Earth Solutions NW LLC
Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

August 6, 2021
ES-6556.01

Grouparchitect
1735 Westlake Avenue North, Suite 200
Seattle, Washington 98109

Attention: Mr. Kevin Sokoloski

Subject: Level 1 Critical Aquifer Recharge Area (CARA) Report and Hydrogeologic Assessment
Redmond 87
Proposed Mixed-Use Development
16101 Northeast 87th Street
Redmond, Washington

Reference: Earth Solutions NW, LLC
Geotechnical Engineering Study
ES-6556, dated August 4, 2021

Temporary Construction Dewatering Feasibility Study
ES-6556.01, dated August 4, 2021

Sound Earth Strategies
Phase II Environmental Site Assessment
Project Number: 0432-088, dated March 15, 2019

D.R. Strong Consulting Engineers, Inc.
Draft T.E.S.C Plan dated April 20, 2021

Studio Meng Strazzara
Progress Plans, dated January 10, 2020

Dear Mr. Sokoloski:

As requested in a City of Redmond Natural Resources review matrix, please find enclosed the Level 1 CARA and hydrogeologic assessment for the subject project. This assessment is based, in part, on the referenced geotechnical engineering study and the progress plans provided by the client. Should design plans change, ESNW should be notified to reevaluate the recommendations and design details in this report. This assessment strives to comply with the Redmond Municipal Code section 13.25 based on the information provided to us and is intended to supplement the referenced geotechnical report and TCD Feasibility Study.

Project

We understand proposed redevelopment plans include construction of a new multi-story, mixed-use building and related infrastructure improvements. The building will include one full level of below-grade parking with a similar excavation level as the project currently under construction immediately to the east. Current plans indicate a finish floor elevation of 26.5 feet. Using an average surface elevation of 38 feet, below level parking will require cuts of about 12.5 feet and the elevator pit(s), brace frame systems and crane base will extend another approximately three feet. Temporary dewatering will be required to allow construction of the below-grade parking level.

If the above design assumptions are incorrect or change, ESNW should be contacted to review the recommendations provided in this report. ESNW should review final designs to confirm that our geotechnical recommendations have been incorporated into the plans.

Subsurface Conditions

An ESNW representative observed logged and sampled three borings at the site on February 8, 2019 for purposes of assessing soil and groundwater conditions. Please refer to the boring provided in Appendix A of the referenced geotechnical report for a more detailed description of the subsurface conditions.

The boring locations were surfaced with asphalt paving. Underlying the asphalt, fill was encountered at boring location B-3 consisting of medium dense silty gravel with sand (USCS: SM) that extended to a depth of about three and one-half feet below grade. Below the fill encountered at boring location B-3 and below the pavement at the remaining locations, medium dense to dense relatively clean sand with variable gravel content (USCS: SP and SP-SM) and gravel with silt and sand (GP, GW and GW-GM) was encountered extending to the maximum exploration depth of 31.5 feet below existing grade. Blow counts indicate variable in situ relative density of the native soils and included some loose layers within the soil profile.

Groundwater

Piezometers were installed at all boring locations to allow for groundwater level acquisition. Upon equilibration the groundwater level was measured on February 22, 2019 at depths ranging from about 12.5 to 12.8 feet below existing grade. ESNW was not authorized to conduct a seasonal groundwater monitoring program for this project; however, we were monitoring groundwater levels on the site immediately to the east of this site through the 2019-2020 season. Groundwater levels measured on the site immediately to the east of this property, following a period of heavy precipitation (February 2020), indicated levels at roughly 7 feet bgs. Data provided by the City of Redmond indicate seasonal high and low groundwater levels near this site seasonally range from depths of about 4.6 to 20.8 feet bgs. We recommend a seasonal high groundwater level of 10 feet below existing grade be used for design on this site. This information is based on monitoring well data records maintained by the city staff.

The referenced Phase II Environmental Site Assessment (ESA) report concludes "r*esults of the Phase II ESA indicate that soil and groundwater encountered beneath the Property during subsurface investigations did not show evidence of impacts due to the operation of an automotive repair service at the Property, or from nearby dry cleaning facilities."*

Wellhead Protection Zones

The site has been designated within a Level One CARA by the City of Redmond. Given a defined radial distance from a municipal supply well, site associated groundwater within the level one CARA radial distance will have a travel time of five years or less to reach the municipal supply well. These CARA's are the most vulnerable to contamination from pollutants. Where feasible, recharge through infiltration is encouraged within these overlays to maintain groundwater quality and quantity conditions. On this basis, we have prepared a hydrogeologic assessment in accordance with Appendix 1 of the referenced RZC. The minimum required report elements and/or information are listed in italics, followed by our responses based on available information.

Hydrogeologic Assessment

a. *Available information regarding geologic and hydrogeologic characteristics of the site, including the surface location of all critical aquifer recharge areas located on site or immediately adjacent to the site, and permeability of the unsaturated zone.*

The regional unconfined aquifer lies directly below the subject site and transitions to an upland area toward the east. The aquifer is presumed to be primarily recharged by direct infiltration of precipitation and groundwater flow.

The aquifer is unconfined within an alluvial deposit and native soils primarily consist of sand and gravel deposits. The depth to the groundwater table during our February 2019 site investigation was on the order of 12 to 13 feet bgs. The upper unsaturated soils include a fines content of about 10 percent, or less, and presents a relatively high infiltration capacity. In this respect, the permeability of the unsaturated zone at the subject site is high. However, this property has been developed with a commercial structure, asphalt paving and hardscape features that effectively cutoff recharge of the local groundwater resource. The current plan proposes to replace the existing development with new impervious surface of similar extent. On this basis, little to no change in aquifer recharge is expected to occur.

b. *Groundwater depth, flow direction, and gradient based on available information.*

The local groundwater table was encountered at a depth of roughly 12 to 13 feet during our February 2019 fieldwork. On February 11, 2020, following a period of heavy precipitation, groundwater levels were measured about 7 feet below the existing ground surface at the boring locations on the property immediately to the east.

The referenced water table map indicates that the flow direction of the aquifer underlying the subject site is generally toward the southwest, and based on review of existing well information, the hydraulic gradient of the aquifer in the immediate vicinity is approximately 0.001 feet per feet.

C*urrently available data on wells and springs within 1,300 feet of the project area.*

As part of this study, public records on wells within approximately 1,300 feet of the project were requested. The following monitoring wells (MW) are located in proximity to the site:

MW	Location	Yearly High (feet bgs)	Yearly Low (feet bgs)
MW-003	Approximately 500 feet west	9.8 (2/1/2011)	20.0 (6/6/2018)
MW-004	Approximately 500 feet southwest	8.9 (12/21/2015)	18.7 (9/12/2018)
MW-005	Approximately 700 feet southwest	10.1 (12/6/2009)	19.0 (8/6/2009)
MW-006	Approximately 200 feet south	10.2 (2/1/2011)	19.6 (7/31/2019)
MW-007	Approximately 200 feet south	10.0 (2/1/2011)	19.5 (7/31/2018)
MW-031	Approximately 1,300 feet northwest	4.6 (12/11/015)	12.8 (10/2/2017)
MW-032	Approximately 1,300 feet northwest	6.9 (12/15/2010)	16.9 (6/12/2018)
MW-033	Approximately 1,000 feet northwest	9.9 (12/12/2015)	20.0 (6/7/2018)
MW-036	Approximately 800 feet northwest	10.3 (1/23/2013)	18.5 (8/12/2015)
MW-331	Approximately 800 feet south	5.9 (2/2/2012)	20.8 (8/21/2018)
MW-391	Approximately 1,000 feet southwest	7.2 (12/1/2016)	14.1 (7/31/2018)

Based on review of the collected well data, seasonal groundwater table fluctuations between 4.6 feet bgs (seasonal high) and 20.8 feet bgs (seasonal low) are possible throughout areas surrounding the site; however, the data from the closest monitoring well indicates a historical high groundwater level of about 10 feet below existing ground surface.

c. Location of other critical areas, including surface waters, within 1,300 feet of the project site.

To the best of our knowledge, there are no other critical areas or surface waters within 1,300 feet of the site.

d. Available historic water quality data for the area to be affected by the proposed activity.

The subject site is located nearest to Supply Well 4, which is located approximately 1,400 feet northwest of the subject site. While aquifer gradients drain away from the well, it should be noted that the supply well has detected concentrations above maximum contaminant levels (MCLs) for iron and manganese. While the supply well has exceeded MCL for the two contaminants, the recorded levels have been relatively stable. Concentrations of PCE, PFOS, and PFOA have been encountered within the proximity of supply well 4, but are below MCLs.

Best management practices proposed to be utilized.

With respect to grading/construction activities, existing asphalt on the surface or exposed during grading shall not be used as fill or utility trench backfill. Fill either generated from site excavations or imported for placement must comply with RZC 15.24.080 and .095. Section 15.24.095-2 provides minimum criteria for evaluating suitability of new fill placed on sites. These criteria can effectively be evaluated during construction using field site and/or source screening techniques.

Best management practices (BMPs) for this project will be determined during the ongoing project design phase and submitted to the City for review and approval. At a minimum, site BMPs shall comply with current RZC requirements. BMPs are typically specified by the project civil engineer and indicated on the plans.

e. *Historic water quality and elevation data for the area to be affected by the proposed activity compiled for at least the previous five-year period.*

As stated above, the depth of the groundwater table in the site area ranges from approximately 4.6 to 20.8 feet bgs. Water quality in the area includes iron and manganese above MCL, with minor concentrations of PCE, PFOS, and PFOA.

f. *Groundwater monitoring plan provisions.*

The owner or representatives will perform groundwater monitoring of nearby monitoring wells over the course of the project. We will work with the City during the design phase to determine an appropriate monitoring program; however, the monitoring program should comply with the following codes:

- RMC 13.25.050 Groundwater and water quality standards
- RMC 13.25.070.B Temporary construction dewatering plan requirements

Baseline measurements will be recorded prior to dewatering and will conclude upon project completion.

g. *Discussion of the effects of the proposed project on the groundwater quality and quantity, including: Predictive evaluation of groundwater withdrawal effects on nearby wells and surface water features, predictive evaluation of contaminant transport based on potential releases to groundwater, and predictive evaluation of groundwater (recharge, elevation, dewatering feasibility, constructability, discharge permitting, etc.) on the proposed project.*

The project is expected to incorporate one level of below grade construction. In this respect, the basement level portions of the building structure will penetrate the underlying aquifer during the wetter winter and spring seasons, and temporary dewatering to locally lower the groundwater table around the site perimeter during construction will be required. Based on preliminary evaluation and review of existing well locations, we anticipate the temporary dewatering activities would not adversely impact water quality or the performance of City well installations. With respect to contaminant release during construction, effective measures will need to be in place during (and after) construction to mitigate potential contaminant release. In any case, the portion of the basement structure penetrating the aquifer will be required to be waterproofed and watertight upon completion. On this basis, and assuming a final "watertight" condition, no adverse impacts to public production wells or monitoring wells are anticipated as a result of the proposed project.

With respect to dewatering volumes, while a preliminary dewatering assessment is provided in the referenced TCD Feasibility Study, a formal dewatering plan and analysis prepared by a hydrogeologist will be necessary during final design. During the dewatering process, periodic monitoring of water quality will be required to ensure discharge is within allowable limits for suspended solids. If infiltration will be utilized, the facilities will need to comply with current applicable stormwater code provisions for water quality. Additionally, consistent with code requirements, where subsurface drains are utilized, the drains will need to be tightlined to an approved discharge point. In any case, permanent subsurface (perforated) drains must not extend below the seasonal high groundwater table.

h. *Identification of the type and quantities of any deleterious substances or hazardous materials that will be stored, handled, treated, used, produced, recycled, or disposed of on the site, including but not limited to materials, such as elevator lift/hydraulic fluid, hazardous materials used during construction, materials used by the building occupants, proposed storage and manufacturing uses, etc.*

Shoring will be required for the below-grade excavations. As such, inert/non-toxic fluids should be used for installing the drilled shafts and non-treated timber lagging will be required. Construction entrance and truck wash, including a spill prevention kit and wash area plan will be in place prior to proceeding with construction. The type and quantity of deleterious materials and substances should be defined during the design phase of construction, and a safe means for storing the materials should be determined with approval from the City.

i. *Proposed methods of storing any of the above substances, including containment methods to be used during construction and/or use of the proposed facility.*

The type and quantity of deleterious materials and substances should be defined during the design phase of construction, and a safe means for storing the materials should be determined with approval from the City. In general, dedicated storage areas should be utilized for contaminants during and post construction. A spill prevention plan should be prepared as part of site design. A surface water pollution prevention plan (SWPPP) will be prepared and approved prior to grading.

j. Proposed plan for implementing RZC 21.64.050.D.3.f, Protection Standards During Construction.

The proposal will follow CARA performance standards as outlined in RZC 21.64.050. Fill material will comply with the standards outlined in RMC 15.24.095 and analytical results of proposed fills will be provided to ensure that fill materials are in compliance with the Model Toxics Control Act, and do not exceed cleanup standards.

k. A spill plan that identifies equipment and/or structures that could fail, resulting in an impact. Spill plans shall include provisions for regular inspection, repair, and replacement of structures and equipment that could fail.

Plans to provide mitigation on-site and not affect off-site areas during construction will be addressed by implementing an approved spill prevention plan. Dedicated storage areas and handling protocols for potentially hazardous materials and establishing dedicated fueling/maintenance areas on-site will be covered within the spill prevention plan.

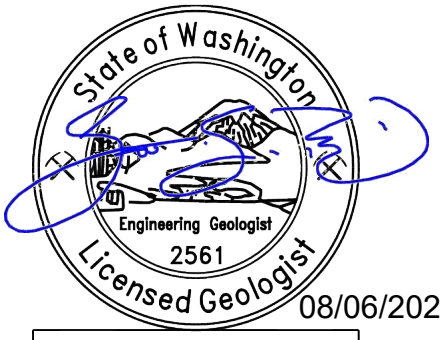
l. A complete discussion of past environmental investigations, sampling, spills, or incidents that may have resulted in or contributed to contaminated soil or groundwater at the site.

Sound Environmental Strategies have prepared a Phase 1 and Phase 2 Environmental Site Assessment. Please see the transmitted environmental reports for further discussion on site environmental history. In summary, no recognized environmental conditions were identified at the subject site.

We trust this level one CARA and hydrogeologic assessment meets your current needs. Should you require additional information, or have questions, please contact us.

Sincerely,

EARTH SOLUTIONS NW, LLC



08/06/2021

Scott S. Riegel

Scott S. Riegel, L.G., L.E.G.
Senior Project Manager

cc: Goodman Real Estate
Attention: Mr. Tim Dickerson (Email only)