CITY OF KIRKLAND
123 FIFTH AVENUE, KIRKLAND, WASHINGTON 98033-6189
(425) 587-3225

DETERMINATION OF NONSIGNIFICANCE (DNS) .

CASE #: SEP06-00009 DATE ISSUED: 5/12/2006

DESCRIPTION OF PROPOSAL

Proposed parking area and future accessory structure (garage/ accessory dwelling unit) located on the western edge of the their property. Approximately 820 cubic yards of soil will be removed from the western half of the property and a shoring wall of varying heights (from 8 to 32 feet) will be constructed.

PROPONENT: **DALE CHRISTIAN AND LISA CHRISTIAN**

LOCATION OF PROPOSAL

437 5TH AVE WEST

LEAD AGENCY IS THE CITY OF KIRKLAND

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21.030 (2) (c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public upon request.

This DNS is issued under 197-11-340 (2); the lead agency will not act on this proposal for 14 days from the date above. Comments must be submitted by 5:00 p.m. 5/26/2006

Responsible official: 5/8/06

Eric Shields, Director Date
Department of Planning and Community Development
425-587-3225

Address: City of Kirkland
123 Fifth Avenue
Kirkland, WA 98033-6189

You may appeal this determination to NANCY COX at Kirkland City Hall, 123 Fifth Avenue, Kirkland, WA 98033 no later than 5:00 p.m., May 26, 2006 by WRITTEN NOTICE OF APPEAL.

You should be prepared to make specific factual objections. Contact Nancy Cox to read or ask about the procedures for SEPA appeals.

Please reference case # SEP06-00009.

Publish in the Eastside Journal (date): May 16, 2006

ATTACHMENT 4
SHR07-00002

Distribute this form with a copy of the checklist to the following:

_____ Environmental Review Section, Department of Ecology,
P.O. Box 47703, Olympia, WA 98504-7703

_____ Department of Fish and Wildlife (for streams and wetlands - with drawings)
North Lake Washington Tributaries Area Habitat Biologist
16018 Mill Creek Boulevard, Mill Creek, WA 98012

_____ Department of Fish and Wildlife (for shorelines and Lake Wa. - with drawings)
Lake Washington Tributaries Area Habitat Biologist
C/O DOE
3190 160th Avenue SE, Bellevue, WA 98008

_____ Seattle District, U.S. Army Corps of Engineers,
P.O. Box C-3755
Seattle, WA 98124

_____ Attn: Lynn Best, Acting Director, Environmental Division, Seattle City Light
700 5th Avenue, Suite 3316
P.O. Box 34023
Seattle, WA 98125-4023

_____ Muckleshoot Tribal Council, Environmental Division, Fisheries Department
39015 172nd SE
Auburn, WA 98092

_____ Northshore Utility District,
P.O. Box 82489
Kenmore, WA 98028-0489

_____ Shirley Marroquin
Environmental Planning Supervisor
King County Wastewater Treatment Division
201 South Jackson Street, MS KSC-NR-0505
Seattle, WA 98104-3855 - and -

_____ Gary Kriedt
King County Metro Transit Environmental Planning
201 South Jackson Street, MS KSC-TR-0431
Seattle, WA 98104-3856

_____ Director of Support Services Center
Lake Washington School District No. 414
P.O. Box 97039
Redmond, WA 98073-9739

_____ John Sutherland, Developer Services
Washington State Department of Transportation
15700 Dayton Ave. N., MS 240
P.O. Box 330310
Seattle, WA 98133-9710

_____ Tim McGruder, Conservation Chair
East Lake Washington Audubon Society
13450 NE 100th St.
Kirkland, WA 98033

✓ Julie Stofel, Wash. Dept. of Fish and Wildlife, 16018 Mill Creek Blvd, Mill Creek, WA 98012

Applicant / Agent Matt Mengert, Thielsen Architects, 720 Market St, Suite C Kirkland, WA 98033

cc: Case # BLD06-00304

Distributed to agencies along with a copy of the checklist. (see attached).

Distributed By:

Date:

SEPA_C_A, rev: 5/9/2006

CITY OF KIRKLAND
Planning and Community Development Department
123 Fifth Avenue, Kirkland, WA 98033 425.587-3225
www.ci.kirkland.wa.us

MEMORANDUM

To: Eric R. Shields, AICP, Planning Director

From: Tony Leavitt, Planner TL

Date: May 9, 2006

Subject: **ENVIRONMENTAL DETERMINATION FOR CHRISTIAN PARKING AREA AND FUTURE ACCESSORY STRUCTURE (SEP06-00009)**

Dale and Lisa Christian have submitted an environmental checklist (see Enclosure 1) and related materials for their proposed parking area and future accessory structure (garage/ accessory dwelling unit) located on the western edge of the their property located at 437 5th Avenue West (BLD06-00304, see Enclosure 2). Approximately 820 cubic yards of soil will be removed from the western half of the property and a shoring wall of varying heights (from 8 to 32 feet) will be constructed. The completed parking area will accommodate a total of 4 parking stalls.

The subject property contains a Seismic Hazard Area and a High Landslide Hazard Area. The parking area and the future accessory structure would be located with the High Landslide Hazard Area. The applicant has submitted a Geotechnical Engineering Study dated January 2, 2004 prepared by Geotech Consultants (Enclosure 3).

Additionally the subject property is located near a bald eagle nesting site. The applicant will be required to submit a copy of a Washington State Department of Fish and Wildlife Approved Bald Eagle Management Plan prior to issuance of a City of Kirkland Building Permit.

Prior to issuance of any permits, a thorough analysis will be conducted to assure that all aspects of the project comply with all applicable City codes and policies. This analysis will include a review for compliance with Kirkland Zoning Chapter 85. State law specifies that this environmental review under the State Environmental Policy Act (SEPA) is to focus only on potential significant impacts to the environment that could not be adequately mitigated through the City of Kirkland regulations and Comprehensive Plan.[1]

I have had an opportunity to visit the site and review the environmental checklist for the project referenced above. I have not identified any significant adverse environmental impacts. Therefore, I recommend that a Determination of Non-Significance be issued for this proposed action.

Should you have any questions, please contact me.

[1] ESHB 1724, adopted April 23, 1995

SEPA ENCLOSURES

1. Environmental Checklist
2. Site Plan
3. Geotechnical Engineering Study dated January 2, 2004 prepared by Geotech Consultants

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Review by Responsible Official:

I concur ☑

I do not concur ☐

Comments:

Eric R. Shields, AICP
Planning Director

5/8/06
Date

CITY OF KIRKLAND ENVIRONMENTAL CHECKLIST

ENCLOSURE 1
SEP06-00009

Purpose of Checklist:

The State Environmental Policy Act (SEPA), Chapter 43.21C RCW, requires all governmental agencies to consider the environmental impac proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant a impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the City identify impact your proposal, and to reduce or avoid impacts from the proposal, whenever possible

Instructions for Applicants:

This environmental checklist asks you to describe some basic information about your proposal. Answer the questions briefly with the most information known, or give the best description you can.

You must answer each question accurately and carefully to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "do not know" or "does not apply." Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the City staff can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The City may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impacts.

Use of Checklist for Non-project Proposals:

Complete this checklist for non-project proposals also, even though questions may be answered "does not apply." IN ADDITION, complete the SUPPLEMENTAL SHEET FOR NON-PROJECT ACTIONS (Part D).

For non-project actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer," and "affected geographic area," respectively.

A. BACKGROUND

1. Name of proposed project, if applicable: ***Christian Residence Parking area***
2. Name of applicant: ***Dale and Lisa Christian***
3. Tax parcel number: ***124810-0065-00***
4. Address and phone number of applicant and contact person: ***437 5th Ave w. Kirkland 425-576-8643***

BLD06-00306

5. Date checklist prepared: ***3/4/06***

6. Agency requesting checklist: ***City of Kirkland -Planning and Development***

7. Proposed timing or schedule (including phasing, if applicable): ***Summer - Fall 2006***

8. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal?

   We anticipate future construction of a shotcrete concrete wall to cover the proposed timber lagging shoring wall, and possible future construction of a detached 2-car garage with accessory dwelling unit within the northern half of the proposed parking area.

9. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

   Geotechnical report and topographical survey.

10. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

    not to our knowledge

11. List any government approvals or permits that will be needed for your proposal, if known.

    City of Kirkland Building Permit

12. Give brief, complete description of your proposal, including the proposed uses, the size and scope of the project and site including dimensions and use of all proposed improvements. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.

    Excavation and construction of a soldier pile/timber lagging shoring wall rnnning the width of the property with an asphalt parking area for approximately 4 guest vehicles (approx. 1385 sq. ft.), located along the toe of the shoring wall.

13. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

    437 5th Ave West, Kirkland WA

TO BE COMPLETED BY APPLICANT

EVALUATION FOR AGENCY USE ONLY
REVIEWED BY:
Tony Leavitt, Planner

B. ENVIRONMENTAL ELEMENTS

1. EARTH

a. General description of the site (circle one): Flat, rolling, hilly, steep, slopes, mountainous, other
Steep on eastern half of site between Waverly Way and 5th Ave W. Flat on western half of site between 5th Ave. W. and Lake Washington

b. What is the steepest slope on the site (approximate percent slope)?
approx. 140%

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

Dense glacial till soils overlain with by a shallow layer of silty sand

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

There are no visible signs of unstable soils on our lot

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

There is no fill proposed for the project. Grading will occur for the parking area, with approx. 820 cu. yards of soil being removed from site

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

The lodgement till soil that would be exposed after excavation is very dense, stable and has low permability. Therefore, it does not readily erode. There will not be appreciable erosion during the use of the project.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt, buildings)?
49.8% including ingress/egress easement paving

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:
Siltation barriers will be in place during construction. Landscaping will be installed and maintained after construction of the project.

PW Erosion Control Standards - COK

2. AIR

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities, if known.

During construction: possible dust during excavation and exhaust from excavation equipment and trucks. After completion: no emissions other than standard auto associated from single family residence.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

Not that we are aware of.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:
Roadways will be periodically cleaned and the evacuation areas moistened to reduce dust.

3. WATER

a. Surface

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

Lake Washington

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Yes - adjacent. The entire project will be constructed within 200 feet of Lake Washington (see attached Site Plan)

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

No dredging or fill will occur within the surface water areas. There are no wetlands on the site.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.
No

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.
No

6) Does the proposal involve any discharges of waste materials to surface

waters? If so, describe the type of waste and anticipated volume of discharge.
No

b. Ground

1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.

No.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.) Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Does not apply.

c. Water Runoff (including storm water):

1) Describe the source of runoff (include storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Runoff from proposed paved parking area will be collected in (3) catch basins, the last one being a floatable materials separator, and then tightlined to another existing on-site floatable materials separator catch basin before being discharged into Lake Washington.

2) Could waste materials enter ground or surface waters? If so, generally describe.
No

Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:
Surface water from impervious surfaces will be collected in catch basins and a floatable materials separator catch basin. Ground water will be collected by perforated drain lines and connected to a tight line running to the floatable materials separator catch basin.

4. PLANTS

a. Check or circle types of vegetation found on the site:

- [x] deciduous tree: alder, maple, aspen, other
- [ ] evergreen tree: fir, cedar, pine, other
- [x] shrubs
- [x] grass

- ☐ pasture
- ☐ crop or grain
- ☐ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
- ☐ water plants: water lily, eelgrass, milfoil, other
- ☐ other types of vegetation:

b. What kind and amount of vegetation will be removed or altered?
Blackberry bushes, some small deciduous trees and shrubs will be removed during excavation on the 5th Ave W side of site.

c. List threatened or endangered species known to be on or near the site.
None known

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:
Proposed landscaping will include indigenous plants.

5. ANIMALS

a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

birds: hawk, heron, eagle, songbirds, other
mammals: deer, bear, elk, beaver, other
fish: bass, salmon, trout, herring, shellfish, other ***Song Birds***

b. List any threatened or endangered species known to be on or near the site.
None known
Bald Eagle Nesting site located South of property.

c. Is the site part of a migration route? If so, explain.
No

d. Proposed measures to preserve or enhance wildlife, if any:
Landscaping will use plants similar in nature to those being removed, maintaining habitat
WDFW Required Approval

6. ENERGY AND NATURAL RESOURCES

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.
None, as it is a parking pad

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.
No

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:
Not applicable

7. ENVIRONMENTAL HEALTH

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.
No

1) Describe special emergency services that might be required.
Does not apply

2) Proposed measures to reduce or control environmental health hazards, if any:
Does not apply

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?
Does not apply

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.
Short-term: noise from construction traffic and equipment, generally from 8 am - 4 pm Monday - Friday

3) Proposed measures to reduce or control noise impacts, if any:
Adhering strictly to approved construction work hours.

8. LAND AND SHORELINE USE

a. What is the current use of the site and adjacent properties?
The site and adjacent properties are used for single family residences.

b. Has the site been used for agriculture? If so, describe.
No

c. Describe any structures on the site.
Existing single family residence

d. Will any structures be demolished? If so, what?
No

e. What is the current zoning classification of the site?
WD II

f. If applicable, what is the current shoreline master program designation of the site?
SR (suburban residential)

g. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.
yes, the eastern steep slope portion is designated a Geologically Hazardous Area due to slope

h. Approximately how many people would reside or work in the completed project.
none.

i. Approximately how many people would the completed project displace?
none

j. Proposed measures to avoid or reduce displacement impacts, if any:
not applicable

k. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:
The project scope and scale is in keeping with the existing neighborhood.

9. HOUSING

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.
Not applicable.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.
Not applicable.

c. Proposed measures to reduce or control housing impacts, if any:
Not applicable.

10. AESTHETICS

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?
Tallest portion of proposed shoring wall is approx. 34'-0" above the proposed parking area paving. Principal exterior building material will be timber lagging until the anticipated future shotcrete concrete wall is installed over the lagging

b. What views in the immediate vicinity would be altered or obstructed?
None.

c. Proposed measures to reduce or control aesthetic impacts, if any:
Proposed wall and parking is similar in scale to similar strucutures along 5th Ave. W. and the neighborhood. Landscaping will help to soften the asthetic impact of the proposed wall

11. LIGHT AND GLARE

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?
None.

b. Could light or glare from the finished project be a safety hazard or interfere with views?
No.

c. What existing off-site sources of light or glare may affect your proposal?
None.

d. Proposed measures to reduce or control light and glare impacts, if any:
Not applicable

12. RECREATION

a. What designated and informal recreational opportunities are in the immediate vicinity?
Waverly Beach Park is located appx 2 blocks north

b. Would the proposed project displace any existing recreational uses? If so, describe.
No

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:
Not applicable.

13. HISTORICAL AND CULTURAL PRESERVATION

a. Are there any places or objects listed in, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.
No

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.
NA

c. Proposed measures to reduce or control impacts, if any:
NA

14. TRANSPORTATION

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on-site plans, if any.
Access to site is served via 5th Ave. W., a private ingress/egress easement road which then connects to Waverly Way

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?
No. Nearest stop is approx. 3/4 mile away

c. How many parking spaces would the completed project have? How many would the project eliminate?
Four spaces would be added. None eliminated.

d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).
None required.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.
No

f. How many vehicular trips per day would be generated by the completed project? If know, indicate when peak volumes would occur.
NA - since project is intended for guest parking not occuring on a regular/daily basis.

g. Proposed measures to reduce or control transportation impacts, if any:
NA

15. PUBLIC SERVICES

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.
No

b. Proposed measures to reduce or control direct impacts on public services, if any.
NA

16. UTILITIES

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other ***All are available at existing residence on the site, except no septic system.***

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.
No new utilities are anticipated for project.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Date Submitted: 3/9/06

5/9/06

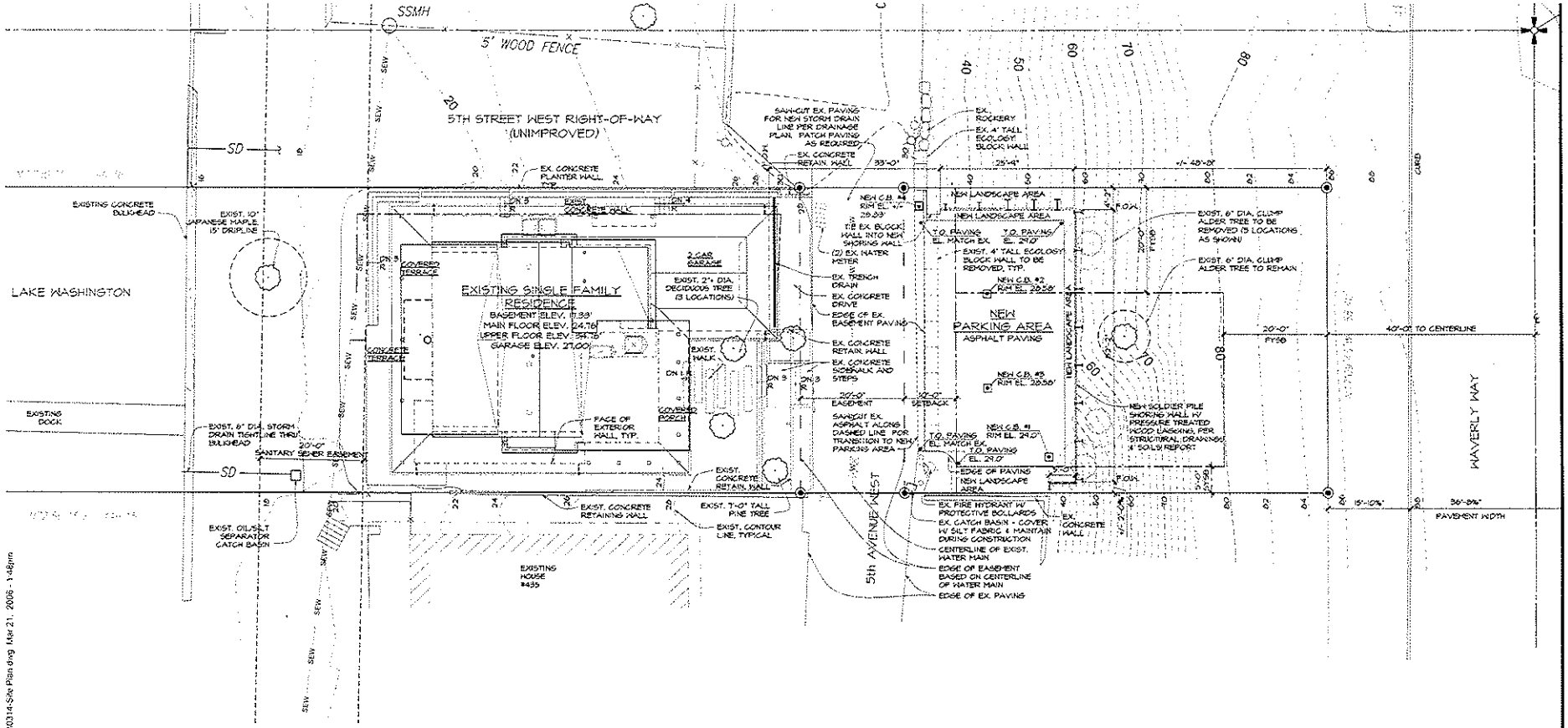
D. SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS

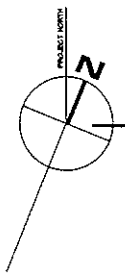
(Do not use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?



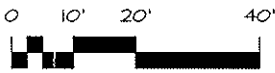


SITE PLAN

1" = 20'-0"

SITE PLAN NOTES:

1. No existing significant trees on site within area of construction.



SCALE: 1" = 20'-0"

Issue Date: 3/21/06
Drawn: MJM
Revised:

Thielsen ARCHITECTS
Kirkland, WA 98033 ▼ Tel 425.828.0333 ▼ Fax 425.828.9376

Project:
CHRISTIAN PARKING
437 5TH AVE. W
KIRKLAND, WA

Sheet Title:
SITE PLAN

Sheet:

ENCLOSURE 2
SEP06-00009

GEOTECH
CONSULTANTS, INC.

13256 Northeast 20th Street, Suite 16
Bellevue, Washington 98005
(425) 747-5618 FAX (425) 747-8561

January 2, 2004

JN 00253-1

Dale Christian
c/o Thielsen Architects
720 Market Street, Suite C
Kirkland, Washington 98033

Attention: Matt Mengert

Subject: **Geotechnical Engineering Study**
Proposed Christian-Wilson Parking Area and Future ADU
437 – 5th Avenue West
Kirkland, Washington

Reference: "Geotechnical Engineering Study – Proposed Christian/Wilson Residence", western half of subject site, Geotech Consultants, Inc., October 1, 2000.

Dear Mr. Mengert:

We are pleased to present this geotechnical engineering report for the parking area and future garage/ADU (accessory dwelling unit) to be constructed in Kirkland, Washington. The scope of our work consisted of exploring site surface and subsurface conditions, and then developing this report to provide recommendations for general earthwork and design criteria for shoring, retaining walls, and foundations. This work was authorized by your acceptance of our proposal, dated October 30, 2003.

We were provided with a site plan, a preliminary shoring plan, and a topographic map. Thielsen Architects developed these plans, which are dated November 18, 2003. Based on these plans and conversations with the project architect, we anticipate that a shoring wall will be constructed into the hillside to the east of 5th Avenue West. The new wall will be nearly in line with the retaining wall on the southern adjacent property. We understand that a parking area will be constructed off of 5th Avenue West at approximately elevation 30 feet. The shoring wall will retain between 15 feet and 30 feet of the hillside. We understand that the parking area may be developed in the future as a garage or an ADU. No plans of these future structures were developed at the time of this report.

SITE CONDITIONS

SURFACE

The Vicinity Map, Plate 1, illustrates the general location of the rectangular site, which is bisected by 5th Avenue West. The area of the subject property between Lake Washington and 5th Avenue West is gently sloping and developed with a new residence. On the upslope, eastern side of 5th Avenue West, there is a small rockery and a very steep slope approximately 48 feet in height. The slope inclination varies from 100 percent to near 150 percent. The majority of this slope is covered with a thin veil of vegetation, but significant portions of the slope are bare. There are indications, such as the bare scars and bowed trees, on the subject site and adjacent properties that indicate a history of past soil creep and shallow near-surface slides on the very steep slope. It appears that the toe of this slope was also cut for the construction of 5th Avenue West.

ENCLOSURE 3
SEP06-00009

The area of the site to the east of the steep slope continues upward gently for another 6 to 8 feet to the edge of West Waverly Way. The adjacent property to the north is an abandoned street right-of-way. The adjacent lot to the south of the proposed parking area is developed with a parking area and an ADU, featuring a retaining wall on the order of 8 to 10 feet tall.

SUBSURFACE

The subsurface conditions of the portion of the property to the west of 5th Avenue West were explored in 2000 by excavating two test pits. We returned to the site on November 6, 2003 to drill a boring at the top of the steep slope at the approximate location shown on the Site Exploration Plan, Plate 2. Based on our approximation of the boring location and the topographic map supplied, the test boring was drilled near surface elevation 80 feet. Our exploration program was based on the proposed construction, anticipated subsurface conditions and those encountered during exploration, and the scope of work outlined in our proposal.

The boring was drilled using a track-mounted, hollow-stem auger drill. Samples were taken at 5-foot intervals with a standard penetration sampler. This split-spoon sampler, which has a 2-inch outside diameter, is driven into the soil with a 140-pound hammer falling 30 inches. The number of blows required to advance the sampler a given distance is an indication of the soil density or consistency. A geotechnical engineer from our staff observed the drilling process, logged the test borings, and obtained representative samples of the soil encountered. The Test Boring Log is attached as Plates 3 and 4.

Soil Conditions

Our test boring revealed very dense, gravelly, silty sands (glacial till) within several feet of the ground surface to approximately 48 feet below grade (± *elevation 32 feet*). At that depth, very dense, wet sands were encountered and were not penetrated by the boring, which extended to 50 feet (± *elevation 30 feet*). Our earlier test pits and our observation of the excavation for the residence on the western side of 5th Avenue West very dense glacial till soils to their maximum depth (approximately 8 feet below grade (± *elevation 20 feet @ bottom of excavation*)).

Groundwater Conditions

Groundwater seepage was observed in our boring at depths of approximately 34 feet (± *elevation 46 feet*) and 48 feet below grade (± *elevation 32 feet*). Several sandy and very moist soil lenses were encountered in the till soils and the groundwater at 34 feet below grade appears to be attributed to groundwater perched in a sandy lens. Given the soil conditions and our understanding of other projects near the site, we believe that the groundwater encountered at 48 feet could be from a more significant source than a small perched layer, and could yield significant amounts of water. The sand layer encountered at this elevation also appears to decline or pinch out before the soil exposure along the eastern edge of 5th Avenue West and the excavation elevations on the western side of 5th Avenue West.

The test boring was left open for only a short time period. Therefore, the seepage levels on the log represent the location of transient water seepage and may not indicate the static groundwater level. Groundwater levels encountered during drilling can be deceptive, because seepage into the boring can be blocked or slowed by the auger itself.

It should be noted that groundwater levels vary seasonally with rainfall and other factors. We anticipate that groundwater could be found in more permeable soil layers or pockets within the till, and between the near-surface weathered soil and the underlying glacial till.

The final log represents our interpretation of the field log. The stratification lines on the log represent the approximate boundaries between soil types at the exploration location. The actual transition between soil types may be gradual, and subsurface conditions can vary away from the exploration location. The log provides specific subsurface information only at the location tested. The relative densities and moisture descriptions indicated on the test boring log are interpretive descriptions based on the conditions observed during drilling.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

Our explorations and observations at the subject site indicate that the bluff to the east of 5th Avenue West is composed mainly of very dense glacial till soils with a high internal strength and cemented composition. Bluffs of this type are typical in the Puget Sound, but they are subject to provide shallow colluvial slides as the soil on the surface of the slope weathers and becomes loosened by erosion, root action, and freeze-thaw. These debris flow slides typically involve saturated surface soils and often occur following significant rainfall events. These types of slides appear to have occurred on the subject slope in the past and would be predicted to occur in the future. Typical return periods for natural slides of this type are in the range of 20 to 50 years on each individual slope section. Since the area above the proposed wall will be subject to future sloughing, some catchment should be incorporated into the wall design. Since there is a variable height of slope above the proposed wall, the height of catchment will need to vary. We recommend allowing for 1 foot of catchment wall height for every 5 feet of slope height above the wall (rounding up). The catchment wall should be designed for the pressures and abide by the recommendations described in the ***Permanent Foundation and Retaining Wall*** section of this report. Since the grading behind the wall will slope at the wall, we recommend that a lined drainage swale with a yard drain be constructed above the wall to collect surface water and direct it away from the wall.

We understand that the design team has elected to utilize a tied-back soldier-pile wall as the proposed retaining wall along the eastern side of the proposed parking area. We also understand that, at a recent project on a nearby site (to the north of the subject site in the same bluff), the proposed single row of deep tiebacks encountered significant quantities of artesian water and the design had to be adjusted to a double row of shorter anchors to avoid the groundwater. In an attempt to avoid this potential problem, we understand that the design team has elected to install a double row of more shallow anchors at the subject site. Based on our test boring and our experience at the house site to the west, we anticipate that a majority of the soldier pile depth will be drilled through very dense glacial till soils, but that the toe of the soldier piles will likely encounter the very dense, water-bearing sands that underlie the till. If these sands are encountered and are water-bearing, they could hamper pile and tieback installation and require slurry methods of pile installation and casing of the tieback holes. Due to the presence of the slope, our test boring could not be drilled in the exact location of the proposed wall, and soil conditions can vary away from the exploration location. Therefore, the conditions that will be encountered at the proposed soldier-pile wall location will only be known at the time of construction. If the wet sand layer does not pinch out or dive to the west, the top of this wet soil layer could be encountered in the lower portion of the proposed lagged shoring wall. Methods to reduce the chances of encountering the wet sands in the

cut would be to reduce the depth of the excavation or moving the shoring wall to the west. Since the exact location of the sand layer is not known, the amount of adjustment in the depth or position of the shoring wall necessary to miss the sands is not known.

Due to the potential for significant groundwater to be encountered in the excavated cut at the toe of the soldier-pile wall, a cut-off trench drain in conjunction with a system of underslab drains should be planned for the proposed development. The cut-off drain should consist of a 6-inch perforated PVC drain installed in an 18-inch-deep trench along the face of the soldier piles. The trench will need to be lined with non-woven filter cloth and filled around the drain pipe with washed crushed rock (no fines, no sand). The underslab drainage should consist of an 8-inch layer of clean washed crushed rock under the slab and 4-inch-diameter perforated pipes embedded in the drainage material. The pipes should be spaced 15 feet apart and sloped for drainage. A detail of the proposed cut-off trench drain and underslab drains is attached to this report as Plate 6. If a future footing will be constructed at the base of the shoring wall, the cut off drain will need to be constructed a sufficient distance from the future footing to avoid the influence area of the footing, which usually extends downward from the footing edges at a 1:1 (H:V) inclination.

Groundwater was encountered in our boring, and will likely be encountered in the proposed excavation. If permanent building walls are to be constructed against the shoring walls, drainage should be provided by attaching a continuous geotextile drainage composite with a solid plastic backing, similar to Miradrain 6000, to the face of the lagging, prior to pouring the foundation wall. These drainage composites should be hydraulically connected to the foundation drainage system through weep holes placed in the foundation walls. In addition, waterproofing should be provided where moist conditions or some seepage through the walls are not acceptable in the future. This typically includes limiting cold-joints and wall penetrations, and using bentonite panels or membranes on the outside of the walls. Applying a coat of asphalt emulsion is not considered waterproofing.

The proposed garage or ADU can be supported on a conventional foundation bearing on the native, dense glacial till soils. To maintain continuity of the structure, we recommend that all of the foundations be excavated to the dense, glacially consolidated soil. Depending on the proposed foundation grades, this may require overexcavation which may be filled with lean concrete or compacted quarry spalls.

The erosion control measures needed during the site development will depend heavily on the weather conditions that are encountered. While site clearing will expose an area of bare soil, the erosion potential on the site is relatively low due to the shoring installation and the gentle slope of the base of the excavation. We anticipate that a silt fence will be needed around the downslope side of the site. Rocked construction access roads should be extended into the site to reduce the amount of mud carried off the property by trucks and equipment. Following rough grading, it will be necessary to mulch or hydroseed bare areas that will not be immediately covered with landscaping or an impervious surface.

CONVENTIONAL FOUNDATIONS

The proposed structure can be supported on conventional continuous and spread footings bearing on undisturbed glacial till, or on crushed quarry rock fill/lean concrete placed above this competent native soil. See the section entitled ***General Earthwork and Structural Fill*** for recommendations regarding the placement and compaction of structural fill beneath structures. Prior to placing structural fill beneath foundations, the excavation should be observed by the geotechnical engineer

to document that adequate bearing soils have been exposed. Adequate compaction of structural fill should be verified by observation by the geotechnical engineer. We recommend that continuous and individual spread footings have minimum widths of 12 and 16 inches, respectively. Footings should also be bottomed at least 18 inches below the lowest adjacent finish ground surface. The local building codes should be reviewed to determine if different footing widths or embedment depths are required. Footing subgrades must be cleaned of loose or disturbed soil prior to pouring concrete.

Depending on the final site grades, some overexcavation may be required below the footings to expose competent native soil. Unless lean concrete is used to fill an overexcavated hole, the overexcavation must be at least as wide at the bottom as the sum of the depth of the overexcavation and the footing width. For example, an overexcavation extending 2 feet below the bottom of a 2-foot-wide footing must be at least 4 feet wide at the base of the excavation. If lean concrete is used, the overexcavation need only extend 6 inches beyond the edges of the footing.

An allowable bearing pressure of 4,000 pounds per square foot (psf) is appropriate for footings supported as recommended. A one-third increase in this design bearing pressure may be used when considering short-term wind or seismic loads. For the above design criteria, it is anticipated that the total post-construction settlement of footings founded on competent native soil will be less than one inch.

Lateral loads due to wind or seismic forces may be resisted by friction between the foundation and the bearing soil, or by passive earth pressure acting on the vertical, embedded portions of the foundation. For the latter condition, the foundation must be either poured directly against relatively level, undisturbed soil or be surrounded by level structural fill. We recommend using the following ultimate values for the foundation's resistance to lateral loading:

PARAMETER	ULTIMATE VALUE
Coefficient of Friction	0.50
Passive Earth Pressure	400 pcf

Where: (i) pcf is pounds per cubic foot, and (ii) passive earth pressure is computed using the equivalent fluid density.

We recommend maintaining a safety factor of at least 1.5 for the foundation's resistance to lateral loading, when using the above ultimate values.

SEISMIC CONSIDERATIONS

The site is located within Seismic Zone 3, as illustrated on Figure No.16-2 of the 1997 Uniform Building Code (UBC). In accordance with Table 16-J of the 1997 UBC, the site soil profile is best represented by Soil Profile Type S_c (Very Dense Soil). The site soils are not subject to seismic liquefaction because of their dense nature.

SLABS-ON-GRADE

The building floors may be constructed as slabs-on-grade atop the drainage mat described in the ***General*** section placed over existing non-organic soils, or structural fill. The subgrade soil must be in a firm, non-yielding condition at the time of slab construction or underslab fill placement. Any soft areas encountered should be excavated and replaced with select, imported structural fill.

All slabs-on-grade should be underlain by a capillary break or drainage layer consisting of a minimum 4-inch thickness of coarse, free-draining structural fill with a gradation similar to that discussed in ***Permanent Foundation and Retaining Walls***. As noted by the American Concrete Institute (ACI) in the *Guides for Concrete Floor and Slab Structures*, proper moisture protection is desirable immediately below any on-grade slab that will be covered by tile, wood, carpet, impermeable floor coverings, or any moisture-sensitive equipment or products. ACI also notes that vapor *retarders*, such as 6-mil plastic sheeting, are typically used. A vapor retarder is defined as a material with a permeance of less than 0.3 US perms per square foot (psf) per hour, as determined by ASTM E 96. It is possible that concrete admixtures may meet this specification, although the manufacturers of the admixtures should be consulted. Where plastic sheeting is used under slabs, joints should overlap by at least 6 inches and be sealed with adhesive tape. The sheeting should extend to the foundation walls for maximum vapor protection. If no potential for vapor passage through the slab is desired, a vapor *barrier* should be used. A vapor barrier, as defined by ACI, is a product with a water transmission rate of 0.00 perms per square foot per hour when tested in accordance with ASTM E 96. Reinforced membranes having sealed overlaps can meet this requirement.

In the recent past, ACI (Section 4.1.5) recommended that a minimum of 4 inches of well-graded compactable granular material, such as a 5/8 inch minus crushed rock pavement base, should be placed over the vapor retarder or barrier for protection of the retarder or barrier and as a "blotter" to aid in the curing of the concrete slab. Sand was not recommended by ACI for this purpose. However, the use of material over the vapor retarder is controversial as noted in current ACI literature because of the potential that the protection/blotter material can become wet between the time of its placement and the installation of the slab. If the material is wet prior to slab placement, which is always possible in the Puget Sound area, it could cause vapor transmission to occur up through the slab in the future, essentially destroying the purpose of the vapor barrier/retarder. Therefore, if there is a potential that the protection/blotter material will become wet before the slab is installed, ACI now recommends that no protection/blotter material be used. However, ACI then recommends that, because there is a potential for slab cure due to the loss of the blotter material, joint spacing in the slab be reduced, a low shrinkage concrete mixture be used, and "other measures" (steel reinforcing, etc.) be used. ASTM E-1643-98 "Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs" generally agrees with the recent ACI literature.

We recommend that the contractor, the project materials engineer, and the owner discuss these issues and review recent ACI literature and ASTM E-1643 for installation guidelines and guidance on the use of the protection/blotter material. Our opinion is that with impervious surfaces that all means should be undertaken to reduce water vapor transmission.

Isolation joints should be provided where the slabs intersect columns and walls. Control and expansion joints should also be used to control cracking from expansion and contraction. Saw cuts or preformed strip joints used to control shrinkage cracking should extend through the upper one-

fourth of the slab. The spacing of control or expansion joints depends on the slab shape and the amount of steel placed in it. Reducing the water-to-cement ratio of the concrete and curing the concrete, by preventing the evaporation of free water until cement hydration occurs, will also reduce shrinkage cracking.

PERMANENT FOUNDATION AND RETAINING WALLS

Retaining walls backfilled on only one side should be designed to resist the lateral earth pressures imposed by the soil they retain. We anticipate that all of the retaining walls at the site will consist of permanent tied-back soldier-pile walls.

The shoring design should be submitted to Geotech Consultants, Inc. for review prior to beginning site excavation. We are available and would be pleased to assist in this design effort.

Cantilevered and Tied-Back Soldier Piles

Cantilevered and tied-back soldier pile systems have proven to be an efficient and economical method for providing excavation shoring. Tied-back walls are typically more economical than cantilevered walls where the depth of excavation is greater than 15 feet.

Soldier Pile Installation

Soldier-pile walls would be constructed after making planned cut slopes, and prior to commencing the mass excavation, by setting steel H-beams in a drilled hole and grouting the space between the beam and the soil with concrete for the entire height of the drilled hole. We anticipate that the holes will require casing and/or slurry methods of installation due to the wet sand soils. Excessive ground loss in the drilled holes must be avoided to reduce the potential for settlement on adjacent properties. If water is present in a hole at the time the soldier pile is poured, concrete must be tremied to the bottom of the hole. If slurry methods of pile construction are utilized, structural concrete should be utilized in the toe of the piles to improve the concretes ability to displace the slurry.

As excavation proceeds downward, the space between the piles should be lagged with treated timber, and any voids behind the timbers should be filled with washed builder's sand packed behind the lagging boards as they are placed. The sand should also be water settled following the installation of all of the lagging boards. Temporary vertical cuts will be necessary between the soldier piles for the lagging placement. The prompt and careful installation of lagging is important, particularly in loose or caving soil, to maintain the integrity of the excavation and provide safer working conditions. Additionally, care must be taken by the excavator to remove no more soil between the soldier piles than is necessary to install the lagging. Caving or overexcavation during lagging placement could result in loss of ground on neighboring properties. The purpose of these backfill requirements is to ensure that the design criteria for a retaining wall are not exceeded because of a build-up of hydrostatic pressure behind the wall. We recommend that a lined drainage swale with a yard drain be constructed above the wall to collect surface water and direct it away from the wall. In addition, the top 12 to 18 inches of the backfill should consist of a compacted, relatively impermeable soil or topsoil.

Timber lagging should be designed for an applied lateral pressure of 30 percent of the design wall pressure, if the pile spacing is less than three pile diameters. For larger pile spacings, the lagging should be designed for 50 percent of the design load. Additionally, the sawn ends of the timber lagging on this project shall be painted with a wood preservative to prolong the life of the lagging. In the future, deteriorated lagging boards will need to be replaced, or a permanent facing will need to be installed over the face of the wall.

If permanent building walls are to be constructed against the shoring walls, drainage should be provided by attaching a geotextile drainage composite with a solid plastic backing, similar to Miradrain 6000, to the face of the lagging, prior to pouring the foundation wall. These drainage composites should be hydraulically connected to the foundation drainage system through weep holes placed in the foundation walls.

The above recommendations are not intended to waterproof the below-grade walls. The performance of subsurface drainage systems will degrade over time. Therefore, waterproofing should be provided where moist conditions or some seepage through the walls are not acceptable in the future. This typically includes limiting cold-joints and wall penetrations, and using bentonite panels or membranes on the outside of the walls. Applying a thin coat of asphalt emulsion is not considered waterproofing, but will only help to prevent moisture, generated from water vapor or capillary action, from seeping through the concrete.

Soldier-Pile Wall Design

Permanent soldier-pile wall installations should be designed for the following soil loads:

PARAMETER	ACTIVE VALUE	RESTRAINED VALUE
Active Earth Pressure (flat backslope)*	30 pcf	20(**H**) psf
100 percent Backslope Surcharge*	18(**S**) psf	18(**S**) psf
150 percent Backslope Surcharge*	23(**S**) psf	23(**S**) psf
Ultimate Passive Earth Pressure	525 pcf	
Soil Unit Weight	130 pcf	

Where: (i) pcf is pounds per cubic foot, (ii) psf is pounds per square foot, (iii) (H) is the exposed height of the retaining wall, (iv) (S) is the height of the slope above the retaining wall, and (v) active and passive earth pressures are computed using the equivalent fluid pressures.

Design of Eastern Catchment Wall

Based on the height, inclination, and composition of the eastern slope adjacent to the proposed addition and our experience with the design of similar projects in the Puget Sound area, it is our opinion that it will be necessary to construct a variable height catchment wall

above finished grade along the eastern edge of the proposed retaining wall. The catchment height will be determined by the height of the slope above the wall location based on the equation:

Catchment Height (**C**) = Slope Height (**S**)÷5 (*rounded up to the nearest foot*)

We anticipate that future slides would occur as a mudflow striking the westerly exposed side of the wall. An active equivalent fluid pressure of one hundred **(100)** pounds per cubic foot should be used to account for the impact force. These forces would act in a downslope direction.

Additionally, some means of access to the western side of the structure must be provided to remove soil that accumulates beside the structure. Based on the performance of similar buildings, we anticipate that removal of accumulated material will be required every two to five years. The removal of small amounts of material could be accomplished by hand. The freeboard of the catchment wall must be maintained for the wall to provide any protection from landslides.

The catchment wall is not intended to provide protection from trees that descend the hillside with a slide, or on their own. Projectile or fallen trees can cause significant damage to structures and potentially loss of life. The removal of trees on steep slopes is a heavily debated issue. The tree root systems do provide near-surface soil stabilization benefits, but we generally recommend that any unhealthy or undercut trees be removed above the stump. We recommend that any suspect trees above the structure be evaluated on a case-by-case basis by an arborist.

It is important that the shoring design provides sufficient working room to drill and install the soldier piles, without needing to make unsafe, excessively steep temporary cuts. Cut slopes should be planned to intersect the backside of the drilled holes, not the back of the lagging.

The minimum embedment below the floor of the excavation for cantilever soldier piles should be equal to the height of the "stick-up."

The vertical capacity of soldier piles will be developed by frictional shaft resistance along the embedded pile length. An allowable frictional capacity of 1,000 psf may be utilized. Due to the soil conditions anticipated in the soldier piles and the anticipated pile installation techniques, we do not recommend relying on pile end bearing. The above frictional value assume that the excavation is level in front of the soldier pile and that the bottom of the pile is embedded a minimum of 10 feet below the floor of the excavation. Based on our experience on previous projects with conditions similar to those anticipated at the subject site, we recommend that the toe of the piles consist of structural concrete.

Tieback Anchors

General considerations for the design of tied-back or braced soldier-pile walls are presented on Plate 5. We recommend installing tieback anchors at inclinations between 20 and 30 degrees below horizontal. The tieback will derive its capacity from the soil-grout strength developed in the soil behind the no-load zone. The no-load zone is the area behind which the entire length of each tieback anchor should

be located. To prevent excessive loss of ground in a drilled hole, the no-load section of the drilled tieback hole should be backfilled with a sand and fly ash slurry, after protecting the anchor with a bond breaker, such as plastic casing, to prevent loads from being transferred to the soil in the no-load zone. The no-load section could be filled with grout after anchor testing is completed.

During the design process, the possible presence of foundations or utilities close to the shoring wall must be evaluated to determine if they will affect the configuration and length of the tiebacks.

Based on the results of our analyses and our experience at other construction sites, we suggest using an adhesion value of 1,500 psf in the very dense silty sand to design permanent anchors, if the mid-point of the grouted portion of the anchor is more than 15 feet below the overlying ground surface. This value applies to non-pressure-grouted anchors. Pressure-grouted or post-grouted anchors can often develop adhesion values that are two to three times higher than that for non-pressure-grouted anchors. These higher adhesion values must be verified by load testing.

Soil conditions, soil-grout adhesion strengths, and installation techniques typically vary over any site. This sometimes results in adhesion values that are lower than anticipated. Therefore, we recommend substantiating the anchor design values by load-testing all tieback anchors. At least two anchors in each soil type encountered should be performance-tested to 200 percent of the design anchor load to evaluate possible anchor creep. Wherever possible, the no-load section of these tiebacks should not be grouted until the performance tests are completed. Unfavorable results from these performance tests could require increasing the lengths of the tiebacks. The remaining anchors should be proof-tested to at least 135 percent of their design value before being "locked off." After testing, each anchor should be locked off at a prestress load of 80 to 100 percent of its design load.

If caving or water-bearing soil is encountered, the installation of tieback anchors will be hampered by caving and soil flowing into the holes. It will be necessary to case the holes, if such conditions are encountered. Alternatively, the use of a hollow-stem auger with grout pumped through the stem as the auger is withdrawn would be satisfactory, provided that the injection pressure and grout volumes pumped are carefully monitored.

All drilled installations should be grouted and backfilled immediately after drilling. No drilled holes should be left open overnight.

EXCAVATIONS AND SLOPES

Excavation slopes should not exceed the limits specified in local, state, and national government safety regulations. Temporary cuts to a depth of about 4 feet may be attempted vertically in unsaturated soil, if there are no indications of slope instability. However, vertical cuts should not be made near property boundaries, or existing utilities and structures. Based upon Washington Administrative Code (WAC) 296, Part N, the average soil condition within the anticipated depth of excavation at the subject site would generally be classified as Type A. Therefore, temporary cut

slopes greater than 4 feet in height cannot be excavated at an inclination steeper than 0.75:1 (Horizontal:Vertical), and the bottom of a cut.

It is our professional opinion that the very dense till on this site could be safely excavated to a temporary slope angle of 0.5:1 (H:V). However, this is steeper than the recommendations presented in WAC 296. If this steeper inclination is used for temporary cut slopes, a competent person must make a daily inspection prior to the start of each work day to look for evidence of possible instability or hazardous conditions related to worker safety near the cut slopes. A "competent person" is defined by WAC 296 as someone that can identify existing or predictable hazards related to safety and exercise the authority to take corrective action to eliminate the hazard, if necessary.

The above-recommended temporary slope inclinations are based on what has been successful at other sites with similar soil conditions. Temporary cuts are those that will remain unsupported for a relatively short duration to allow for the construction of foundations, retaining walls, or utilities. Temporary cut slopes should be protected with plastic sheeting during wet weather. The cut slopes should also be backfilled or retained as soon as possible to reduce the potential for instability.

All permanent site cuts or fills should be inclined no steeper than 2:1 (H:V). Water should not be allowed to flow uncontrolled over the top of any temporary or permanent slope. Also, all permanently exposed slopes should be seeded with an appropriate species of vegetation to reduce erosion and improve the stability of the surficial layer of soil.

EXCAVATION AND SHORING MONITORING

As with any shoring system, there is a potential risk of greater-than-anticipated movement of the shoring and the ground outside of the excavation. This can translate into noticeable damage of surrounding on-grade elements, such as foundations and slabs. Therefore, we recommend making an extensive photographic and visual survey of the project vicinity, prior to demolition activities, installing shoring or commencing excavation. This documents the condition of buildings, pavements, and utilities in the immediate vicinity of the site in order to avoid, and protect the owner from, unsubstantiated damage claims by surrounding property owners.

Additionally, the shoring walls should be monitored during construction to detect soil movements. To monitor their performance, we recommend establishing a series of survey reference points to measure any horizontal deflections of the shoring system. Control points should be established at a distance well away from the walls and slopes, and deflections from the reference points should be measured throughout construction by survey methods. At least three soldier piles should be monitored by taking readings at the top of the pile. Additionally, benchmarks installed on the surrounding buildings should be monitored for vertical movement. We suggest taking the readings at least once a week, until it is established that no deflections are occurring. The initial readings for this monitoring should be taken before starting any demolition or excavation on the site.

DRAINAGE CONSIDERATIONS

We anticipate that the foundation walls may be constructed against the shoring walls. Where this occurs, a drainage composite should be placed against the lagging prior to pouring the foundation wall. Weep pipes located no more than 6 feet on-center should be connected to the drainage composite and poured into the foundation walls or the perimeter footing. A footing drain installed

along the inside of the perimeter footing will be used to collect and carry the water discharged by the weep pipes to the storm system. Footing drains placed inside the building or behind backfilled walls should consist of 4-inch, perforated PVC pipe surrounded by at least 6 inches of 1-inch-minus, washed rock wrapped in a non-woven, geotextile filter fabric (Mirafi 140N, Supac 4NP, or similar material). At its highest point, a perforated pipe invert should be at least as low as the bottom of the footing, and it should be sloped for drainage. All roof and surface water drains must be kept separate from the foundation drain system.

As discussed in the ***General*** section, we also recommend a trench drainage system along the edges of the excavation and a drainage system beneath the proposed slab. These systems are described in the ***General*** section.

All roof and surface water drains must be kept separate from the foundation drain system. A typical trench drain detail is attached to this report as Plate 6. For the best long-term performance, perforated PVC pipe is recommended for all subsurface drains.

The excavation and site should be graded so that surface water is directed off the site and away from the tops of slopes. Water should not be allowed to stand in any area where foundations, slabs, or pavements are to be constructed. Final site grading in areas adjacent to the walls should slope away at least 2 percent where possible. Along the eastern side of the wall, we recommend installing a swale and a yard drain to intercept surface run-off and direct it into the storm drains. Water from roof, storm water, and foundation drains should not be discharged onto slopes; it should be tightlined to a suitable outfall located away from any slopes.

GENERAL EARTHWORK AND STRUCTURAL FILL

All building and pavement areas should be stripped of surface vegetation, topsoil, organic soil, and other deleterious material. The existing foundations and foundation walls should be removed before site development. The stripped or removed materials should not be mixed with any materials to be used as structural fill, but they could be used in non-structural areas, such as landscape beds.

Structural fill is defined as any fill placed under a building, behind permanent retaining or foundation walls, or in other areas where the underlying soil needs to support loads. As discussed in the ***General*** section, only rock fill is appropriate for use beneath proposed footing. All structural fill should be placed in horizontal lifts with a moisture content at, or near, the optimum moisture content. The optimum moisture content is that moisture content that results in the greatest compacted dry density. The moisture content of fill is very important and must be closely controlled during the filling and compaction process.

The allowable thickness of the fill lift will depend on the material type selected, the compaction equipment used, and the number of passes made to compact the lift. The loose lift thickness should not exceed 12 inches. We recommend testing the fill as it is placed. If the fill is not sufficiently compacted, it can be recompacted before another lift is placed. This eliminates the need to remove the fill to achieve the required compaction. The following table presents recommended relative compactions for structural fill:

LOCATION OF FILL PLACEMENT	MINIMUM RELATIVE COMPACTION
Beneath footings, slabs or walkways	95%
Filled slopes and behind retaining walls	90%
Beneath pavements	95% for upper 12 inches of subgrade; 90% below that level

Where: Minimum Relative Compaction is the ratio, expressed in percentages, of the compacted dry density to the maximum dry density, as determined in accordance with ASTM Test Designation D 1557-91 (Modified Proctor).

Structural fill that will be placed in wet weather should consist of a coarse, granular soil with a silt or clay content of no more than 5 percent. The percentage of particles passing the No. 200 sieve should be measured from that portion of soil passing the three-quarter-inch sieve. On-site soils are not suitable for structural fill.

LIMITATIONS

The analyses, conclusions, and recommendations contained in this report are based on site conditions as they existed at the time of our exploration and assume that the soil and groundwater conditions encountered in the earlier test pits and a recent boring are representative of subsurface conditions on the site. If the subsurface conditions encountered during construction are significantly different from those observed in our explorations, we should be advised at once so that we can review these conditions and reconsider our recommendations where necessary. Unanticipated soil conditions are commonly encountered on construction sites and cannot be fully anticipated by merely taking soil samples in a test boring and pits. Subsurface conditions can also vary between exploration locations. Such unexpected conditions frequently require making additional expenditures to attain a properly constructed project. It is recommended that the owner consider providing a contingency fund to accommodate such potential extra costs and risks. This is a standard recommendation for all projects.

This report has been prepared for the exclusive use of Dale Christian, Thielsen Architects, and their representatives, for specific application to this project and site. Our recommendations and conclusions are based on observed site materials, and selective laboratory testing and engineering analyses. Our conclusions and recommendations are professional opinions derived in accordance with current standards of practice within the scope of our services and within budget and time constraints. No warranty is expressed or implied. The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design.

ADDITIONAL SERVICES

Geotech Consultants, Inc. should be retained to provide geotechnical consultation, testing, and observation services during construction. This is to confirm that subsurface conditions are consistent with those indicated by our exploration, to evaluate whether earthwork and foundation construction activities comply with the general intent of the recommendations presented in this report, and to provide suggestions for design changes in the event subsurface conditions differ from those anticipated prior to the start of construction. However, our work would not include the supervision or direction of the actual work of the contractor and its employees or agents. Also, job and site safety, and dimensional measurements, will be the responsibility of the contractor.

The following plates are attached to complete this report:

Plate 1	Vicinity Map
Plate 2	Site Exploration Plan
Plate 3 and 4	Test Boring Log
Plate 5	Tied-back Retaining Wall Detail
Plate 6	Wall and Underslab Drain Detail

We appreciate the opportunity to be of service on this project. If you have any questions, or if we may be of further service, please do not hesitate to contact us.

Respectfully submitted,

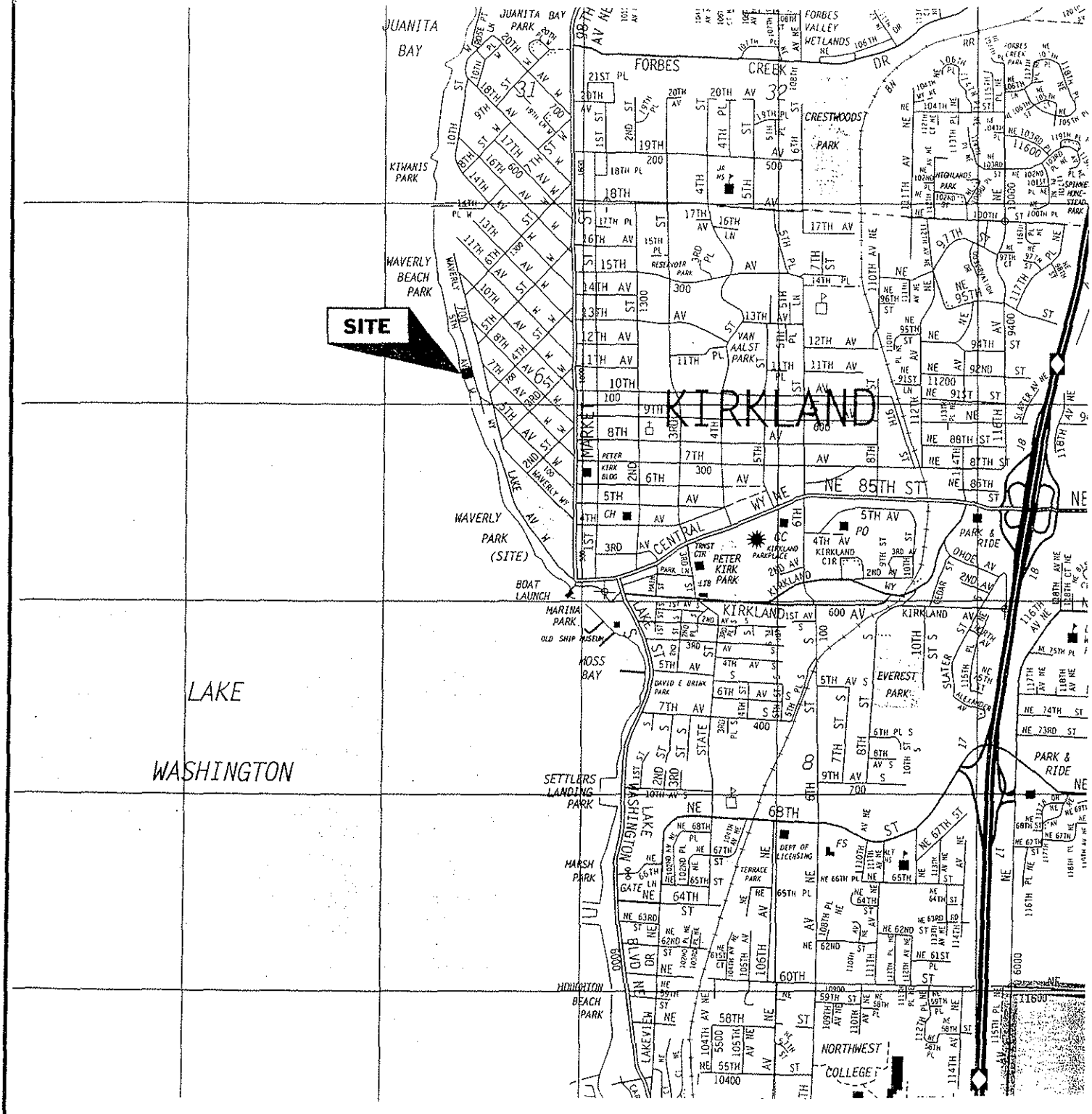
GEOTECH CONSULTANTS, INC.

EXPIRES 01-31-04

James Strange, Jr., P.E.
Geotechnical Project Manager

cc: **CT Engineering** – Rick Wyble

JHS: esn

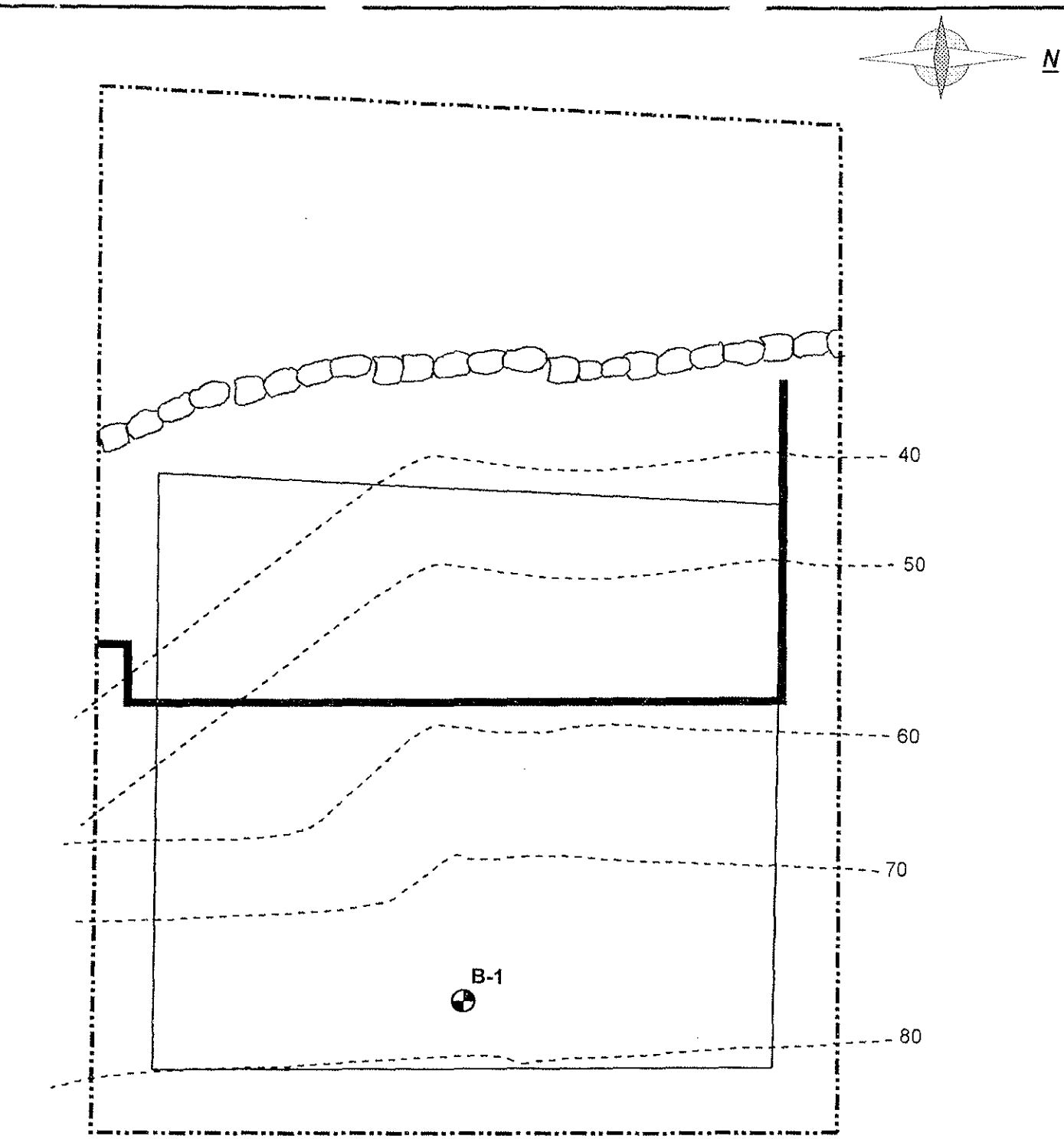


GEOTECH
CONSULTANTS, INC.

VICINITY MAP

437 - 5th Avenue West
Kirkland, Washington

Job No:	Date:		Plate:
00253-1	Dec. 2003		1

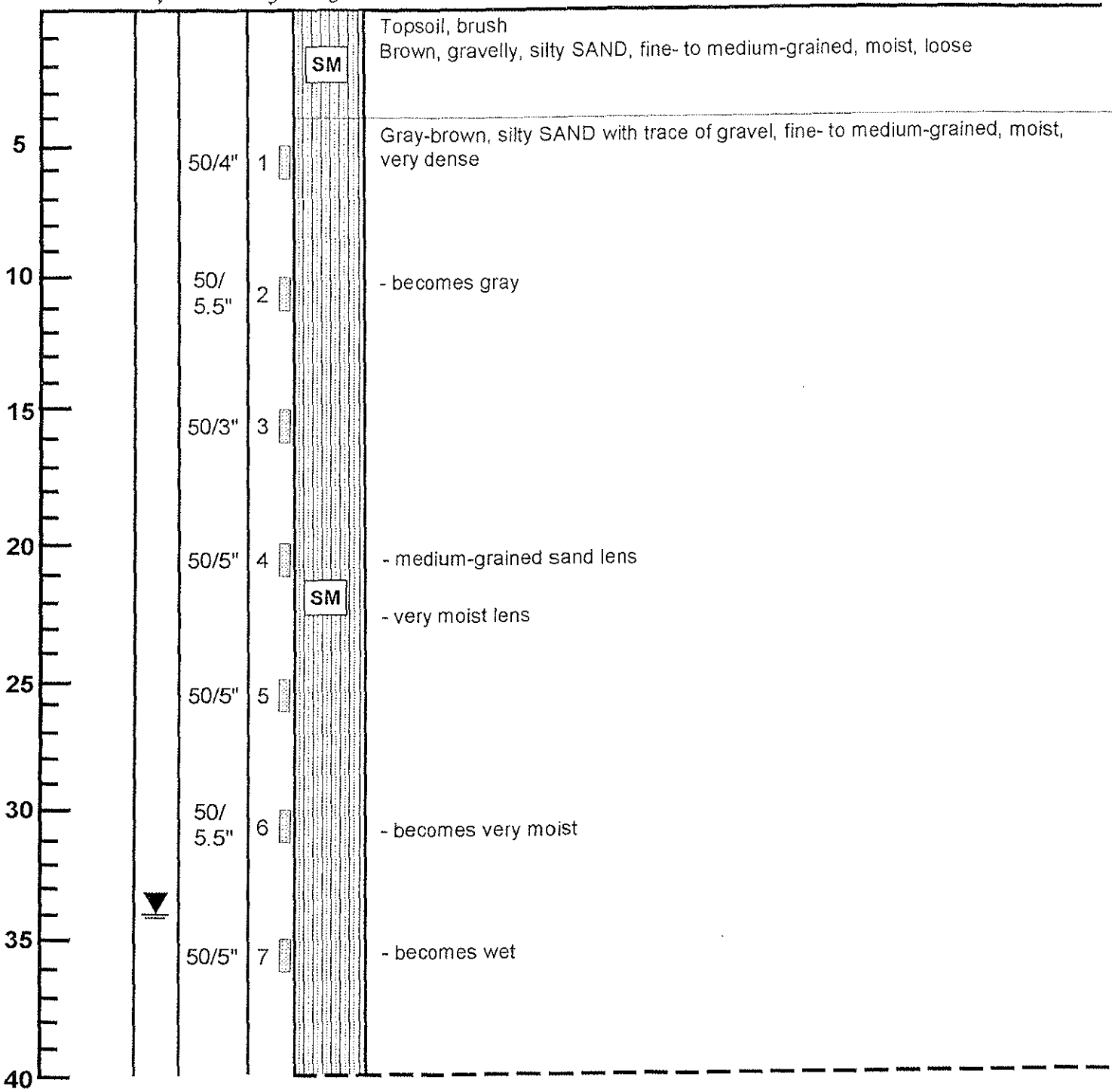


GEOTECH
CONSULTANTS, INC.

Site Exploration Plan
437 - 5th Avenue West
Kirkland, Washington

Job No:	Date:		Plate:
00253-1	Dec. 2003	No Scale	2

BORING 1



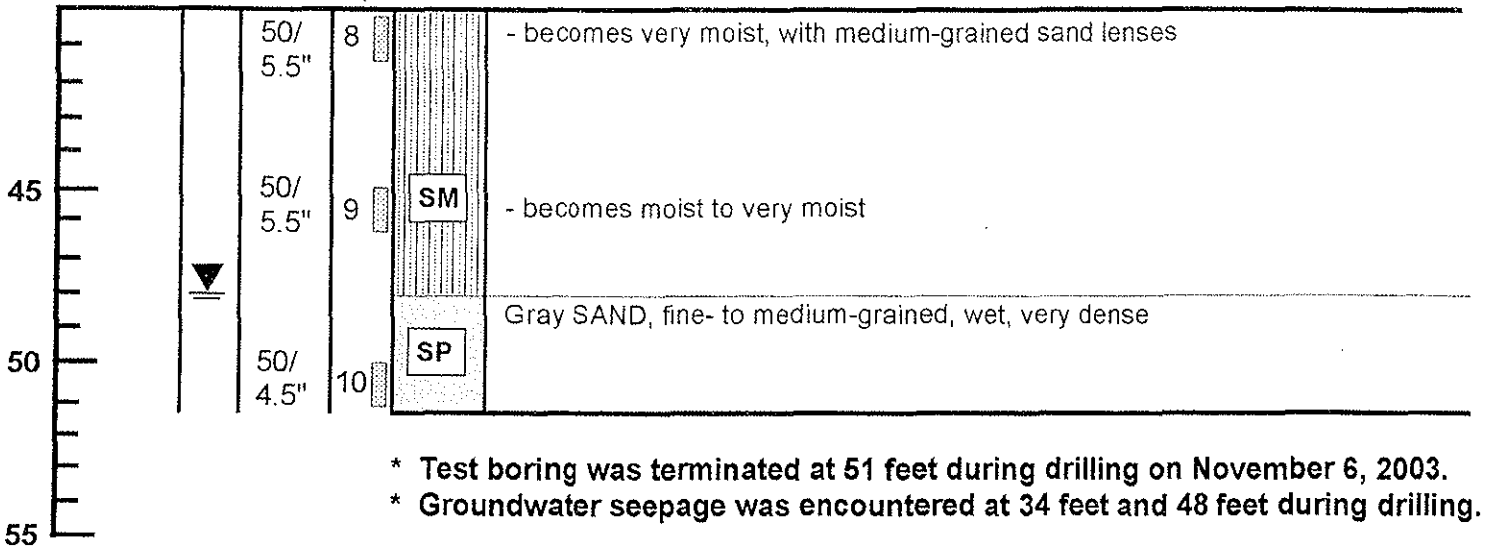
GEOTECH
CONSULTANTS, INC.

BORING LOG

437 - 5th Avenue South
Kirkland, Washington

Job No:	Date:	Logged by:	Plate:
00253	Nov. 2003	GDB	3

ORING 1 (continued)



* **Test boring was terminated at 51 feet during drilling on November 6, 2003.**

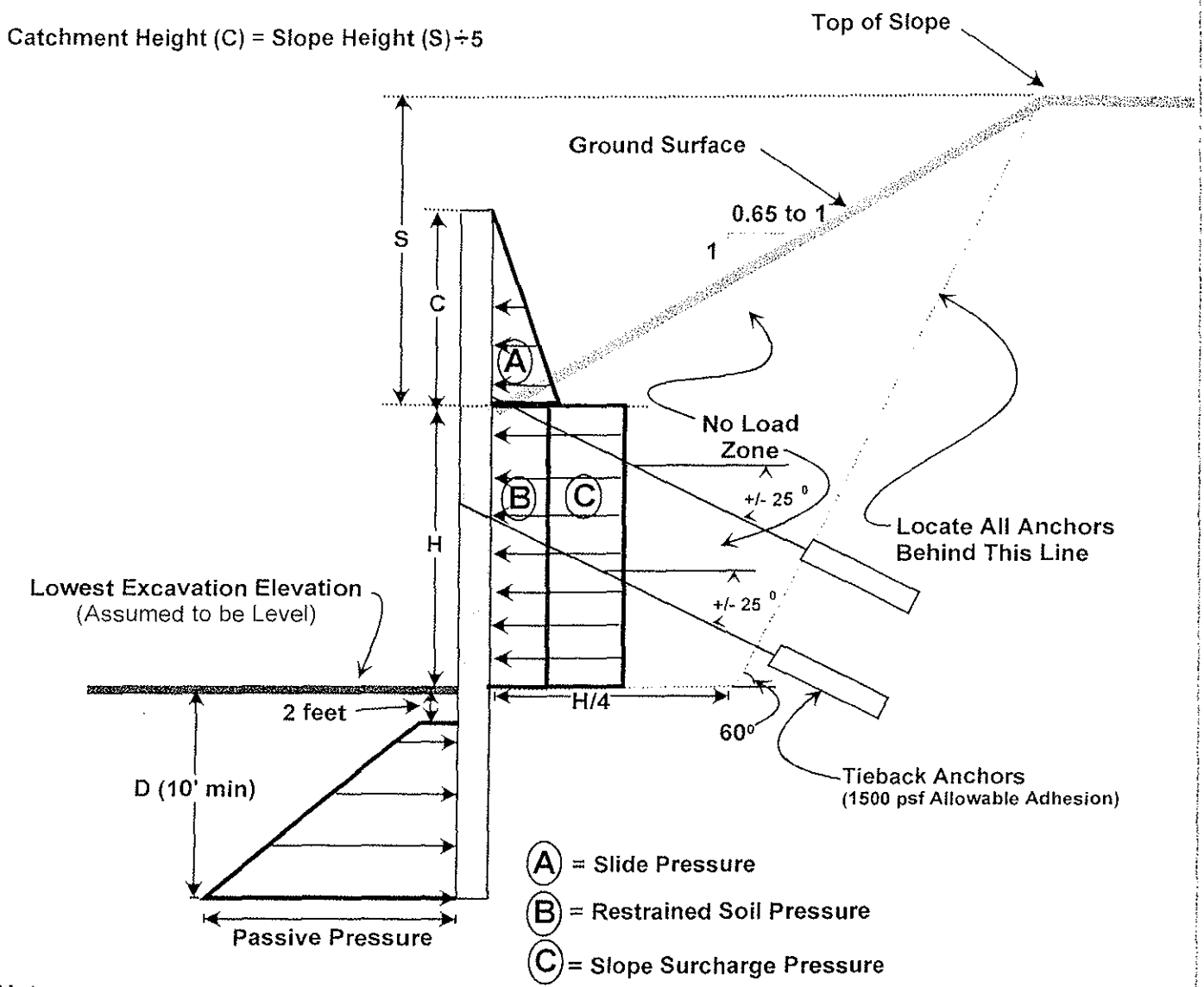
* **Groundwater seepage was encountered at 34 feet and 48 feet during drilling.**

GEOTECH
CONSULTANTS, INC.

BORING LOG

437 - 5th Avenue South
Kirkland, Washington

Job No:	Date:	Logged by:	Plate:
00253	Nov. 2003	GDB	4



Notes:

(1) The geotechnical report should be referenced for specifics regarding design and installation.
(2) Active pressures act over the pile spacing.
(3) Passive pressures act over twice the grouted soldier pile diameter or the pile spacing, whichever is smaller.
(4) It is assumed that no hydrostatic pressures act on the back of the walls.
(5) Steeper slopes positioned above or behind the wall will exert additional pressures on the wall.

GEOTECH
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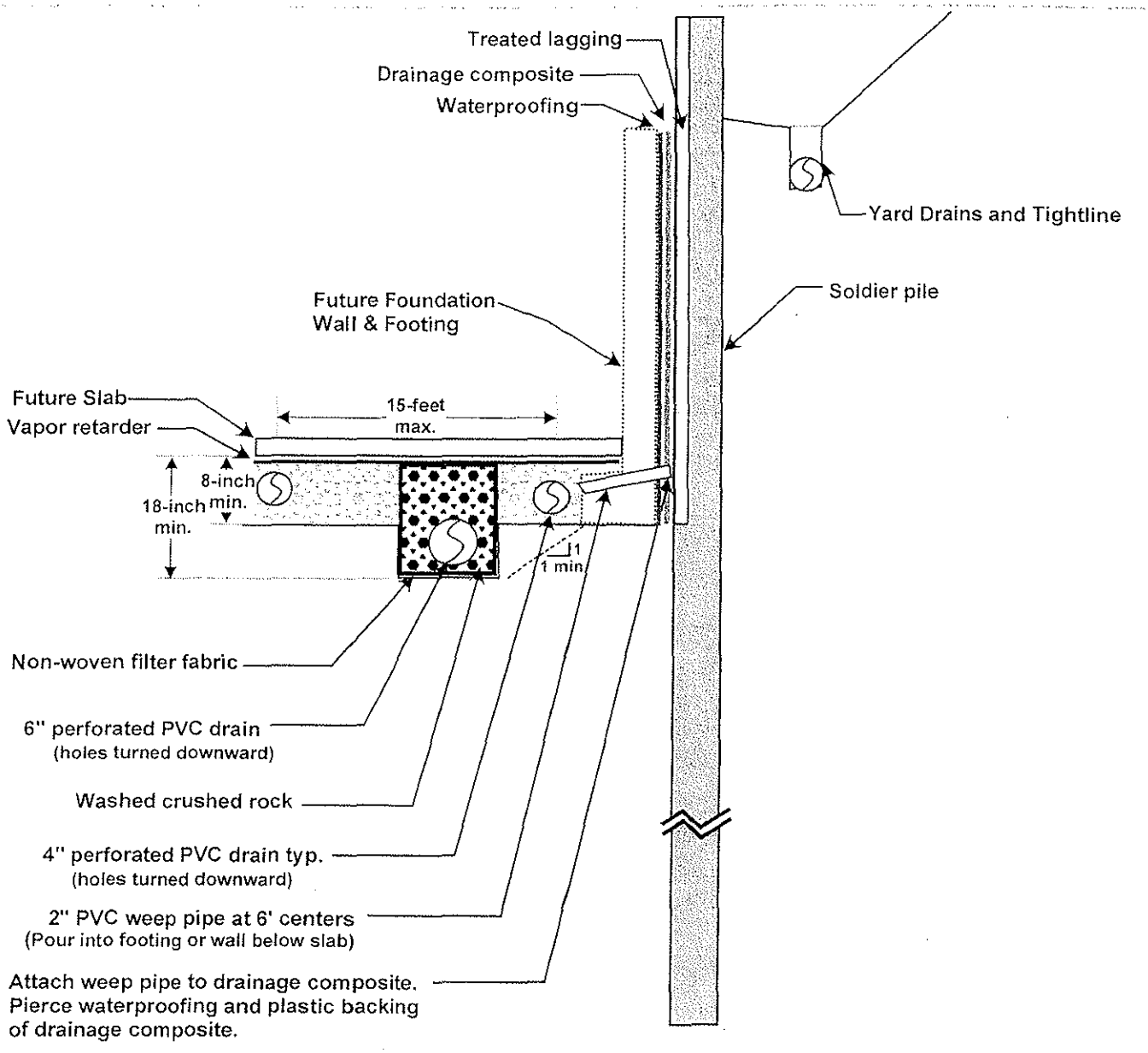
Tied-Back Shoring Detail
437 - 5th Avenue West
Kirkland,Washington

Job No:	Date:		Plate:
00253-1	Dec 2003		5



Note - Refer to the report for additional considerations related to drainage and waterproofing.

GEOTECH
CONSULTANTS, INC.

Wall and Underslab Drain Detail
437 - 5th Avenue West
Kirkland,Washington

Job No:	Date:		Plate:
00253-1	Dec 2003	No Scale	6

GEOTECH
CONSULTANTS, INC.

13256 Northeast 20th Street, Suite 16
Bellevue, Washington 98005
(425) 747-5618 FAX (425) 747-8561

JN 00253

January 30, 2006

Dale Christian
c/o Thielsen Architects
720 Market Street
Kirkland, Washington 98033

Attention: Matt Mengert

Subject: **Revised Seismic Considerations**
Proposed Christian-Wilson Parking Area and Future ADU
437 – 5th Avenue West
Kirkland, Washington

via facsimile: (425) 828-9376

Dear Mr. Mengert:

Reference: "Geotechnical Engineering Study," subject site, Geotech Consultants, Inc., January 2, 2004.

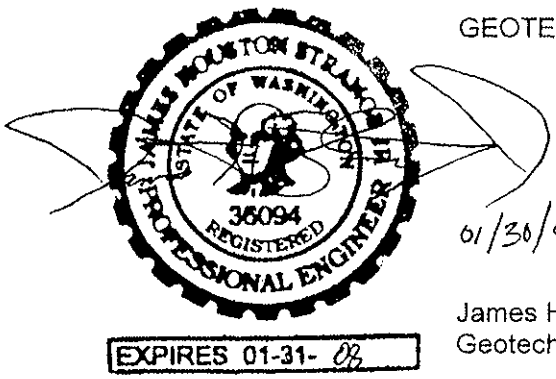
Dear Mr. Mengert:

We herby amend the ***Seismic Considerations*** section of the Geotechnical Engineering Study referenced above as follows:

The site is located within Seismic Zone 3, as illustrated on Figure No. 16-2 of the 1997 Uniform Building Code (UBC). In accordance with Table 16-J of the 1997 UBC, the site soil profile within 100 feet of the ground surface is best represented by Soil Profile Type S_C (Very Dense Soil). Under the 2003 International Building Code (IBC) the Soil Class would be C. As required by the Critical Areas Ordinance, the design criteria presented in this report consider the effects of a one-in-100-years seismic event. The site soils are not susceptible to seismic liquefaction because of their very dense nature.

Respectfully submitted,

GEOTECH CONSULTANTS, INC.



01/30/06

James H. Strange, Jr., P.E.
Geotechnical Project Manager

EXPIRES 01-31-08

JHS: jhs