



6/18/2021

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Stephen Repasch, Executive Director
Bethlehem Authority
Room B-311
10 East Church Street
Bethlehem, PA 18018

Re: Change Order Request #2
Project Name: Emergency Water Supply Interconnection Evaluation
AECOM Design Engineering Services Agreement 60637597 (dated 7/30/2020)

Dear Mr. Repasch:

As discussed during the May 11, 2021 coordination call, flow testing efforts were postponed by Easton Suburban Water Authority (ESWA) so Bethlehem Authority and AECOM agreed that the Concept Design Report would be completed using assumptions derived from available information. ESWA now plans to complete flow tests and this information will need to be processed and the results incorporated into the Concept Design Report.

Additionally, Bethlehem Authority and the City identified two areas for further analysis that were not originally covered in the Concept Design Report: (1) Extended Period Simulation (EPS) analyses to assess the system's response in terms of pressures and the range in tank levels while looking at indicators such as pipe velocities and head losses while operating under emergency supply conditions and (2) evaluation of available fire flows while operating under emergency supply conditions. EPS analyses was agreed to be most important to the overall report content and is currently proposed as part of this amendment. Available fire flow analyses could be added if the Authority requests and would not warrant a detailed analysis of the entire system. Instead, a targeted investigation is proposed as two optional scope items for consideration. Below is a description of the additional services that AECOM proposes to perform under this change order:

Task 1- Flow Testing Work Plan

ESWA plans to conduct flow testing using their equipment and staff during the month of June, 2021. AECOM proposes to review new field data recorded by ESWA, process the data for input to the hydraulic model and follow up with ESWA staff to resolve any questions or concerns. AECOM attended a Work Plan discussion with ESWA and the City on 6/7/2021 and stands ready to support the field effort remotely as needed during the day of testing. **These efforts will require additional effort for a Staff Engineer, Senior Professional, Senior Principal Professional at a total cost of \$1,800.**

Task 2 - Interconnection Analysis and Hydraulic Modeling

In absence of field testing information from ESWA, AECOM made assumptions relative to the available pressures at the systems' boundaries for the evaluation of ESWA interconnect needs for the submission of the draft report. These assumptions will be revised based on new actual field data following revised hydraulic simulations that will be completed using the June 2021 data. AECOM will also update the system model to run EPS analyses with the interconnections active and incorporate the results into the Concept Design Report.

The Authority also requested more discussion on the impact of utilizing the interconnections without making piping improvements. As a result, AECOM proposes to revise hydraulic modeling relative to ESWA, conduct extended period analyses, and update the Draft Concept Design Report to show system conditions with pump stations at the interconnections without the associated piping improvements. **These efforts will require additional effort for a Staff Engineer, Senior Professional, Senior Principal Professional at a total cost of \$4,300.**

Task 3 - Conceptual Design of Interconnections and Booster Stations

The conceptual designs will be updated to incorporate the findings of the EPS analyses and expand the discussion related to interconnection facilities without additional piping improvements. **As a result, AECOM will require additional effort for a Staff Engineer, Senior Professional, Senior Principal Professional at a total cost of \$3,300.**

Based on the additional services described above, AECOM requests that Bethlehem Authority authorize a **\$9,400** change order for a total value of \$76,736 under AECOM Design Engineering Services Agreement 60637597.

Task 2a – Available Fire Flow Analysis (Optional)

The Authority may request for AECOM to evaluate the impact of system supply via interconnections on the availability of flows for fire fighting. If this is requested, AECOM will set up the model to assess available fire flows at a residual pressure of 20 psi at 10 selected locations within the distribution system. AECOM will incorporate the results of these analyses into the report and update recommended design parameters for facilities as appropriate. **These efforts, if selected for inclusion by the Authority, will require additional effort for a Staff Engineer, Senior Professional, Senior Principal Professional at a total cost of \$3,000.**

Task 3a – Concept Interconnection and Booster Station Design with Fire Flow Analysis (Optional)


The interconnections analysis will need to be updated to reflect the results of the optional Available Fire Flow analyses covered under Task 2a. **As a result, AECOM will require additional effort for a Staff Engineer, Senior Professional, Senior Principal Professional at a total cost of \$2,500, if this optional task is desired.**




If Optional Tasks 2a and 3a are chosen to be included, AECOM requests that Bethlehem Authority authorize a **\$14,900** change order for a total value of \$82,236 under AECOM Design Engineering Services Agreement 60637597.

If you have any questions, please contact me at the following telephone number (610) 291-1172.

Sincerely,



Zachary Keegan, PE.
AECOM Project Manager



Christopher Curran, PE.
AVP
AECOM Project Director