeting minutes to CWD after each meeting documenting key decisions made and any outstanding action items.

Using information gained through the above evaluations and workshops with CWD, Hazen will prepare Draft Technical Memoranda (TMs) documenting decisions for each topic. The TMs will include a summary of agreed upon design concepts including, but not necessarily limited to:

- Design sizing and concepts.
- Description of facilities and site requirements.
- Listing of major equipment and system requirements.
- Description of demolition and utility relocations.
- Description of building type and architectural requirements.
- Description of utility requirements.
- Sequence of construction and major maintenance of plant operations requirements.
- Mechanical plan and section of new or modified facilities.

The TMs will be developed with adequate detail to allow the CMAR Contractor to develop a preliminary cost model. Comments from CWD and CMAR (if applicable) will be addressed, and Final TMs will be issued by Hazen. Deliverables: Technical Workshops with CWD, including Draft TMs, agendas, PowerPoint presentations, and meeting minutes; Final TMs.

It is envisioned that CWD will utilize the TMs and the CMAR Contractor's cost model results to further define the scope of the project to be constructed in terms of schedule, work package elements, and budget considerations. The goal of this portion of the Work is definition of a project to be constructed that is in CWD's best interests and meets CWD's needs in terms of treatment, as well as budget and schedule requirements.

Task 4: 30% Design

Following completion of preliminary design by CWD, Hazen will begin preparation of the 30% Design.

Major Equipment Selection. Assist CWD with major equipment selection. Prepare an equipment list with approved, selected equipment, manufacturers, and manufacturers' local sales representatives, allowing for equivalents. Update this list as needed throughout all phases of work. Deliverables: Equipment List.

Coordination with Construction Manager. Hazen will coordinate closely with the CMAR Contractor who will develop construction cost estimates, perform constructability reviews, and help Hazen develop initial construction sequencing plans to ensure Maintenance of Plant Operations (MOPO). This information will be incorporated by Hazen into the design documents.

30% Design. Hazen will develop the layouts and design based on the approved TMs. Hazen will submit in-progress documents to the CWD for review and comment at the 30-percent design milestone. Hazen will schedule and conduct a design review meeting with the CWD to review. In general, the 30% documents will include the following:

- General
 - Cover, sheet list, abbreviations
 - Process flow diagram(s)
 - Liquid train hydraulic profile
 - Mass balance
- Process Mechanical
 - Equipment layout plans
 - Major sections
- Site/Civil
 - Preliminary site plan, showing structure locations
- Electrical
 - Power distribution concepts, one-line diagrams
- Instrumentation and Control
 - P&IDs (process portion for new and modified unit processes)
- Other
 - Field survey info (see Task 6 below)
 - Equipment list
 - Updated construction cost estimate (prepared by CMAR; reviewed by Hazen)
 - Constructability Review (prepared by CMAR; reviewed by Hazen)
 - Drawing and specification list

Task 5: Permitting Assistance

Hazen will assist CWD with discussions with Georgia Environmental Protection Division (EPD) to increase the site's waste load allocation to accommodate the additional flow discharge and work with CWD and EPD to establish new NPDES discharge limits for the WPCP. Hazen will prepare supporting documentation as required for permitting and regulatory agency approvals, such as Georgia Environmental Protection Division, Corps of Engineers, and Atlanta Regional Commission. Hazen will assist CWD as needed in preparing and updating any permitting-related and planning-related documents including public notices and materials for public meetings.

Anticipated planning documents to be prepared include:

- Wasteload Allocation Request
- Antidegradation Analysis
- Environmental Information Document (EID)
- Design Development Report (to be completed in future work authorization post-30% design)
- National Pollutant Discharge Elimination System Permit Application

To assist in the development of the EID, Hazen will perform a desktop review of the project site area, including a review of National Wetlands Inventory (NWI) data and Natural Resources Conservation Service (NRCS) on-line Web Soil Survey (WSS) to identify soil types in the vicinity of the site. Hazen will also perform a wetland and stream delineation.

Task 6: Field Services

Hazen will perform the following field survey work concurrent with the tasks listed above:

- Topographic Survey – A site survey will be performed by a subconsultant to verify critical as-built elevations, hydraulics, existing above grade surface features, topography, locating the soft digs (by others) and performing utility locates (by others). An allowance of \$75,000 is included for the subconsultant's cost for performing the site survey.
- Geotechnical Investigation - A geotechnical investigation will be performed by a subconsultant to obtain information for design of new structure foundations (assumed to be mat foundations). An allowance of \$100,000 is included for the subconsultant's cost for performing the geotechnical investigations. Deliverable: Geotechnical Report.
- Hazardous Materials Survey - Hazen will obtain the services of a subconsultant to perform a hazardous materials survey of areas identified to be impacted by the work and incorporate applicable requirements in the detailed contract documents. An allowance of \$25,000 is included for the subconsultant's cost for performing the Hazardous Materials Survey. Deliverable: Hazardous Materials Report.

Task 7: Industrial Support

Hazen will perform the following industrial support services concurrent with the tasks listed above:

- Industrial Support to Date – Since the beginning of June 2023, Hazen has been providing industrial support to CWD regarding proposed SIUs Qcells and SK. Efforts include the following:
 - Coordination efforts and technical process related calls and Teams meetings with the proposed industries (e.g., Qcells and SK).
 - Headworks analysis update (using 2018 framework) to add pending industrial users to the Industrial Allocation Table.
 - Biowin modeling related specifically to the proposed Qcells industry.
- Full Update of Headworks Loading Evaluation - Hazen will conduct a Headworks Analysis and Local Limits Evaluation. The evaluation will be a full update to the work completed in 2018. Anticipated efforts include the following:

- Evaluate available data sets needed for the headworks analysis update, including domestic data, industrial data, WPCP influent and effluent data, and biosolids data.
 - Develop a sampling plan, if needed (it is assumed that the City will collect samples and send to a laboratory for analysis).
 - Compile and review industrial discharge data.
 - Review previous headworks analysis calculations and provide recommendations on updated input parameters for analysis.
 - Update Headworks Analysis Model with recent data and inputs from the revised NPDES permit and Fact Sheet.
 - Review local pretreatment limits, including: arsenic, cadmium, chromium, copper, cyanide, lead, mercury, molybdenum, nickel, selenium, silver, and zinc.
 - Add emerging pollutants to headworks analysis to include TDS, sulfate, lithium, and fluoride.
 - Prepare a Draft and Final Technical Report (complying with EPD's requirements) summarizing results of Headworks Loading Evaluation.
 - Assist City with submission of report to EPD within 180 days of effective date of NPDES permit.
- Ongoing SIU Coordination - As industries approach the City to negotiate development, there will be a need to evaluate the potential industrial discharge(s) to determine potential impacts on the WPCP. Hazen will work with CWD to evaluate each industry and advise CWD of risks associated with each discharge and a basis for issuing a given pre-treatment permit. Hazen will continually update the headworks analysis, if needed, for each SIU, recommend local limits for relevant parameters, and provide technical support in communicating as required with the SIUs. This may require meetings with the SIUs, coordination meetings with CWD, and internal coordination meetings. Hazen will issue meeting summaries/minutes for meetings with SIUs.
 - Operations strategy development - CWD is facing a period of time in which new SIUs will be discharging to the WPCP before the plant expansion is under construction. The effect of some of the pollutants will require CWD to operate the WPCP differently to manage the impacts. Hazen will develop operational guidelines for the new conditions that will include operational guidelines, key performance indicators (KPIs), and troubleshooting procedures. Hazen will also provide process training to WPCP staff on the new guidelines. Operational guidelines will be communicated in training materials through PowerPoint slides.

Schedule

This Task Order is based upon the anticipated schedule shown below. This Task Order is based upon a nine-month project schedule. It is envisioned that tasks will be performed concurrently.

Task	Duration	1	2	3	4	5	6	7	8	9
1: Project Management	9 months									
2: CMAR Procurement	6 months									
3: Preliminary Design	6 months									
4: 30% Design	3 months									
5: Permitting Assistance	9 months									
6: Field Services	9 months									
7: Industrial Support	9 months									

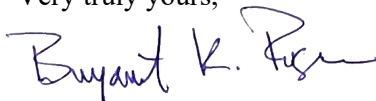
Compensation

Compensation for the Scope of Services outlined above will be in accordance with the terms specified in Hazen’s Agreement for General Engineering and Consulting Services with the City of Cartersville, dated September 1, 2016 with a maximum not to exceed amount of \$1,850,000. Work in excess of this limit will not commence without prior written approval from CWD. This budget includes a \$200,000 allowance for Hazen’s subcontractors for Field Services (Task 6). A cost summary estimated by task is provided below.

Task	Budget
1-5: Project Management, CMAR Procurement, Preliminary Design, 30% Design, Permitting Assistance	\$1,500,000
6: Field Services	\$200,000
7: Industrial Support	\$150,000
	\$1,850,000

Please call Kristen Smeby at (678) 464-6515 or me at (404) 353-0571 if you have any questions regarding this proposal. We look forward to serving CWD through this very important project.

Very truly yours,



Bryant (Pat) Rogers, PE
 Vice President

cc: Kristen Smeby, Vivi Nguyen