



Geotechnical
Environmental
Site Civil

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July 15, 2021

Dan Fossner
107 Fairlawn avenue
Dobbs ferry, New York

RE: Proposed Retaining Wall Replacement
107 Fairlawn Avenue
Dobbs ferry, New York
SESI Project No. 11347

Dear Mr. Fossner,

In accordance with your request, we have performed geotechnical engineering analyses for the purpose of evaluating the impacts of the proposed gravity retaining wall and plunge pool on the adjacent soil slope at the above referenced site.

We have performed internal stability calculations for the proposed gravity retaining wall as well as global stability calculations. The following table is a summary of the global stability factors of safety for static and seismic conditions. Three cases were analyzed to compare the effects of the proposed retaining wall and footing to the existing condition. Case 1 was a slope failure that starts at the backyard and ends at the slope downhill, case 2 starts at Fairlawn Avenue and ends at the downhill slope and case 3 starts at Fairlawn Avenue and ends at the backyard.

In preparation of the proposed retaining wall design and the global stability calculations, we have reviewed the following documents:

1. November 17, 2006 "Report on Subsurface soil and foundation investigation" prepared by Carlin – Simpson & Associates
2. March 5, 2010 Set of plans prepared by Carlin-Simpson and Associates
 - a. "Slope Location Plan & Stationing" figure 1
 - b. "Soil Nailed Slope with Steel Wire Mesh" figure 2
 - c. "Mechanically Stabilized Earth (MSE) slope" figure 3
3. July 1, 2013 "Stormwater pollution prevention and erosion control plan" prepared by Gabriel E. Senor, P.C. dated May 17, 2014 last revised July 1, 2013
4. August 4, 2014 "Geotechnical Recommendations for the proposed swimming pool at 7 fairlawn ave. Dobbs Ferry, New York" prepared by Daniel G. Loucks, P.E.
5. Sep 23, 2015 "Soil Nail As-Built" plan prepared by Gabriel E. Senor, P.C. Consulting Engineer and Land Surveyors dated Aug 2, 2015 received by James J. Han Engineering P.C.
6. May 6, 2019 "Geotechnical Evaluation of proposed pool construction above existing soil slope" prepared by tectonic dated April 30, 2019 last revised May 6, 2019
 - a. Partial topographic survey prepared by tectonic dated March 20, 2019

7. July 19, 2019 "Site Plan" prepared by Paul Gdanski, P.E., PLLC page 1 of 2 dated August 27, 2014 sheet 1 of 2 last revised July 19, 2019

The global stability analysis was performed using Slide2 by Rocscience to model the existing slope, retaining wall, the proposed gravity wall and the proposed footings. The following assumptions were made in order to generate the cross sections:

- All existing retaining walls assumed to have 0.5 feet bury.
- Existing geogrid length of tiered wall assumed to match design drawings from plan reference #3
- Lower retaining wall assumed to not contain geogrid since less than 4 feet tall.
- Soil nail locations and angles taken from reference #6.
- Soil properties taken from reference #6.
- length of nails to match design from plan reference #2.

Table 1 – Global Stability Factors of Safety				
Static Analysis				
	Existing	Proposed	Proposed W/ Footing	Notes
Case 1 Backyard To Slope	1.327	1.330	1.326	The proposed condition does not materially change the factor of safety
Case 2 Street to Slope	1.529	1.512	1.581	The proposed condition does not materially change the factor of safety
Case 3 Street to Backyard	1.655	2.047	2.049	The proposed condition increases the factor of safety
Seismic				
Case 1 Backyard To Slope	1.104	1.105	1.104	The proposed condition does not materially change the factor of safety
Case 2 Street to Slope	1.262	1.250	1.300	The proposed condition does not materially change the factor of safety
Case 3 Street to Backyard	1.370	1.646	1.646	The proposed condition increases the factor of safety

*factors of safety presented in the table serve to illustrate a comparison of proposed condition to the existing condition. The factors of safety are based on the assumptions provided above.

Based on the assumptions provided above, the globally stability model was produced. Calculations reveal that the proposed slope factors of safety are negligible (0.017) or above the existing condition (see table 1) and therefore, the proposed wall does not reduce the factor of safety from the existing conditions. This shows that the proposed gravity wall does not affect the global stability factors of safety.

In order to determine the effects of the proposed canopy footing, a model was analyzed with a strip footing of 1 tsf placed 5 feet behind wall at elevation 60 (7 feet below grade). Table 1 shows the results of the added footing. The results indicate that the load from the proposed canopy footing does not materially decrease the factor of safety. Page 16 of 21 on the slope stability cross sections illustrates that the critical slope surfaces all fall above the location of the bottom of footing and therefore, the footing does not affect the stability of the lower slope.

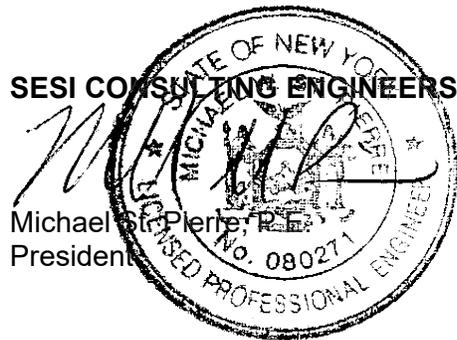
Slope stability considerations in regards to the plunge pool construction are limited to:

1. Physical conflict with soil nails and or soil nail bond area
 - a. Excavation limits of the pool are outside of the zone of influence of the soil nails (see retaining wall drawings).

2. Excavation depth near base of gravity wall undermining the proposed wall.
 - a. Sequence of the construction is provided on retaining wall drawings. Proposed plunge pool to be constructed prior to proposed gravity wall.
3. Additional surcharge load of pool system
 - a. The weight of the concrete plunge pool and water is less than the weight of the excavated soil and therefore does not increase load on the slope.

In conclusion, the proposed gravity retaining wall, canopy footings, and plunge pool do not lower the existing factors of safety and for case 3, the factor of safety increases.

Sincerely,



Michael St. Pierre, P.E.
President

Alexander G. Barish Jr., P.E.
Assistant Project Engineer

Attachments: Retaining Wall Drawings dated July 15, 2021
Retaining Wall Calculations
Retaining Wall Global Stability