



Hazen and Sawyer
4011 Westchase Blvd.
Raleigh NC, 27607

July 22, 2019

John T. Goodman
Water Resources Department Safety Engineer
City of Greensboro
PO Box 3136,
Greensboro, NC 27402-3136

Re: Budgetary Fee Estimate for Pumping Facilities PEI Calculations and Optimization Evaluations

Dear Mr. Goodman

Hazen and Sawyer appreciates the opportunity to provide the City of Greensboro this scope and fee estimate for services to support the City's efforts to achieve LEED certification. Hazen understands this certification requires calculations of the pump energy index (PEI) to confirm 50% of the City's pumps meet the required energy efficiency performance. This letter provides the estimated engineering fee to perform the scope items described herein to evaluate the City's water and wastewater pumps operational efficiency and calculate the PEI data per the Department of Energy's Energy Conservation Standards for Pumps (10 CFR Parts 429 and 431). The scope and fee estimates herein are budgetary estimates intended for the City's budgetary planning purposes. The scope and fee estimates can be refined as more information becomes available and as needed to meet the City's objectives.

Hazen will perform the following tasks to calculate the PEI for the remote water distribution and lift stations, raw water pump stations and wastewater process pumping stations.

Task 1 - Survey existing documentation to identify PEI calculation data needs. Existing documentation includes manufacturer's pump data sheets/curves, draw down test reports and site visits (as needed). It is assumed 25% of the pumping facilities will require a site visit.

Task 2 - Calculate PEI for each pump using test procedures defined in 10 CFR 431 Subpart Y (Energy Efficiency Program For Certain Commercial And Industrial Equipment – Pumps). These calculations will be performed using information from the existing documentation from Task 1 above.

Task 3 - Identify optimization potential for pumps that have a PEI greater than 1 (low operational efficiency) and summarize the reasons each pump has a low efficiency score. Propose additional evaluations (i.e. wire to water efficiency test, etc.) and modifications needed to ensure that a minimum of 50% of the City's pumps have a PEI of 1 or less. The modifications to achieve the desired PEI will be coordinated with the City on a case by case basis.

Task 4 – Technical memorandum that summarizes all PEI calculations using the DOE PEI calculations. Calculations will be performed using the Department of Energy’s procedures in defined in 10 CFR 429 & 431.

Task 5 – As an added value task, Hazen can perform more detailed optimization evaluations for the pumping facilities. This task would incorporate utility billing data evaluations to document the cost of operations and identify opportunities to reduce energy usage and costs through pumping operations modifications and pumping efficiency improvements. This evaluation will include:

- Pumping efficiency improvements (i.e. new pumps, variable speed systems, repairs)
- Alternate utility billing rates that could be more compatible with the pump station operations
- Cost savings potential from managing pumping operations during on/off-peak periods.
- Cost savings potential from managing peak demand.

This task would provide prioritized recommendations that focuses on the modifications that have the highest optimization potential (“low hanging fruit”). It is assumed that pump stations with less than 20hp of connected load would be excluded from this task resulting in a total of 42 remote pump stations.

The budgetary fee estimate for Tasks 1-4 is \$93,000 with a completion time of 140 days from notice to proceed. It should be noted that the fee estimate for Tasks 1-4 include all remote pumping facilities (61 remote facilities). The City may elect to omit the small pumping stations where there is a low level of benefit potential from optimization.

The budgetary fee estimate for Task 5 is \$47,400 and would be performed in parallel with Tasks 1-4. The completion time for Tasks 1-5 would be 180 days from notice to proceed.

The basis for these budgetary fee estimates are summarized on Table 1 herein. Hazen understands that minority and women's business enterprise (MWBE) participation is an important objective for the City. Hazen anticipates a minimum of 13% participation on this project.

Hazen and Sawyer truly appreciates this opportunity to continue providing engineering services to the City of Greensboro

Very truly yours,



Bryan R. Lisk PE, CEM
Senior Associate

cc: Alan Stone PE, Aaron Babson PE

Table 1 – Budgetary Fee Estimate Summary

	Utility Billing and Pumping Optimization Evaluations									
	Pump Energy Index (PEI) Calculations									
	Quantity	Hours Each	Total Hours	Labor (\$/HR)	Fee Estimate	Quantity	Hours Each	Total Hours	Labor (\$/HR)	Fee Estimate
Remote Pump Stations	61	8	488	\$150	\$73,200	42	6	252	\$150	\$37,800
TZO WRF*	1	72	72	\$150	\$10,800	1	16	16	\$150	\$2,400
NB Transfer PS	1	20	20	\$150	\$3,000	1	16	16	\$150	\$2,400
Lake Townsend WTP	1	20	20	\$150	\$3,000	1	16	16	\$150	\$2,400
Mitchell WTP	1	20	20	\$150	\$3,000	1	16	16	\$150	\$2,400
	Totals		600		\$93,000		Totals		300	\$47,400

* TZO estimate includes influent pumps, water recirc pumps, RAS/WAS pumps, and primary sludge pumps & thickened sludge pumps.