

December 23, 2020

American Campus Communities
12700 Hill County Boulevard, Suite 7-200
Austin, Texas 78738

Attention: Mr. Jeremy Roberts
jroberts@americancampus.com

SUBJECT: Geotechnical Consultation
Estimated Groundwater Discharge
UTUMC Student Housing
1415 NE 43rd Street
Seattle, Washington
PSI Project Number: 07041176

Professional Service Industries, Inc. (PSI), an Intertek company, is providing geotechnical consultation for the above-mentioned project. We have prepared this letter to provide additional clarification regarding the estimated permanent groundwater discharge volume collected by the embedded basement drainage system. PSI's previous work at the site is summarized in our revised geotechnical engineering report dated October 8, 2020 and titled "Geotechnical Engineering Report; Proposed UTUMC Student Housing; 1415 NE 43rd Street, Seattle, WA 98105," PSI project number 07041176.

PSI understands that the Seattle Department of Construction & Inspection (SDCI) has reviewed the permit submittal documents with the following comment:

Groundwater discharge to the public storm system - Peak Flow Control is required

Per SMC 22.805.050.C.7, parcel-based projects that will permanently discharge groundwater to a public drainage system or to a public combined sewer shall also comply with subsection 22.805.080.B.4 (Peak Control Standard) if the total new plus replaced hard surface is 2,000 square feet or more. Please address this in the drainage report as well.

Please provide an estimate of the anticipated permanent groundwater discharge rate from the geotechnical engineer and provide Flow Control facilities for the site to meet the Peak Flow Control Standard.

Per the "De Minimis Standard Exception to Peak Flow Control requirements for Permanent Groundwater Discharge," the project is exempt from meeting the Peak Flow Control requirements if the groundwater discharge is less than 10% of the allowable discharge from the 4% annual probability. The project Civil Engineer has calculated this value to be **13.1 gpm** for the project.

As discussed in our October 2020 geotechnical report, static perched groundwater was encountered in the glacial till generally within sandy lenses of soil at the site and was measured (2018) in borings B-1 and B-2 at depths of approximately 32 feet bgs and 30 feet bgs in boring B-1 and B-2, respectively, at the time of our field investigation. Groundwater elevation encountered in standpipe piezometer monitoring wells about seven days after the installation (May 2020) of the monitoring wells were 38



feet and 23 feet in borings B-3 and B-4, respectively. The most current groundwater readings indicate the perched groundwater is at a depth of 24 feet and 45 feet. Perched groundwater elevations at the site could be impacted by excavations taking place for the rail station to the northwest of the sit.

It is our opinion, that the regional groundwater is below the depth (about elevation 136 feet) of the deepest excavations for the project and the perched groundwater encountered is part of a continuous groundwater system that is mostly confined within sandier seams within the till soils. PSI anticipates that the groundwater table fluctuates seasonally and in response to significant precipitation events.

Based on previous experience, we anticipate the groundwater discharge from the sandier seams will decrease significantly during construction and can be managed during construction and over the life of the project using a series of under slab drains connected to the wall drains installed during construction of the temporary shoring. A system sumps and pumps will likely be sufficient to manage groundwater flows into the excavation during construction. A permanent system should be designed to control intermittent or seasonal groundwater collected during the life of the project.

Based on preliminary variable head well testing performed at the site we anticipate horizontal permeability **kh** of the till soil to be on the order of **1×10^{-2} to 1×10^{-3} meters per day**. Vertical permeability **kv** will be at least **two** orders of magnitude less. We estimate that groundwater discharge rates for permanent conditions will be significantly less than **10 gpm**, based on the project drawings, and groundwater conditions observed during our geotechnical investigations.

We recommend using an appropriate factor of safety when sizing the components of the permanent drainage system. If groundwater flows during construction are encountered at shallower depths or generate larger flows than originally anticipated, PSI should be notified to assist in determining the proper course of action.

Should you have any questions after reviewing this letter, please feel free to contact us at your convenience.

Respectfully Submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.

Brian R. Jackson, EI
Staff Engineer



RENEWS: 05/24/2021

Britton W. Gentry, PE GE
Chief Engineer