

October 23, 2019

Ms. Stephanie Brixey  
Durham County  
Deputy Director / POTW Director  
5926 NC Highway 55 East  
Durham, NC 27713

**Reference:     Durham County, North Carolina**  
**Stirrup Iron Creek Basin Collection System Capacity Analysis**

Dear Ms. Brixey:

AECOM Technical Services of North Carolina, Inc. (AECOM) thanks you for this opportunity to present our proposal for professional engineering and technical services for the Stirrup Iron Creek Basin Collection System Capacity Analysis tasks.

### **UNDERSTANDING OF THE PROJECT**

Durham County is working to anticipate future development patterns in the Stirrup Iron Creek sewershed and the resulting sanitary sewer collection and conveyance needs. The County's areas of interest within the Stirrup Iron Creek sewershed include:

- A future NCDOT project to convert a portion of US70 to a controlled access roadway may impact an existing pump station (Page Point Drive PS). The County wishes to identify and plan expansion and/or relocation of this pump station, if needed, in advance of the roadway project.
- Growth and changes in land use in the vicinity of Airport Boulevard and TW Alexander Drive have the potential to impact the Page Park pump station. The County wishes to evaluate the remaining capacity of the existing pump station and anticipate a timeline for improvements.
- Residential and industrial development in the western Stirrup Iron Creek sub-basin may be limited in the future by the capacity of existing interceptors, Stirrup Iron Creek pump station, and forcemain. The County wishes to quantify the amount of flow which must be relieved from the western Stirrup Iron Creek sub-basin in order to accommodate future development.

Durham County is therefore seeking Engineering Design and Consulting Services for modifications to its existing collection system model and the analysis of scenarios that will allow for evaluation of allocation requests, projections of future sanitary sewer capacity needs, and recommendations for infrastructure improvements.

AECOM will perform this scope of services in the following four tasks:

- Task 1 – Page Point Drive Pump Station Evaluation
- Task 2 – Page Park Pump Station Evaluation
- Task 3 – Stirrup Iron Creek Basin - Collection System Model Scenarios
- Task 4 – On-Call Evaluation of Capacity Requests

***Task 1 – Page Point Drive Pump Station Evaluation***

AECOM will perform up to two site visits and collaborate with County staff to collect as-built data for the existing Page Point Drive Pump Station. Data collection needs include wet well dimensions, invert elevations, forcemain dimensions, pump curves, controls settings, and operating data such as run-times, flow, and pressure readings. Additionally, AECOM will note observations of infrastructure condition such as signs of corrosion (spalling, loss of concrete, exposed reinforcement, corrosion of metal fixtures, etc.) in both the wet well and outfall manhole. AECOM will collaborate with County staff to make drawdown observations during pump station operation, to the extent possible.

AECOM will define the gravity collection system service area which may contribute to the Page Point Drive Pump Station (Page Point Drive Pump Station sub-basin) and develop current, future (2025), and “build-out” loads for the sub-basin. AECOM will compile existing as-built data and GIS data provided by Durham County (originated by Hydrostructures, Inc. under a separate project) including, but not limited to, pipe diameters, pipe material, (XY) manhole data, top of manhole and manhole inverts (Z), manhole sizes, manhole type, and topographic data as the basis of a skeletonized collection system (greater than 8-inches in diameter) within the sub-basin. At a minimum, the skeletonized collection system will include the trunk line under US70 through to the invert at the wet well.

AECOM will collaborate with Durham County staff to develop a loading methodology for future (2025) and “build-out” loads in the Page Point Drive Pump Station sub-basin and will evaluate the skeletonized sub-basin collection system and Page Point Drive Pump Station under current, future (2025), and “build-out” loads. AECOM will make recommendations for capacity improvements. Additionally, AECOM will evaluate up to two options for relocation of the Page Point Drive Pump Station and related collection system alterations. The results of all data collection, analyses, and recommendations will be compiled and reported in technical memo #1.

***Task 2 - Page Park Pump Station Evaluation***

AECOM will perform up to two site visits and collaborate with County staff to collect as-built data for the existing Page Park Pump Station. Data collection needs include wet well dimensions, invert elevations, forcemain dimensions, pump curves, controls settings, and operating data such as run-times, flow, and pressure readings. Additionally, AECOM will note observations of infrastructure condition such as signs of corrosion (spalling, loss of concrete, exposed reinforcement, corrosion of metal fixtures, etc.) in both the wet well and outfall manhole. AECOM will collaborate with County staff to make drawdown observations during pump station operation, to the extent possible.

AECOM will collaborate with County staff to define the gravity collection system service area which may contribute to the Page Park Pump Station (Page Park Pump Station sub-basin) and develop future (2025), and “build-out” loads for the sub-basin. The results of all data collection, analyses, and observations will be compiled and reported in technical memo #2.

### ***Task 3 - Stirrup Iron Creek Basin - Collection System Model Scenarios***

AECOM will begin with the existing steady state sewer hydraulic model, created in Bentley Systems SewerCAD V8i Select Series 4 by AECOM (then URS Corporation) in 2015, and updated by AECOM in 2017. For this 2019 effort, AECOM will update the model with the following:

- Gravity collection system boundaries and loads developed in Tasks 1 and 2 for the Page Point Drive Pump Station and Page Park Pump Station.
- Allocation requests made subsequent to the 2017 model update will be incorporated into the baseline model loads.
- AECOM will collaborate with Durham County staff to refine the “build-out” methodology used to develop loads in the 2017 model.

The updated model will be used to simulate basinwide collection system conditions in the future (2025) and at theoretical build-out.

- The intent of modeling the future (2025) condition is to identify near-term infrastructure improvements which may be necessary to accommodate anticipated capacity allocation requests.
- The intent of the build-out condition is to identify the range of flows which may be generated within the Stirrup Iron Creek basin in order to plan for long-term growth.

Both conditions will be used to evaluate capacity needs within the basin and identify conceptual options for management of future flows. It is AECOM’s understanding that the County is particularly interested in evaluating capacity needs in the areas southeast of Chin Page Road and northwest of Chin Page Road. AECOM will prioritize identification of capacity improvements in those areas.

The results of all data collection, analyses, and observations will be compiled and reported in Technical Memo #3.

### ***Task 4 –On-Call Evaluation of Capacity Requests***

AECOM will provide on-call professional services to assist the County in evaluation of requests for allocation of sanitary sewer capacity within the Stirrup Iron Creek basin. AECOM will provide up to 80 manhours of assistance under this task. Initial tasks include:

- Evaluation of current capacity request north of US70
- Evaluation of current capacity request in the vicinity of CREE
- Evaluation of current capacity request in the BethPage area
- Update Exhibit of Estimated Remaining Capacity

AECOM will summarize each request and report the results of each evaluation in a memo.

### **CLIENT RESPONSIBILITIES**

It shall be the responsibility of the client to provide the following items:

- Provide expected flow from known new development areas.
- Provide all existing flow monitoring data.
- Provide all pertinent and updated documents and mapping in shapefiles and/or excel database.

Ms. Stephanie Brixey, PE

October 2, 2019

Page 4 of 5

- Provide all pertinent flow data in electronic format.
- Provide all pertinent lift station wet and dry weather data in electronic format.
- Provide all pertinent data regarding areas of concern of the sewer system and maintenance/repair reports within the defined area of study.
- Providing access to the OMNI site so pump run times (and other data) can be obtained.

### **EXCLUSIONS AND ASSUMPTIONS**

The following items are excluded from the scope of services:

- Topographic and as-built survey
- Flow monitoring
- Creation or update of County GIS databases.
- Extended period simulations

The following assumptions were used in the development of this proposal:

- No meetings or coordination with NCDOT are required.
- Similar loading methodology will be used in all scenarios.

### **ADDITIONAL SERVICES**

Any item not contained in the Scope of Services or items outlined as Exclusions will be deemed as Additional Services. Additional Services will be provided if requested by Durham County at the Standard Hourly Billing Rates.

### **COMPENSATION**

AECOM will provide the services stated above for a time and materials, not to exceed fee of \$126,180.

The breakdown in fee among the four tasks is estimated as follows:

|                                                   |          |
|---------------------------------------------------|----------|
| Task 1 – Page Point Drive Pump Station Evaluation | \$38,040 |
| Task 2 – Page Park Pump Station Evaluation        | \$30,190 |
| Task 3 – Update Basinwide Future Model Scenarios  | \$48,350 |
| Task 4 – On-Call Evaluation of Capacity Requests  | \$9,600  |

### **SCHEDULE**

AECOM will provide the stated service in accordance with the following schedule:

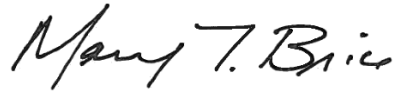
|                                                   |                                          |
|---------------------------------------------------|------------------------------------------|
| Task 1 – Page Point Drive Pump Station Evaluation | 60 days from notice to proceed           |
| Task 2 – Page Park Pump Station Evaluation        | 60 days from notice to proceed           |
| Task 3 – Update Basinwide Future Model Scenarios  | 60 days from acceptance of Tasks 1 and 2 |
| Task 4 – On-Call Evaluation of Capacity Requests  | as-needed                                |

Ms. Stephanie Brixey, PE  
October 2, 2019  
Page 5 of 5

AECOM Technical Services of North Carolina, Inc. appreciates this opportunity to serve Durham County. Please contact me at (919) 461-1358 if you have any questions regarding our proposal.

Sincerely,

AECOM Technical Services of North Carolina, Inc.

A handwritten signature in black ink that reads "Mary T. Brice". The signature is written in a cursive, flowing style.

Mary T. Brice, PE, LEED AP  
Municipal Water Practice Leader

A handwritten signature in blue ink that reads "Carl C. Chambers". The signature is written in a cursive, flowing style.

Carl C. Chambers, P.E.  
Mid-Southeast Area – Water Infrastructure  
Leader