January 17, 2019

Mr. Bram Barth
Lose & Associates, Inc.
1314 5th Avenue North
Nashville, Tennessee 37208

Subject: Addendum No. 4 to Geotechnical Engineering Report
Hal and Berni Hanson Regional Park
Evergreen Mills Road, Ashburn, Loudoun County, Virginia
(GeoConcepts Project No. JD155133F)

Dear Mr. Barth:

GeoConcepts Engineering, Inc. (GeoConcepts) is pleased to present Addendum No. 4 to our revised geotechnical report for the subject project. This addendum has been prepared in response to VSMP comments 14d, 14f, and 15a provided by Loudoun County Department of Building and Development dated December 4, 2018.

Response to 14d
At the time of the previous report submission, the 75% plans provided to GeoConcepts indicated weir walls outlet structures. Recommendations presented in our Addendum No. 2 dated May 23, 2018 has been revised below:

The outlet works for the SWM ponds are expected to consist of riser/barrel outlets. An allowable soil bearing pressure of 2,000 psf is recommended for riser/barrel outlets foundations when founded on natural soils or new compacted fill, and 6,000 psf when founded on weathered rock. If existing fill is encountered at riser/barrel outlets foundation subgrade, we recommend that the existing fill be removed until bearing on natural soils or weathered rock is encountered. In the event a riser/barrel outlet subgrade consists of a combination of natural soils and weathered rock, there is a concern that differential settlement will occur. Accordingly, in this case, the weathered rock portion of the subgrade should be lowered a minimum of 1 foot and be replaced with new compacted fill.

Response to 14f
Recommendations for seepage along outlet pipes is presented below:

To minimize the potential for excess seepage along the exterior of the outlet pipes, we recommend that a concrete cradle be placed below the pipes from the riser pipe to a distance of two-thirds of their total length. The cradle thickness should be 6 inches or ¼ the pipe diameter thickness, whichever is larger. The pipe should be embedded into the cradle a depth of 0.5 times the pipe diameter. The cradle should be placed directly on top of undisturbed natural soils or newly compacted fill and should extend up to a level equal to or above the spring line of the pipe. The last one-third of the outlet pipes should be constructed with a 12-inch gravel drainage layer and 12-inch filter layer surrounding the pipes on all sides. The gravel drainage layer and filter material should meet the requirements of Fairfax County PFM Section 6-1605. Water that accumulates in the drainage layer should be collected and outletted through perforated, 4-inch diameter PVC pipes, and discharged through the head wall or beyond the downstream toe of the embankment.
Response to 15a

Seasonal high water table (SHWT) depth estimations were provided in Addendum No. 3 Revision 1 dated August 30, 2018. The SHWT depths presented in our Addendum No. 3 Revision 1 dated August 30, 2018 have been revised below:

In accordance with the Loudoun County Facilities Standards Manual, Chapter 5.225.B.7, direct observation of the groundwater was performed between April 30 and May 1, 2018.

The water table at Bioretention Pond #1 (boring BI-3) was measured at a depth of about 9.5 feet below the existing grade. Referencing the USDA-NRCS Soil Survey for Loudoun County, Virginia, the seasonal high water table (SHWT) for the Penn silt loam (73B) soil is greater than 80 inches below the surface. Thus, the water table elevation determined during the current investigation is about 3 feet lower than the published data obtained from the soil survey. Based on our investigation, we estimate that the SHWT depth at Bioretention Pond #1 is located approximately 6.5 feet below the ground surface. The approximate SHWT depth provided for Bioretention Pond #1 is based on USDA-NRCS Soil Survey published information.

The water table at Bioretention Pond #2 (boring BI-1) was measured at a depth of about 6.0 feet below the existing ground surface. Referencing the USDA-NRCS Soil Survey for Loudoun County Virginia, the SHWT for Sycoline-Catlett complex (60C) soil is 10 to 24 inches or greater than 80 inches, and Haymarket and Jackland soils (67B) are 10 to 20 inches or greater than 80 inches. Thus, the water table elevation determined during the current investigation compared favorably to the published data obtained from the soil survey. However, the Sycoline portion of the 60C soil has the potential to have water tables at 10 to 24 inches deep, and the Jackland portion of the 67B soil has the potential to have water tables at 10 to 20 inches deep. Based on our investigation, we estimate the SHWT depth at Bioretention Pond #2 is located approximately 6.0 feet below the existing ground surface. The approximate SHWT depth provided for Bioretention Pond #2 is based on direct observation of the ground water. The contractor should be aware of the potential for a shallower water table based on USDA-NRCS Soil Survey published information.

Sincerely,

GEOCONCEPTS ENGINEERING, INC.

William Richards, PE
Project Manager