



**Steven H. Emerman, Ph.D.**  
Specializing in Groundwater and Mining

shemerma@gmail.com • (801) 921-1228  
785 N 200 W, Spanish Fork, Utah 84660, USA

July 26, 2020

Matthew Fountain  
Director, Department of Stormwater Management  
City of Charleston  
2 George Street, Suite 2100  
Charleston, South Carolina 29401  
E-mail: [Fountainm@charleston-sc.gov](mailto:Fountainm@charleston-sc.gov)

Dear Mr. Fountain,

I am writing to introduce myself to you. I am a retired professor of hydrology and now do full-time consulting on hydrologic modeling, especially in relation to impacts of mining, logging and urban development. I see that you are also a graduate of Cornell University. I received a Ph.D. from Cornell University in 1984.

I have been advising the South Carolina Coastal Conservation League on stormwater management. I have attached my report to that organization entitled “Potential Impact of New Urban Development on Flooding on James Island, Charleston, South Carolina,” in case it is helpful to you.

I listened with great interest to your presentation on the AECOM Central Park/Wambaw Creek drainage study at the James Island Intergovernmental Council Meeting on Wednesday, July 22.

Would you be willing to meet with me, some James Island residents, and members of the South Carolina Coastal Conservation League to discuss some questions that arose from that presentation?

The following are examples of the kinds of questions that we would like to discuss:

- 1) When will the AECOM study be available for public comments?
- 2) What were the Terms of Reference for the AECOM study?
- 3) Would it be possible to obtain a complete map of the “Existing Condition?”
- 4) How was the “Existing Condition” of the stormwater infrastructure developed in the AECOM study? In particular, to what degree did the development of the “Existing Condition” involve the visual or physical inspection of the stormwater infrastructure?



**Steven H. Emerman, Ph.D.**  
Specializing in Groundwater and Mining

shemergen@gmail.com • (801) 921-1228  
785 N 200 W, Spanish Fork, Utah 84660, USA

- 5) How was the “Existing Condition” verified? In other words, how did the AECOM study use previous storm events as inputs, calculate the flooding that would result from those storm events, and compare the predicted flooding with observations (watermarks on homes, observations of depth and duration of flooded streets, etc.)?
- 6) How was the “Existing Condition” calibrated? In other words, how were the components of the “Existing Condition” (especially the components that were not visually inspected) adjusted so as to improve the match between predictions and observations?
- 7) Were calculations based on the “Existing Condition” carried out assuming ideal conditions of the stormwater infrastructure (e.g., channels free of any mud or debris) or typical conditions (e.g., channels with a typical load of mud and debris)?
- 8) Will the proposed Central Park and Riverland Oaks developments be required to ensure that their peak discharge rates will not exceed the downstream system capacity as calculated from the “Existing Condition” as developed by the AECOM study? In terms of “downstream system capacity,” I am referring to the following passages in the 2013 and 2020 Stormwater Design Standards Manuals:

2013 version:

“The post-development, peak discharge rates [are] restricted to one-half the pre-development rates for the 2 and 10-year 24-hour storm event **or to the downstream system capacity, whichever is less.**”

2020 version:

“For non-SFR [Single-Family Residence] sites of 0.5 acres or more, the post-development, peak discharge rates are restricted to one-half the pre-development rates for the 50 percent and 10 percent AEP [2-year and 10-year], 24-hour storm events **or to the downstream system capacity, whichever is less.**”

- 9) In your presentation, you discussed the impacts of converting from the “Existing Condition” to the “Improved Condition” only in terms of the 2-year and 25-year storms. Does the AECOM study also analyze the impacts of the 100-year storm? In this respect, I am referring to the central role of design for the 100-year storm in both the 2013 and 2020 Stormwater Design Standards Manuals:



**Steven H. Emerman, Ph.D.**  
Specializing in Groundwater and Mining

shemergen@gmail.com • (801) 921-1228  
785 N 200 W, Spanish Fork, Utah 84660, USA

2013 version:

**“100-Year Storm Event Analysis:** All construction, development and redevelopment activities which disturb one (1) acre or more shall perform an hydraulic analysis to determine the impacts of the proposed development during 100-year 24-hour storm event (precipitation only).

The project shall not:

- i. Increase the likelihood of dwelling flooding and property damage above current conditions;
- ii. Increase water surface elevations or reduce system capacity in stormwater system and facilities upstream or downstream of the project. An increase or reduction shall be based on a comparison with pre-development conditions;
- iii. Increase erosion potential and pollutant loads that would adversely impact the quality of receiving waters.”

2020 version:

**Percent Probability of Exceedance Storm Event Analysis**

Construction, development, and redevelopment activities that disturb 1 acre or more shall include a hydrologic/hydraulic analysis to determine the impacts of the proposed development during the 1 percent AEP, 24-hour storm event. For the 1 percent AEP Storm Event Analysis, the project shall not:

- Increase the likelihood of dwelling flooding and property damage above current conditions.
- Increase water surface elevations or reduce system capacity in the stormwater system and facilities upstream or downstream of the project. An increase or reduction shall be based on a comparison with pre-development conditions (with more stringent requirements potentially applied in special protection areas).
- Increase erosion potential and pollutant loads that would adversely impact the quality of receiving waters.

I thank you very much for considering this meeting and look forward to hearing from you.

Best wishes,

A handwritten signature in black ink that reads "Steven H. Emerman".

Steven H. Emerman