



Hazen and Sawyer
629 Green Valley Rd, Suite 200
Greensboro, NC 27408 • 336.478.3378

May 25, 2018

Brian Boyd
Project Manager, Department of Water Resources
City of Greensboro
2602 S. Elm-Eugene St.
Greensboro, NC 27406

Re: Scope and Fee Proposal for the design of the Air Park Booster Pump Station

Dear Mr. Boyd:

Hazen and Sawyer is appreciative of the opportunity to submit the enclosed proposal to provide Engineering Design Services as described below for the addition of a Booster Pump Station on Sharps Airpark Court in Greensboro, NC.

Background

Hazen and Sawyer will provide engineering design services for the addition of a 2 mgd pump station, with the purpose of increasing the firm capacity and reliability of the pumping supply to the 1120 pressure zone as recommended by the 2009 and 2017 master plans. Based on the evaluation completed by Hazen and Sawyer in 2016, a pump station with three (3) – 1 mgd pumps with a TDH of 124 feet is sufficient to boost water from the 1070 to the 1120 pressure zone, however, the design team would like to further evaluate other options to make sure three pumps is the optimal solution.

The property proposed for the Airpark Booster Pump Station is located on the parcel at 5 Sharps Airpark Ct with PIN 7815608434 and owned by the City of Greensboro. Per the current USGS soil survey and published FEMA maps the parcel contains a blue line stream tributary to the East Fork Deep River and the 100 year floodplain encompasses the majority of the property. Hazen is aware of a deed, signed and accepted by the planning board on September 8th, 1999, redefining the 100-year flood plain boundary for this property for the purpose of development with the Bud Holding Company. The deed references a revised 100-yr floodplain line and cites a reference to Sheet 14-P, dated April 27, 1999; however, the FEMA FIRMs do not support this statement. The site is located on the Randleman Lake Watershed and will be subject to the applicable buffer and impact rules.

The Water Resources Department has indicated a general layout of the Clifton Road Pump Station is the desired configuration. Specific request for the Air Park Booster Pump Station were identified in the scoping meeting and used to identify the effort required to design this facility. These requests and preferences are attached as Appendix B as a reference to this document.

Preliminary Engineering Phase

Environmental Permitting Requirements: The project team will begin with an initial site visit to research and identify the potential environmental impacts due to development of the parcel. Considering the adjacent East Fork Deep River, adjacent floodway, 100-year floodplain and the blue line stream

indicated on USGS, the team will document the existing conditions of the site, investigate for potential jurisdictional wetland areas, identify the top of bank at the river to determine the buffer set-back extents and confirm protected or endangered species are present. While the Development Plat recorded in 1999 for the property shows a revised floodplain off the property, the FEMA floodplain maps do not support the delineation. After discussions with the City of Greensboro's stormwater department, it is determined the property will require a floodplain development permit and the Finished Floor Elevation (FFE) will be required to be 1-ft above the base flood elevation. The surveyor will be required to provide elevation certifications of the foundation and the conditions post construction. Activities to redefine the boundary of the 100-yr floodplain such as a letter of map revision or amendment are excluded from this scope.

Pending the outcome of the field investigation, Hazen will proceed with other environment permits and determinations with USACE, NCDWQ and others. A complete list of expected permits and potential permits is included in the next section.

Surveying: Upon completion of the field investigations, the team will hire a third-party surveyor to provide a planimetric survey of the parcel as well as the surrounding area for context. The limits of the survey are proposed to include the bordering streets and the adjacent parcel owned by the City to a point across the river bank.

The surveyor will contact 811 to find all subsurface utilities but a ground penetrating radar (GPR) study or third party subsurface utility engineering (SUE) is not anticipated since this is a previously undeveloped site.

Geotechnical Investigations: To determine the bearing capacity of the soils on the parcel, the design team will hire a third party geotechnical firm to perform four borings on the site. Locations will be determined when the building concepts are confirmed. A geotechnical report will be provided of the subsurface soil conditions.

Preliminary Design: The design team will create a set of concept drawings and a basis of design memorandum (BODM) with summary design standards, engineering decisions and a statement of assumptions for review and approval by the design review team. The BODM prepared will be the design guide for the completion of the project for the design team.

Deliverable: The documents referenced above along with a presentation to the management team will be the deliverable for the preliminary engineering phase.

Detailed Design Phase

At the completion preliminary engineering phase, the design team will incorporate comments on the BODM from the management team and will move forward with the detailed design. This phase will begin at approximately 30% design and be complete at the issuance of "Issued for Bid" Construction Documents.

Design: The design will include a fully comprehensive design from concept to a final construction set of drawings. This will include procurement of all necessary permits identified in this scope to comply with the City of Greensboro, State and Federal requirements.

Consistent with the scoping meeting notes and design considerations provided by the City, Hazen and its subconsultants will complete all mechanical, plumbing, architectural, electrical, instrumentation, site/civil

and landscaping design as required to provide a comprehensive booster pump station design for the City of Greensboro.

Applicable Permits: The following permits have been identified as necessary to complete this project.

- COG TRC Review
- Floodplain Development Application
- GDOT Driveway Permit
- USACE stream determination
- NCDENR Erosion Control – The disturbed area will be very close to 1 acre to build the pump station and may need an erosion control permit. The design team will include the practices in the design and will submit for permitting if necessary. It is often advised to inform the division of the project when close to one acre of disturbance, even if it is technically under the threshold to avoid confusion at a later date during construction, especially with the property's close proximity to the river.
- COG Building Permit Review – The design team will submit for approval and address the comments of the permitting division but will not pick up the permit. A licensed general contractor is required to procure and pay for the building permit.

The cost of permit application fees will be included in the scope and fees as an allowance for reimbursable expenses to expedite the permitting process. Hazen will issue the check to cover these costs and will invoice for the expense on the next monthly invoice request.

Hazen will be responsible for the Quality Assurance/Quality Control reviews for the work of our subconsultants and our internal staff. Our project plan will include QA/QC milestone reviews for the 30-60-90 and 100% submittals reviews. We will use both our internal and external sources for these reviews to provide the City of Greensboro the highest quality product.

Deliverables

The final deliverable for the project will include a complete set of signed and sealed contract drawings and specifications.

Contract Drawings will be produced on a full size 22" x 34" ANSI D paper. The permit copies and the final "Issued for Bid" set will be signed and sealed.

Project Manual with Technical Specifications: The project manual will use the most current version of the City of Greensboro's Front End Documents (Including general project provisions, General and Supplemental Conditions and other Div. 00 items) The design team will use the City of Greensboro's technical specifications as much as practical and will provide the specifications with Hazen's standards where the COG specifications aren't applicable.

The project specifications will be customized to the project for the individual requirements concerning pump performance, architectural features, security, instrumentation and other items as necessary.



Schedule

The project team will commence work immediately upon Notice to Proceed (NTP) and will provide final documents for advertisement by the end of March 2019 for an anticipated construction NTP of July 2019.

The team will provide intermediate deadlines per the schedule below:

- Project Kickoff: July 16, 2018
- 30% Documents & Basis of Design Memo: October 1, 2018
- 60% Documents: December 3, 2018
- 90% Documents: February 11, 2019
- 100% Bid Ready: March 25, 2019

Subconsultants

SAMR, PLLC will provide engineering design services, including contract drawings and technical specifications for the following scope:

- HVAC
- Plumbing
- Low voltage electrical up to 120V
- SAMR will also act as a protégé to Hazen for the mechanical scopes of the project in order to provide more comprehensive scopes on future partnering opportunities.

Westcott, Small and Associates will provide engineering design services, including the contract drawing and technical specification preparation for the scope below:

- Site/Civil Design
 - Demolition Plan
 - Site Plan
 - Landscaping Plan to comply with local ordinance
 - Storm drain conveyance plan
 - Grading Plan
 - Erosion Control Plan
 - Watershed Management Plan
- Permits
 - GDOT Driveway Permit
 - Grading Permit
 - Floodplain Development Permit
 - Stream Buffer Impacts (PCN to DEQ), if necessary
- Surveying
 - WSAA will hire and manage the surveyor on the project.

Bidding Services

Hazen, with the M/WBE consultant partners, will provide advertisement and bid period services for this project. Services will include scope for up to two rounds of bidding support. The completion of this scope of services will be at the recommendation of award for the lowest responsive Contractor to the City of Greensboro.



Fee

Please find the proposed lump sum fee for a total of \$338,641.00 for your review. The fee proposal is broken down to include the cost for the subconsultants.

Hazen and Sawyer is pleased to partner with SAMR, PLLC and Westcott, Small & Associates, PLLC as a subconsultant for the design phase services for the above referenced project. Both SAMR (M) and Westcott, Small (W) are City approved M/WBE consultants and we look forward to the opportunity of working with them on this project. SAMR, PLLC will provide engineering design services for a total of \$69,390 at 20.5% utilization. Westcott, Small and Associates will provide design services, for a total of \$85,870 at 25.4% utilization. Hazen will include a 10% subcontractor markup to account for administrative and management costs.

Please find Table 1 below summarizing the total effort for this project.

Table 1 - Summarized Fee Schedule

Task	Fee	Type
Hazen Design Services*	\$178,381	Lump Sum
SAMR, PLLC	\$69,390	Lump Sum
Westcott, Small and Associates	\$85,870	Lump Sum
Geotechnical Investigations (Sub)	\$5,000	Lump Sum
Total Contract Value	\$338,641	Lump Sum

*Includes Hazen 10% Administration and Management Cost

Please feel free to contact us at any time if you have any questions or would like to meet to discuss the items enclosed. Thank you again for the opportunity and we look forward to continuing to work with the City of Greensboro.

Best Regards,

Aaron D. Babson, PE
Senior Associate

cc: H. Thomas Tant, PE

Appendix A

Detailed Cost Breakdown

FEE DERIVATION

LUMP SUM

Task No.	Description	Jul-18									Aug-18							Sep-18							Oct-18							Nov-18																		
		Vice President	Sr Assoc	Associate	Sr. Prin Eng	Eng	Sr Designer	SAMR	WSAA	Other Subs	Vice President	Sr Assoc	Associate	Sr. Prin Eng	Eng	Sr Designer	SAMR	WSAA	Other Subs	Vice President	Sr Assoc	Associate	Sr. Prin Eng	Eng	Sr Designer	SAMR	WSAA	Other Subs	Vice President	Sr Assoc	Associate	Sr. Prin Eng	Eng	Sr Designer	SAMR	WSAA	Other Subs	Vice President	Sr Assoc	Associate	Sr. Prin Eng									
1	Air Park Booster Pump Station	2	16	12	18	40	28	22	24		0	10	8	8	21	22	26	10		4	14	6	8	32	22	22	6		2	18	0	0	102	28	40	106		4	34	0	76	50	106	80	180		0	76	0	154
A	Preliminary Engineering																																																	
	Project Kickoff Meeting	2	4			8		2	2																																									
	Desktop Survey of Existing Conditions				2	8			4																																									
	Verification of Identified Permits, Collection of Applications				2	2			4																																									
	CAD Plan/Drawing Set up		2			4	4							1	2	2	2								2																									
	General Site Layout				2				2				2	4	4		4							4	4		4																							
	General Mechanical Design				2	4	8				2			4	4	4		4			2			8	8			4																						
	General Electrical Design				2			12					4	4			16						4	8		16																								
	General Plumbing Design				2	2	4	8					2	4	4	4					2	4		4	4	4																								
	General Building Layout/Architectural Design			4	2	2					2	4		4									4	4																										
	Planimetric Survey (WSAA to hire Subcontractor)				2	2	2		4	\$ 10,000																																								
	Geotechnical Investigation (subcontractor)				2		2			\$ 5,000																																								
	QA/QC																																																	
	30% Design Review Meeting											4	6													2	2																							
B	Detailed Design																																																	
	Site Layout																																																	
	Siting of Structures																																																	
	Grading Design and Plan																																																	
	Driveway, Parking and Sidewalk Plan																																																	
	Storm Drain Conveyance Design and Plan																																																	
	Erosion Control design																																																	
	Mechanical																																																	
	Pump Selection/Verification and Design																																																	
	Piping Layout																																																	
	Pump Layout																																																	
	Yard Piping Design and Plan																																																	
	HVAC																																																	
	Modeling support and Surge Analysis																																																	
	Electrical																																																	
	Emergency Generator Design																																																	
	120V Design																																																	
	480V Design																																																	
	Instrumentation and Controls																																																	
	Arc Flash Study																																																	
	Security and Remote Telemetry																																																	
	Plumbing																																																	
	Bathroom																																																	
	PW Service																																																	
	Sanitary Sewer																																																	
	Floor Drains																																																	
	Structural/Architectural																																																	
	Structure Design																																																	
	Monorail Support System																																																	
	Architectural Elevations and Design																																																	
	Chemical																																																	

City of Greensboro Water Resources Department
Air Park Booster Pump Station
Subconsultant - SAMR, PLLC
Subconsultant - Wescott, Small & Assoc.

FEE DERIVATION

LUMP SUM

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**City of Greensboro Water Resources Department
Air Park Booster Pump Station
Subconsultant - SAMR, PLLC
Subconsultant - Wescott, Small & Assoc.**

FEE DERIVATION

LUMP SUM

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Appendix B

Scoping Meeting Notes and Design Preferences



Hazen and Sawyer
629 Green Valley Road, Suite 200
Greensboro, NC 27408

March 16, 2018

Project: Air Park Booster Pump Station
Client: City of Greensboro

Meeting Agenda

Subject: Scoping Meeting
Location: KROC – Lake Townsend Conference Room

1. Introductions
2. Understanding of the Task
3. Understanding of the Deliverables
 - Preferred Milestone Submittals for Review
 - 30, 90, 100 proposed in RFP
 - *COG Requests a BODM Deliverable.*
4. Project Documents
 - Specification Preference
 - ~~CSI 50 division or 17 division~~
 - *COG elects to use a 50 division specification*
5. Schedule
 - *COG targets a Notice to Proceed of July 2019*
 - *Approximate advertisement date of March 2019.*
6. Project Specific Items
 - *COG Noted the system has seen some water quality issues due to age and notes the requirement of the chemical feed system at the pump station.*
 - *COG notes the general arrangement of the Clifton Road Pump Station is the preferred with the exception of the chlorination vault, the City would prefer that be in a confined room with ample space. Access door to Chlorination room should open to the outside, no connection to the pump room.*
 - Mechanical
 - Slight shift of the zone boundary between west and high zones.
 - Requiring public notification and education
 - *COG will handle the notification to the customers, excluded from scope.*

- Installation of new boundary zone valve
 - Closing of an existing valve
- Three (3) – 1 mgd constant speed pumps (2 duty – 1 spare)
- Horizontal split case pumps
- Bathroom?
 - *COG would like to have a bathroom at this location for staff, bathroom should open up to the pump station.*
- Epoxy coated floors w/drains
- Housekeeping pads for equipment
- Overhead monorail
 - *Monorail should be completely enclosed in the building so that truck could back into the structure through the roll-up door and load the pump inside.*
- Mag meter / surge valve / arv / blowoff
 - *Also include a surge analysis and a pitot tube for flow testing.*
- Thinking of copper service waterlines in lieu of sch. 80, atleast from the tap to the RPZ, due to the breaks we had at NG from surge
 - *The City requests for copper PW service lines penetrating through the concrete slab and all the way to the RPZ Backflow Preventer.*
- Cla-Valves for surge
 - *Diaphragm Type*
- Roto-tork / Auma Actuators
 - *Or equal*
- HVAC, electric ~~or gas heat?~~
 - *Unit heaters should be electric*
 - *Air Conditioning will not be necessary with proper ventilation.*
- *Hose bibbs are requested on the outside of the building and at least one hose bibb will be provided inside off the discharge line for floor wash down.*
- *Chlorination and pump room should include heat and ample ventilation with air changes conforming to code.*
- *Ventilation – COG requests a Red/Green visual indication on the outside of the building if the ventilation system is off (Red-off/Green-on)*
- *Emergency Eye Wash – COG requests a tempered water eye wash requiring a hot water heater.*
- *Chlorination System shall be an Accu-Tab Chlorination System as manufactured by Axiall Water Treatment Products.*
- *Tilted Disc Check Valves with dampeners similar to Clifton Road Pump Station is desired.*
- *Samples lines shall be provided at least 80 feet downstream of the CL2 Analyzer.*

● Site

- Building layout
 - *COG likes the layout suggested, similar to Clifton Road Pump Station.*
- Grading (Site, driveway, parking, etc.)
- Stormwater Conveyance
- Erosion Control

- Flood Resilience (since portion of property is located within the flood plain)
 - *COG suggests a meeting with Jeremy McCall to discuss the total scope due to the FEMA flood map.*
 - *A call to the Stormwater group and Watershed Manager suggests a floodplain development permit, locating the finish floor elevation 1-foot above the base flood elevation and certification surveys during construction to verify the footing and at the completion of construction will be sufficient. Further permitting with FEMA to redefine the floodplain (LOMR/LOMA) will be excluded from the scope.*
- Parking and turnaround area
 - *COG requests the driveway turning radii and truck bay be designed to accommodate a 5.5 Ton Sterling truck with a bed length of ~20 ft.*
 - *Driveway and access should be wide*
 - *No dedicated parking spots are required.*
- Low maintenance storm water device (Biocell)
 - *A stormwater unit will not be needed due to the watershed plan.*
- Concrete sidewalk outside station access doors
 - *5' wide sidewalks full length around the building*
- ~~Gravel~~ or asphalt drive?
 - *COG prefers a paved drive*
- *Per the property plat, the maximum built upon (impervious) area for the parcel is 34,000 sf.*
- *Landscaping should be provided in the scope and fee*
- *Grass is not desired in the fenced area, would prefer gravel.*
 - *Will need to coordinate with landscaping requirement in design.*
- Architectural
 - Brick and Block Masonry Building w/metal roof
 - *COG preference:*
 - *Split face block, color close to CRPS*
 - *Green metal roof*
 - Chlorination Room, preferred inside similar to NG but more space is needed. Absolutely not in a vault like Clifton
 - Vinyl coated security fencing with barbed wire
 - *8' + barbed wire top*
 - *Electrically operated roll up door*
 - *Signs shall be affixed to building and gate, content of signs to be provided at a later date.*
- Electrical
 - Preference to Auto lights or switch?
 - *Lights shall be switched, design team asked to look into motion sensors to turn off the lights if left on upon exit.*
 - Generator, diesel or natural gas? Temporary Hookups?
 - *Generator shall be diesel and permanent located at site.*
 - *Manufacturers preferred, Cummins, MTU and CARR*

- *SPCC rules for fuel tank size*
 - *Prefer minimum of 24 hour run time full load capacity*
 - Any specific preference regarding manufacturers, dislikes?
 - *No preference to electrical manufacturer but preferred PLC shall be GE with RX3i model*
 - Arc Flash Studies
 - *Electrical equipment can be located inside the pump room*
 - *Electrical shall include single line diagrams*
 - *Add an External Electrical disconnect outside the pump station but inside the fence.*
 - *Gate shall be a manual gate.*
 - *Power monitoring shall be provided on the electrical equipment to include at least voltage and amps.*
 - *External lights should be included.*
- Instrumentation and Controls/Automation
 - Additional SCADA instrumentation (pump bearing temps, motor amp draw, etc.)
 - Thoughts on Automation for station operation?
 - Security Cameras (Longwatch)
 - *Standardized, request City standard in design.*
 - *Include vault tamper switches, wet floor indicators, motion, smoke and door switches.*
 - *Cameras shall have inside and outside views.*
 - Water Quality board, needs to be larger. Are we providing ph & CL analyzers?
 - *City notes adequate room shall be provided around the analyzers.*
 - *PVC or HDPE lines are preferred*
 - *COG will provide all instruments to the contractor.*
 - *Sample line located 80ft downstream.*
 - *Verizon LTE Remote Communications are used at other remote stations.*
 - *COG would like to look at pressure control for automatic pump operation.*
 - *Design team will look at the model to simulate operation*
 - *Suction and Discharge pressure gauges are required*
 - *Instrumentation shall report back to the SCADA system at the plants.*
 - *An HMI remote station shall be provided to operate the pump station.*
- Permitting
 - TRC
 - 401/404 Permitting – City Watershed Manager
 - Greensboro DOT Driveway Permit
 - Erosion Control
 - Wetland, Stream and Buffer Determinations
 - Complete a No-Rise Study for the Site
 - CLOMR/LOMR Applications if required
 - City of Greensboro Building Permit

- QA/QC
- Subcontractors
 - Surveying
 - Geotechnical Investigations
- Are Bidding Services Required?
 - *Yes, through the recommendation of award*
- Are Construction Services Required?
 - *Not in this contract, will be through a separate contract.*