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October 22, 2024
File No. 03.0035410.00

Mr. David Morgan
Environmental Planner and Conservation Agent
Arlington Town Hall
730 Massachusetts Avenue
Arlington, MA 02467

Re: Response to Redesign
Peer Review of Stormwater Mound Evaluation and Design Groundwater Elevation
Proposed Thorndike Place Residential Development
Arlington, Massachusetts

Dear Mr. Morgan:

In accordance with your request, GZA GeoEnvironmental, Inc. (GZA) prepared this letter to address the BSC Group (BSC)'s revised stormwater infiltration design and groundwater mounding analysis associated with the proposed Thorndike Place residential development in Arlington, Massachusetts (the "Site"). BSC performed their work on behalf of the Applicant (Arlington Land Realty, LLC). We also provide our response to the most recent Scott Horsley comment letter. This letter report is subject to the Limitations provided in Appendix A.

BACKGROUND

BSC's June 10, 2024 letter report provided a stormwater mound evaluation and a recommended design groundwater elevation for the Site. GZA's August 1, 2024 peer review of that report recommended that the stormwater infiltration system be redesigned to account for the impacts of groundwater mounding during large storm events and to meet the MassDEP Stormwater Manual's maximum allowable drainage standard of 72-hours. In addition, the redesign was to address peak flow rates that discharge to the stormwater outfall control system (i.e., MassDEP Stormwater Standard 2- Peak Rate attenuation).

BSC RESPONSE AND REDESIGN

BSC subsequently prepared a response letter dated October 4, 2024 that provided a revised stormwater design and associated mounding analysis, with a smaller volume of stormwater infiltration that would be drained in less than 72 hours. The elevation of the bottom of the infiltration system was raised 0.5 feet to elevation 6.5 feet and the outlet control pipe for the infiltration system was lowered to elevation 6.8 feet. In addition, the smaller driveway stormwater infiltration systems were removed.

BSC's revised peak storm water flow calculations provided in their October 4, 2024 letter indicated that post development flows remain less than predevelopment flows, which satisfies MassDEP's Stormwater Standard 2.

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GZA RESPONSE

The revised underground infiltration volume is now 2,099 cubic feet, which is estimated to drain in 11.5 hours (not the 6 hours referenced in the revised BSC report)[1]. The revised groundwater mound estimate for the 100 year design storm is approximately 2.34 feet (using the same aquifer parameter values that GZA used in our previous peer review letter). This revised groundwater mound elevation is approximately 6.34 feet and does not reach the bottom of the infiltration basin (Elevation 6.5 feet).

We note that the bottom of the stormwater infiltration system is now higher than the proposed garage floor level of the new building that is planned to be located 15 feet from the stormwater infiltration system. The proposed garage floor level is elevation 6.0 feet. It is GZA's opinion, that a groundwater underdrain should be designed and constructed beneath the garage floor level in this area to address potential water infiltration issues.

REVIEW OF August 23, 2024 SCOTT HORSLEY LETTER

On behalf of others, Scott Horsley from Water Resource Consultant (Horsley) provided a letter dated August 23, 2024 to the Conservation Commission with additional comments regarding GZA's August 1, 2024 peer review report. One of their comments noted that the stormwater redesign should address MassDEP Stormwater Standard 2 (regarding peak rate control). As noted above the BSC redesign appears to address this comment. The other comment requested clarification on the design seasonal high groundwater elevation.

As previously noted, the Massachusetts Stormwater Handbook states:

> *Seasonal high groundwater represents the highest groundwater elevation. Depth to seasonal high groundwater may be identified based on redox features in the soil. When redox features are not available, installation of temporary push point wells or piezometers should be considered. Ideally, such wells should be monitored in the spring when the groundwater is highest, and the results compared to nearby groundwater wells monitored by the USGS to estimate whether regional groundwater is below normal, normal or above normal.*

It is GZA's opinion that BSC's design groundwater elevation findings are consistent with this definition (in its entirety). Redox features were not present; therefore, wells were installed, water levels were measured in the spring (when the groundwater was highest), and the water levels were compared to historic USGS groundwater levels for a relative comparison of the type of spring conditions present at the time that the measurements were recorded at the Site. As previously reported by GZA, the USGS water levels were well above normal at the time of the Site recorded groundwater elevation measurements (i.e., the highest seasonal water table observed over the past 10 year).

CONCLUSIONS

It is GZA's opinion that the revised stormwater mound evaluation provided in BSC's October 4, 2024 report adequately addresses the impacts of groundwater mounding during large storm events and addresses the 72 hour drainage requirement for the infiltration system. The revised predicted groundwater mound beneath the stormwater infiltration system is not expected to adversely impact the ability of the infiltration system to empty in less than 72 hours. In addition, we believe the storm water redesign adequately addresses the MassDEP Stormwater Standard 2- Peak Rate attenuation requirements.

[1] The design Rawl's rate is 0.27"/hour (0.0225 feet per hour) not 0.043 feet per hour.

We also conclude that the seasonal high water table elevation of 4.0 feet used by BSC is for "above normal" groundwater conditions and is the seasonal high-water table for stormwater management system design for this project.

We trust this information satisfies your current needs. If you have any questions or comments, please feel free to contact the undersigned at (401) 374-2317 or via email at anthony.urbano@gza.com.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Anthony Urbano

Anthony B. Urbano, P.E.
Senior Project Manager

Todd Greene, P.E. (RI)
Principal

Attachment: Attachment A – Limitations

Jobs/env/35410.ABU/correspondence/35410-response to redesign.docx

ATTACHMENT A

Geohydrologic Limitations

USE OF REPORT

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

STANDARD OF CARE

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Proposal for Services and/or Report and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. Conditions other than described in this report may be found at the subject location(s).

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made. Specifically, GZA does not and cannot represent that the Site contains no hazardous material, oil, or other latent condition beyond that observed by GZA during its study. Additionally, GZA makes no warranty that any response action or recommended action will achieve all of its objectives or that the findings of this study will be upheld by a local, state or federal agency.

4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

SUBSURFACE CONDITIONS

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs. The nature and extent of variations between these explorations may not become evident until further exploration or construction. If variations or other latent conditions then become evident, it will be necessary to reevaluate the conclusions and recommendations of this report.

6. Water level readings have been made, as described in this Report, in and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, tidal fluctuations, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The observed water table may be other than indicated in the Report.

COMPLIANCE WITH CODES AND REGULATIONS

7. We used reasonable care in identifying and interpreting applicable codes and regulations necessary to execute our scope of work. These codes and regulations are subject to various, and possibly contradictory, interpretations. Interpretations and compliance with codes and regulations by other parties is beyond our control.

SCREENING AND ANALYTICAL TESTING

8. GZA collected environmental samples at the locations identified in the Report. These samples were analyzed for the specific parameters identified in the report. Additional constituents, for which analyses were not conducted, may be present in soil, groundwater, surface water, sediment and/or air. Future Site activities and uses may result in a requirement for additional testing.

9. Our interpretation of field screening and laboratory data is presented in the Report. Unless otherwise noted, we relied upon the laboratory's QA/QC program to validate these data.

10. Variations in the types and concentrations of contaminants observed at a given location or time may occur due to release mechanisms, disposal practices, changes in flow paths, and/or the influence of various physical, chemical, biological or radiological processes. Subsequently observed concentrations may be other than indicated in the Report.

INTERPRETATION OF DATA

11. Our opinions are based on available information as described in the Report, and on our professional judgment. Additional observations made over time, and/or space, may not support the opinions provided in the Report.

ADDITIONAL INFORMATION

12. In the event that the Client or others authorized to use this report obtain additional information on environmental or hazardous waste issues at the Site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this report.

ADDITIONAL SERVICES

13. GZA recommends that we be retained to provide services during any future investigations, design, implementation activities, construction, and/or property development/ redevelopment at the Site. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.