

June 27, 2025  
File No. 25-237

Nabil Iskander  
8555 – 85<sup>th</sup> Avenue SE  
Mercer Island, WA

**Subject: Liquefaction Evaluation  
8555 – 85<sup>th</sup> Avenue SE, Mercer Island, WA**

Dear Nabil:

As requested, PanGEO Inc. completed a geotechnical study to evaluate the risk of soil liquefaction at your property in Mercer Island, Washington. We understand that you plan to remodel the house which would add about 200 square feet of space. We further understand that, based on email communication on 6/23/2025 with the project team, the reviewer at the City of Mercer is concerned about the risk of soil liquefaction at the site, due to the site's proximity to the lake shore. Our services are provided in accordance with the General Conditions attached at the end of this report.

#### **GEOLOGY SETTING**

According to the geology map of Mercer Island compiled by Troost and Wisher (2006), the property is underlain by Pre-Olympia non-glacial Deposits (Qpon). This soils unit generally consists of sand, gravel, silt, clay and organic deposits of inferred non-glacial origin, based on the presence of paleosols and tephra layers or southern Cascade provenance. This unit is typically dense and hard in its undisturbed state.

#### **SUBSURFACE CONDITIONS**

In addition to the review of geologic map described above, we also researched nearby subsurface data to supplement our understanding of the site soil conditions. Specifically, we collected two test borings previously completed for the adjacent property immediately downslope of the site. The test boring locations relative to the project site are shown in

Plate 1 on the following page. Summary boring logs are included at the end of this report for reference.

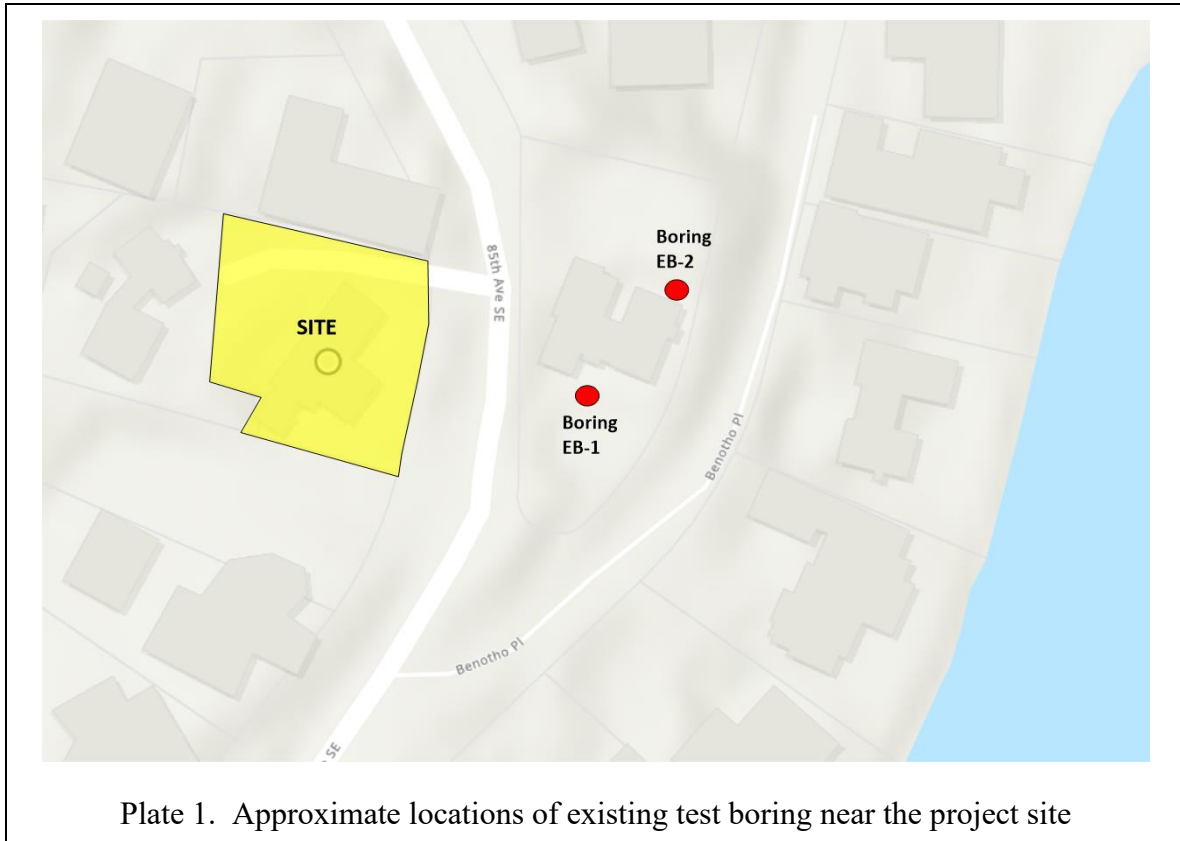


Plate 1. Approximate locations of existing test boring near the project site

In general, the test borings encountered approximately 10 to 15 medium stiff to stiff silt, over very stiff to hard silt. The test borings did not encounter groundwater.

### **LIQUEFACTION EVALUATION**

Liquefaction is a process that can occur when submerged/wet soils lose shear strength for short periods of time during a seismic event. Ground shaking of sufficient strength and duration can result in the loss of grain-to-grain contact and an increase in pore water pressure, causing the soil to behave as a fluid. Soils with a potential for liquefaction are typically cohesionless, with a predominately silt and sand grain size, and must be located below the groundwater table.

Based on our understanding of the site soil conditions, especially with the lack of groundwater at the site or its immediate vicinity, it is our opinion that the liquefaction

potential of the site soils is considered low, and design considerations related to soil liquefaction are not necessary for this project.

#### **STATEMENT OF RISK**

Per Mercer Island City Code Section 19.07.160.B.3, development within geologic hazard areas and critical slopes may occur if the geotechnical engineer provides a statement of risk with supporting documentation indicating that one of the following conditions can be met:

- a. An evaluation of site-specific subsurface conditions demonstrates that the proposed development is not located in a geologic hazard area;
- b. The geologic hazard area will be modified, or the development has been designed so that the risk to the lot and adjacent property is eliminated or mitigated such that the site is determined to be safe; or
- c. Construction practices are proposed for the alteration that would render the development as safe as if it were not located in a geologic hazard area and do not adversely impact adjacent properties; or
- d. The development is so minor as not to pose a threat to the public health, safety, and welfare.

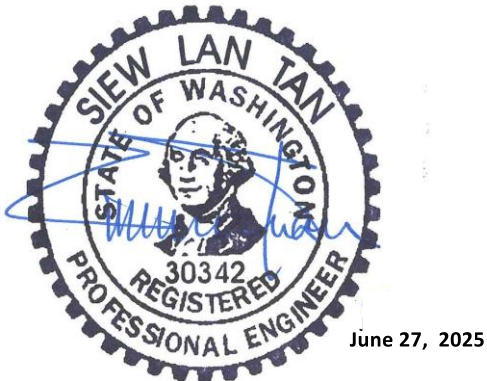
It is our opinion that Criteria (a) and (d) are applicable for this project.

Liquefaction Evaluation  
8555 – 85th Avenue SE, Mercer Island, Washington  
June 27, 2025

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We trust that the information meets your needs at this time. Should you have any questions, or if we can provide additional assistance, please call at your convenience.

Sincerely,



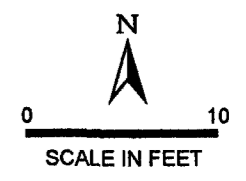
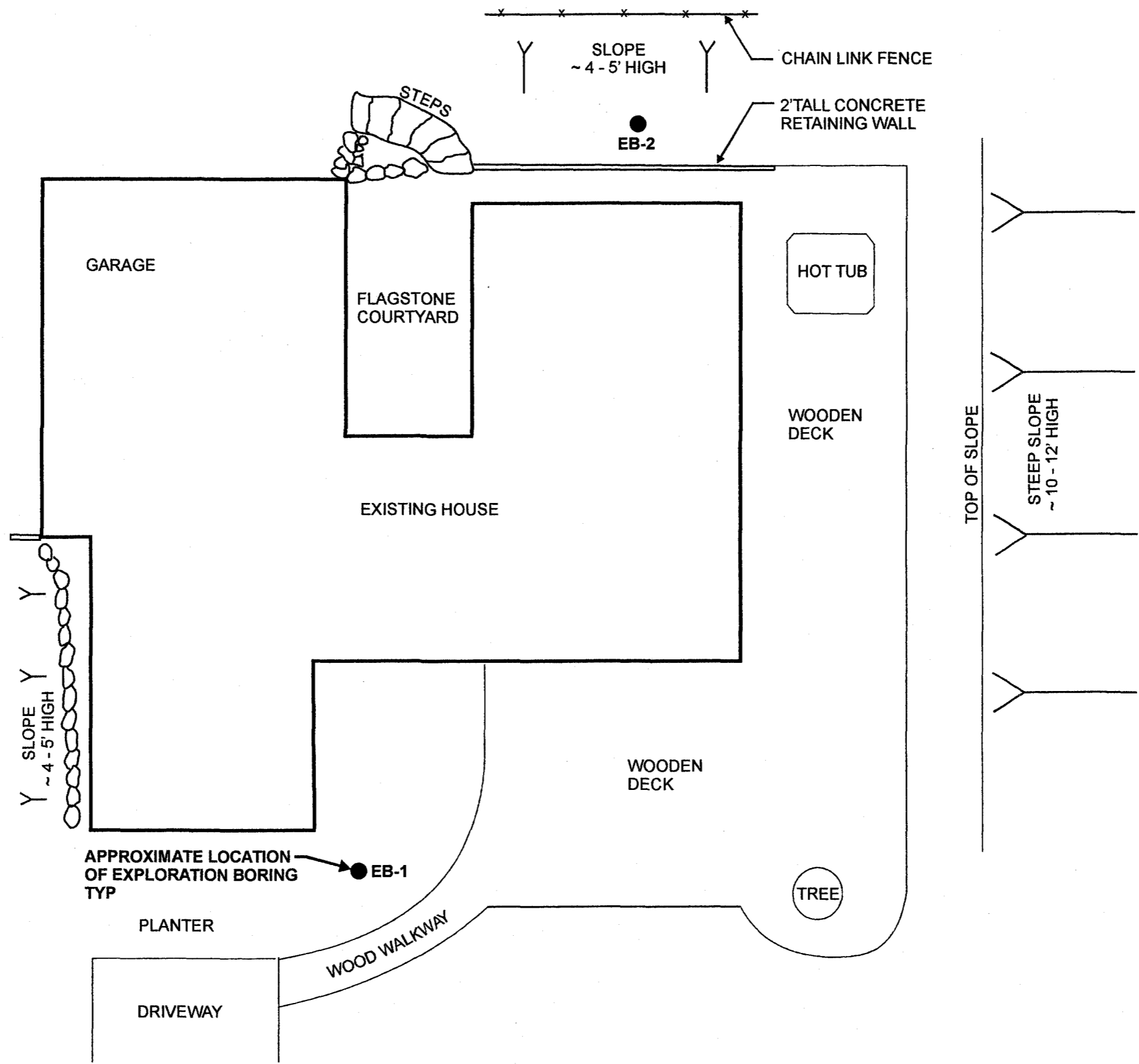
Siew L. Tan, P.E.  
Principal Geotechnical Engineer

Attachments:

Site Plan and Summary Logs of Previous Test Boring

**Site Plan and Boring Logs from  
Previous Geotechnical Report**

070239 March Macdonald Mercer Island Residence \070239 Site and Explr FIG 2.cdr



Associated Earth Sciences, Inc.



**SITE AND EXPLORATION SKETCH**  
**MARCH MACDONALD MERCER ISLAND RESIDENCE**  
**MERCER ISLAND, WASHINGTON**

FIGURE 2  
 DATE 4/07  
 PROJ. NO. KE070239A

Project Number  
KE070239A

Exploration Number  
EB-1

Sheet  
1 of 1

Project Name March MacDonald Mercer Island Residence  
 Location Mercer island, WA  
 Driller/Equipment CN Drilling/Acker  
 Hammer Weight/Drop 140# / 30"

Ground Surface Elevation (ft) Unknown  
 Datum N/A  
 Date Start/Finish 4/6/07, 4/6/07  
 Hole Diameter (in) 4 1/2 inches

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/Foot				Other Tests	
							10	20	30	40		
		S-1		Topsoil Slide Debris Moist, brown, silty SAND, few gravel (SM).			▲7					
		S-2		Very moist, tan, SILT (MH); trace organics.			▲6					
5		S-3		(Driller adding water) No organics; fractured, blocky appearance.			▲10					
		S-4		Contains chunks of hard silt. Becomes non-plastic (ML).			▲4					
10		S-5		Becomes grayish tan.  (Driller adding water)			▲11					
15		S-6		Vashon to Pre-Vashon Undifferentiated Very moist, gray, SILT (ML); contains tan streaks, thin fractured zones at 15 to 15 1/2 feet; dilatent.			▲44					
20		S-7		No tan streaks.			▲53					
				Bottom of exploration boring at 21.5 feet								
25												
30												
35												

*GV in report*

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- ▽ Water Level ( )
- ▼ Water Level at time of drilling (ATD)

Logged by: TJP  
 Approved by: *TJP*

Project Number  
KE070239A

Exploration Number  
EB-2

Sheet  
1 of 1

Project Name March MacDonald Mercer Island Residence Ground Surface Elevation (ft) Unknown  
 Location Mercer island, WA Datum N/A  
 Driller/Equipment CN Drilling/Acker Date Start/Finish 4/6/07, 4/6/07  
 Hammer Weight/Drop 140# / 30" Hole Diameter (in) 4 1/2 inches

Depth (ft)	S T	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/Foot				Other Tests	
							10	20	30	40		
		S-1		<b>Fill</b> Very moist, brown, SILT, with pieces of concrete (ML).								
		S-2		<b>Slide Debris</b> Very moist, tan, SILT (MH); highly fractured.  (Driller adding water)								
5		S-3										
		S-4										
10		S-5		<b>Vashon to Pre-Vashon Undifferentiated</b> Very moist, grayish tan, SILT (ML); slight fracturing.  (Driller adding soapy water)								
15		S-6		Fracture surfaces oxidized.  (Driller adding soapy water)								
		S-7		No oxidized fracture surfaces.								
20				Bottom of exploration boring at 19 feet								
25												
30												
35												

*GW in report*

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample
- M - Moisture
- Water Level ( )
- Water Level at time of drilling (ATD)

Logged by: TJP  
 Approved by: *TJP*

## **GENERAL CONDITIONS**

**PanGEO, Inc.**, a Washington Corporation (“PanGEO”), and Client agree to a work assignment in accordance with the attached proposal and cost estimate, and the following general conditions.

### **INTEGRATION**

The attached proposal together with these General Conditions comprises the entire Agreement between the parties. This Agreement may not be changed without the prior written consent of all parties to the Agreement. There are no terms or conditions that are not expressed in this Agreement.

### **STANDARD OF CARE**

PanGEO agrees to perform its professional services in accordance with that degree of care and skill ordinarily exercised by similarly qualified geotechnical engineering professionals currently practicing in this area under similar conditions. No warranties or other representations are expressed or implied.

### **CLIENT FURNISHED INFORMATION AND OBLIGATIONS**

The Client is responsible to provide PanGEO with a description of the property, its location, and the locations of any underground utilities, facilities or structures on or adjacent to the property that could impact our work. PanGEO, its owners, employees, subcontractors and agents will not be responsible for any damage to buried utilities or subterranean structures that are not specifically identified to PanGEO. The Client also must advise PanGEO of the location and nature of any known or suspected hazardous materials that may exist on the property.

### **SITE ACCESS/RIGHT OF ENTRY**

The Client agrees to advise PanGEO, prior to commencement of our services, of any special requirements for entry, work permits, security clearances, licenses, or any other required permissions. If the property is not owned by the Client, the Client shall obtain permission for right-of-entry for the purpose of performing our services.

### **SURFACE AND SUBSURFACE DISTURBANCE**

PanGEO will take reasonable precautions to minimize surface and subsurface disturbance of the site. In the normal course of exploratory work some disturbance may occur, and the restoration of any disturbance is not part of this Agreement, unless specifically provided in the scope of services and budget for the work.

### **UNANTICIPATED CONDITIONS OR HAZARDOUS MATERIALS**

Subsurface conditions at some locations at the site may vary from those encountered at the locations where surveys or explorations are made. Because the interpretations and recommendations of PanGEO are based solely on the information available to PanGEO, limitations on the available information will result in some uncertainty, and, therefore, risk, with respect to the interpretation of geologic and geotechnical conditions, despite the use of due professional care. If conditions different from those described in our report are observed or appear to be present, PanGEO should be retained to provide additional analyses as necessary to evaluate the situation and modify our recommendations as appropriate.

The discovery of unanticipated conditions or hazardous materials constitutes a changed condition that may require renegotiation of the scope of services and budget, or termination of services. If unanticipated hazardous materials are encountered, PanGEO may take immediate action to protect health and safety. PanGEO shall notify Client as soon as practically possible should unanticipated hazardous materials be encountered. Client agrees to compensate PanGEO for the additional cost of services necessary to protect the health and safety of the public, PanGEO's employees, or others.

### **INDEMNIFICATION FOR HAZARDOUS MATERIALS AND RELEASE OF POLLUTANTS**

Client agrees that any hazardous materials, including asbestos, present at the work site, prior to and during the performance of this Agreement were not generated, stored or disposed of by PanGEO. To the fullest extent permitted by law, the Client shall defend, indemnify and hold harmless PanGEO, its owners, employees, subcontractors and agents, from any and all liability, loss, costs, damage or expenses (including attorneys' fees and costs upon trial and appeal) arising out of or in connection with (1) any future pollution-related claims or damages at the site, including potential claims from third parties that may name PanGEO as a defendant, and (2) the performance of any professional services of PanGEO that result in alleged exacerbation of existing environmental pollution or contamination, or result in any newly caused or created pollution or contamination. This indemnification will not apply to claims, damages, losses or expenses which are a result of negligent acts by PanGEO under this Agreement, or which arise from new pollutants introduced solely by PanGEO.

### **REPORTING OF HAZARDOUS SUBSTANCE RELEASES**

The Client is responsible for reporting releases of hazardous substances when such reports are required by government agencies. The Client agrees to defend and hold PanGEO harmless for government or third party action taken for Client's failure to comply with hazardous substance release reporting requirements.

### **JOB SITE CONDUCT AND SAFETY**

PanGEO will be responsible for its professional activities on the job site. This will not relieve the Client, Owner, or construction contractors of their obligation to maintain a safe job site. Neither PanGEO's professional activities nor the presence of its employees nor subcontractors shall be construed to imply responsibility for job site safety.

#### **SAMPLE RETENTION AND DISPOSAL**

Non-hazardous samples will be discarded 30 days after they are obtained unless prior arrangements are made to store or deliver the samples. Samples containing hazardous materials that are regulated under federal, state, or local environmental laws will be returned to the site.

#### **INSTRUMENTS OF SERVICE**

Reports, field data, laboratory data, analyses, calculations, estimates, designs and other documents prepared by PanGEO as instruments of service shall remain the property of PanGEO. PanGEO will retain pertinent records relating to the services performed for a period of ten years following submission of the report. Copies of the instruments of service will be made available to the Client on request at a reasonable fee. Reuse of any instruments of service by the Client on extensions of this project or on other projects without PanGEO's written permissions will be at the Client's sole risk. Client agrees to defend, indemnify and hold harmless PanGEO from claims, damages and expenses arising out of such reuse.

#### **BILLING AND PAYMENT**

Billing for services will be submitted upon completion of the geotechnical engineering report. A service charge of one and one-half percent (1.5%) per month will be added to unpaid accounts due over 60 days. Expenses incurred in preparation and/or foreclosure of any lien or collecting delinquent amounts including, but not limited to attorneys' fees, costs at trial and appeal and charges for PanGEO's staff time shall be paid in addition to the delinquent amount.

#### **TERMINATION OF SERVICES**

This Agreement may be terminated by either party upon at least seven (7) days written notice in the event of substantial failure by the other party to perform in accordance with the terms and conditions through no fault of the terminating party. Such termination shall not be effective if that substantial failure has been remedied before expiration of the period specified in the written notice. In the event that the Client requests early termination of our services, PanGEO reserves the right to complete such analyses and records as are necessary to place its files in order and complete a report on the services performed to date. Charges for these termination activities shall be in addition to all charges incurred up to the date of termination.

#### **INSURANCE**

PanGEO maintains Workers' Compensation and Employer's Liability Insurance as required by state laws. PanGEO also maintains comprehensive general, auto, professional and environmental liability insurance, certificates of which are available upon request.

#### **LIMIT OF LIABILITY**

*General Liability:* In the performance of this Agreement and subject to the limits, terms and conditions of property damage and public liability coverage, PanGEO agrees to indemnify and hold Client harmless from PanGEO's proportional share of liability resulting from its negligence and any breach of contract compared to that of other persons or entities which results in damage to the Client. PanGEO shall not be responsible for any loss, damage, or liability beyond the amounts, limits, coverage or conditions of its insurance coverage on the date the claim is made. PanGEO shall not be responsible for Client's negligence nor the negligence of third parties.

*Professional Liability:* In consideration of relative opportunities for financial reward from this project for the parties to this Agreement, Client agrees that the maximum aggregate amount of its recovery from PanGEO or its employees due to any and all claims of professional negligence and breach of contract arising out of any incident shall be limited to \$50,000 or the amount of PanGEO's fees for the services provided under this Agreement, whichever is less, unless a higher limit with commensurate compensation is specifically negotiated.

#### **CONSEQUENTIAL DAMAGES**

PanGEO shall not be liable for consequential damages, including loss of use or loss of profits, or indirect damages, regardless of whether such claim is based upon alleged breach of contract, willful misconduct, strict liability, breach of warranty or negligent act, error or omission, whether professional or nonprofessional.

#### **DISPUTES**

Any dispute, controversy or claim arising out of or relating to this Agreement, or breach thereof, shall be mediated. The law of the State of Washington will govern the validity and execution of this Agreement and the disposition of any claims related to this Agreement. The prevailing party in any dispute or litigation concerning this Agreement will be entitled to recover reasonable attorneys' fees and costs incurred at trial and appeal, including staff time, court costs, attorneys' fees, and other claim-related expenses.

#### **ASSIGNMENTS**

Neither the Client nor PanGEO may delegate, assign, sublet or transfer the duties, interests or responsibilities set forth in this agreement without the written consent of the other party.

#### **SURVIVAL**

These terms and conditions shall survive the completion of the services under the Agreement and the termination of the Agreement for any cause.

#### **SEVERABILITY**

The Client and PanGEO have entered into this Agreement of their own free will, to communicate to one another mutual understandings and responsibilities. Any element of the Agreement later held to violate a law or regulation shall be deemed void, and remaining provisions shall continue in force. Client and PanGEO shall in good faith attempt to replace any invalid or unenforceable provision with one that is valid and enforceable, and which comes as close as possible to expressing the intent of the original provision.