LIMITED GEOTECHNICAL ENGINEERING STUDY
PROPOSED RESIDENCE ADJACENT TO
352 POINT WHITNEY ROAD
JEFFERSON COUNTY, WASHINGTON

PROJECT NO. 102-01027
May 7, 2002

Prepared for:

WES AND RUTH DUNHAM
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RENTON, WA 98056

Prepared by:

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Krazan & ASSOCIATES, INC.

GEOTECHNICAL ENGINEERING • ENVIRONMENTAL ENGINEERING
CONSTRUCTION TESTING & INSPECTION

May 7, 2002 KA Project #102-01027

Wes and Ruth Dunham
1119 North 30th
Renton, Washington 98056

Report of Soil and Slope Survey and Limited Geotechnical Engineering Study
Proposed Residence, Adjacent to 352 Point Whitney Road
Quilcene, Jefferson County, Washington

INTRODUCTION

This report presents the results of a soil and slope survey and limited geotechnical engineering study directed at evaluating potential erosion and landslide hazards at the referenced site in accordance with the requirements of the Jefferson County Critical Areas Ordinance. The scope of the study was developed during our site visit on March 24, 2001, and outlined in our proposal to you dated April 2001(KA Proposal No. P01-126P). The services performed under the referenced proposal were in general compliance with requirements outlined in the Jefferson County Critical Areas Ordinance.

As shown on the attached Location map, Figure 1, the site is located near the east end of Point Whitney Road in Jefferson County, and overlooks Dabob Bay to the south and east. Based on our discussions, we understand that design plans for the residence are being developed at this time. The residence will be a one story wood-frame structure. It is our understanding that the main floor will be at approximately elevation 78 feet. Vehicle access into the residence will follow an existing gravel road.

Previous development of the site has been limited in scope with the main features being the existing residential home and associated buildings east (below) of the proposed residential structure as shown on the Site Plan, Figure 2. A shed housing the drinking water well lies to the west of the proposed building site.

Under the current development plan, minimal grading of the site, beyond that required for construction, is anticipated. It is our understanding that portions of the crest of the slope will be utilized to fill in the low lying area to the west of the top of slope. All areas of bare soil and disturbed vegetation will be landscaped such that no erosion hazards are created or will remain following development. Construction of the proposed residence and driveway improvements will not result in an increase of the potential landslide or erosion hazards of the site.

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SURFACE CONDITIONS

As previously described, the site has been previously cleared and to a minor extent developed for the existing residential development, but it does not look to have been significantly graded or otherwise modified. Topographically part of the proposed building site appears to be located in a depressed area adjacent to the top of a relatively steep slope. To the east of the building site the ground slopes downward approximately 35 feet in height with an approximately 1H:1V grade. Below this slope is a relatively level plateau where an existing residence and associated buildings such as a garage and shed are located. Below the plateau is a steep (½H:1V) slope approximately 10 feet in height, which terminates into Dabob Bay. To the west of the building site is an ascending slope on the order of 2H:1V (horizontal to vertical) ratio.

The map "Relative Slope Stability In East-central Jefferson County, Washington" (OFR76-27, 1976, Washington State Department of Natural Resources, Division of Geology and Earth Resources) appears to identify the building site and areas westward as a Class 2 slope and the east facing slopes below the building site as Class 3 slopes. Slopes shown to be of class 3 stability are located near the shoreline to the east. Class 2 slopes are considered "normally stable areas that may become unstable if modified by man" while Class 3 slopes are considered to be "unstable areas". The Coastal Zone Atlas of Washington, Jefferson County volume, indicates a slope stability mapping similar to that shown on the OFR76-27 map. During our reconnaissance of the area it was observed that there were no indicators of past slope soil movement. No indication of deep-seated or rotational landsliding was observed.

Based on our reconnaissance observations, it is our opinion that the slopes adjacent to the site generally reflect and match the slope stability mapping of the area.

The proposed building site and the area to the west has vegetation cover primarily comprised of scattered mature trees with undergrowth. Below the top of the slope east of the proposed building site, ground cover is comprised of a medium to dense growth of ferns and low-growing shrubs and brush with young cedar trees. It is our understanding that the slope was logged approximately 5 years ago. The vegetation in the vicinity of the existing residence on the plateau area was primarily grass with some low growth shrubs and trees.

A general reconnaissance of the property and adjacent areas was made to identify areas of ground water seepage. No indications of water seepage were noted during our site reconnaissance. However, it is possible that the nearly continuous vegetative cover hides small or poorly defined areas of seepage within the ordinance specified 1,000 feet of the site.

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GEOLOGIC SETTING

The site is located in the northwest portion of the Puget lowlands, an elongate, northsouth trending structural depression and topographic trough. The Puget lowlands have been filled several times by glacial ice, resulting in many topographic features, which are a result of glacial erosion and deposition and that caused by outwash streams. The site is in an area of glaciated bedrock and associated deposits. Site soils, topography and geology result primarily from the advance and retreat of the Vashon Stade (most recent glacial advance) of the Frazier Continental Glaciation. On a gross scale the typical soil sequence in the area consists of mixed sands and gravels (Recessional Outwash) over glacial till which in

turn overlies sands, gravels and silts (Advance Outwash and pre-glacial deposits) or bedrock. In the general vicinity of the site the glacial till caps much of the region and overlies both pre-glacial deposits and the local bedrock, which are identified on geologic maps as shale, siltstone, and mudstone. The glacial till in the area is comprised of materials picked up by the ice sheet as it moved, then were deposited at the base of the glacier and overridden and densified by some 1500 or more feet of ice. The pre-glacial materials are a mixture of sands and gravels deposited in association with glacial ice and/or outwash streams. Regional maps of the area indicate that glacial till caps with pre-Vashon stratified sediments underlying the till. Pre-glacial and glacial materials are generally dense to very dense. However, it is not uncommon to find a layer or mantle of looser, weathered or disturbed material over the denser soils or bedrock.

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SUBSURFACE EXPLORATION

Site soils were explored and evaluated in four previously excavated test pits in the immediate area of the proposed residence (test pits TP-1 through TP-4), the water well log and in natural outcrops both on the subject site and adjacent properties. The observed natural exposures are located on the slopes to the east, west and north of the building site. The approximate test pit locations are indicated on the attached Site Plan, Figure 2.

Site soils were viewed in four test pits and various slope and road cut exposures in the area. Soil logs for the test pits are presented in Appendix A. Soils observed on the slopes are discussed in the following text. The soil strata shown on the logs were observed at spot locations. Actual subsoil conditions and thickness may vary between the test pit locations or as exposed in excavations or slope exposures.

Elevations and distances referenced in this report were established using handheld instruments, i.e., tape measure, altimeter, and inclinometer, etc., and should be considered approximate. The base drawing for Figure 2 was prepared by Tillman Engineering, Inc., titled "Topographic Survey, Portions of NW1/4 & NE ¼ Section 18, T.26N, R. 1W, W.M.", dated October 16, 2001.

SOIL PROFILE AND SUBSURFACE CONDITIONS

The "Geologic Map Of Eastern Jefferson County, Washington" (Gayer et al., 1980, Washington State Department of Ecology) indicates that the site is underlain by Vashon glacial till over Pre-Vashon stratified sediments, with outcrops of pre-Fraser Glaciation undifferentiated deposits and Holocene postglacial sediments along the shoreline.

On maps prepared by the Soil Conservation Service (SCS), it appears that the site lies very near the contact between two soil units. Based on the SCS mapping it appears that the property is underlain by Hoodsport gravelly loam, 0% to 15% slopes (soil type HpC) while the slopes along the shoreline below the building area are underlain by Coastal beaches (soil type Co). The SCS indicates that the HpC-type soils are typically located in areas of nearly level to rolling terrain on glacial terrace ridgetops and derived from a glacial till parent material. The Co-type soils are typically located at the base of coastal bluffs or lowlands bordering the Hood Canal.

As observed in the building area it appears that a thin mantle of topsoil with rootlets overlies recessional consolidated outwash, which consists of silty sandy gravels with scattered oversized cobbles. The

As observed in the building area it appears that a thin mantle of topsoil with rootlets overlies recessional consolidated outwash, which consists of silty sandy gravels with scattered oversized cobbles. The outwash becomes very dense and cemented at approximately 3 feet in depth and extended to the depths of the test pits. A review of the water well log indicated rock, gravel and clay to a depth of 27 feet underlain by 7 feet of rock and clay with hardpan encountered to a depth of approximately 74 feet.

Based on the soils observed in the test pits, on the slopes, and exposed at various locations in the area, it is our opinion that the site soils are as a whole generally consistent with those shown on the geologic map of the region. Differences between the mapped and observed soil conditions appear as a result of mapping scale, availability of exposures, and intended map usage. These differences are generally minor and not unexpected.

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CONCLUSIONS AND RECOMMENDATIONS

General

Based upon our site observations and review of pertinent materials, it is our opinion that the potential for ground movement in the area of the proposed building site is low. Similarly, we consider the potential for large-scale landsliding on the east facing slopes on this property, in either the natural condition or resulting from the proposed development, to be low. The east facing slopes are mapped as Class 2 stability and the overall slope stability under the present conditions appears good. The present slope conditions should remain relatively unchanged with the proposed development. However, the following setback recommendations consider this potential and as presently proposed no slope area below the top of slope shown on Figure 2 will be disturbed for site development. Away from the slopes no evidence of erosion was observed and following proper construction and landscaping no erosion hazard will be developed.

Following our review of the Jefferson County critical areas ordinance, it is our opinion that portions of the subject property meet the requirements for definition as a landslide and erosion hazard area. Although it is our opinion that the property meets the requirements of the ordinance for definition as a critical area, it is also our opinion that the proposed building site can be safely and satisfactorily developed through geotechnical design and sound site planning. The following recommendations for site development are provided to address the concerns of the critical areas ordinance and should be incorporated into the site development plan. As previously noted, it is our opinion that overall, the proposed development in and of itself will create a minimal risk of erosion or landslide damage, no disturbance of the slopes is expected, and the development will have little if any effect on adjacent properties.

The site does not appear to meet the classification requirements of a seismic hazard area as defined in the Jefferson County ordinance. However, the property is located in seismic zone 3 as defined by the Uniform Building Code (UBC), as is much of western Washington. In the event of an earthquake of adequate magnitude and/or duration some soil movement on the slope is possible if other conditions are right, but the potential for soil movement on this property is no greater than that on the adjacent developed lots or for properties elsewhere with similar slope and soil conditions. Additionally, the slope core soils appear to be primarily dense glacial materials or bedrock, which, where exposed to the west, is fractured but appears to be generally hard and sound. The recommendations contained in this report were

designed in accordance with current UBC seismic zone 3 requirements, or potentially more stringent future requirements.

By ordinance requirement a native vegetation buffer is required from the edge of all slopes that are geologically hazardous areas. It is our opinion that a vegetation buffer having a minimum width of 10 feet should be maintained parallel to the top of the east facing slopes below the building site. Vegetation within the buffer should remain undisturbed. This setback is shown on Figure 2. In addition to the maintenance of the buffer we recommend that all disturbed areas be replanted as soon as possible after construction is complete.

The following site preparation and foundation design recommendations are provided to aid in minimizing potential erosion and landslide damage risks and should be incorporated into site planning, design and construction.

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Site Preparation and Grading

Water Related Concerns:

Only minor storm water related problems are anticipated if site grading and preparation are undertaken during the normally drier portions of the year. If site work is undertaken during wet weather the near surface soils may become over-saturated and unworkable. If the site work is undertaken during wet weather the contractor should be fully prepared to deal with possible elevated water levels in addition to other soil and water problems normally encountered in these materials during wet weather work including the filtering of runoff, as needed, to prevent the siltation of down slope areas. It should be anticipated that silt fences and other erosion control devices would need to be used to control sediment transport off the site.

Depending upon the final site grades and weather conditions it is possible that areas of perched water or seeps may develop in some areas. In that we are unable to predict where or when this might occur we recommend that any development of springs or seeps be treated as a construction/maintenance problem. The contractor should be prepared to deal with any water-related problems during construction. Water seepage can cause failure of excavation walls and the contractor should be observant for possible cave-in or other hazardous conditions and provide shoring for all cuts and excavations in accordance with local, state, and federal regulations.

Development Recommendations

Under buildings, pavements and fill areas, we recommend that all sod, organic soil, and debris be removed. Over most of the site we anticipate that a stripping depth of 12 inches will be adequate. However, localized deeper stripping depths may be required to remove tree root balls.

Stripped soils, containing organics or debris, should be wasted off site or used in landscape areas. Stripped soils free of organics and debris may be suitable for reuse as structural fill, subject to the recommendations regarding structural fill given below.

Following stripping of the site and prior to the placement of any fill, the exposed subgrade should be proof rolled to a firm, unyielding condition using properly sized equipment. Proof-rolling should be observed by a representative of the geotechnical engineer. Any soft or weaving areas disclosed during proof rolling should be excavated and replaced with compacted structural fill, as directed by the geotechnical engineers representative.

With the exception of driveway side slopes, it is recommended that permanent cut slopes not exceed 2H: 1V (50%). Steeper permanent cut slopes made for driveway areas may require future re-grading, if instability develops. Fill slopes should not be steeper than 2H:1V (50%) for fill placed in accordance with the requirements of appendix chapter 33 of the Uniform Building Code (1997 edition) or 3 to 4H:1V (33% to 25%) for uncontrolled fills of moderate quality material. In areas where steeper slopes are required, retaining structures should be provided. In areas where fills are to be made on slopes steeper than 5H:1V the subgrade should be benched and prepared in accordance with UBC (1997) requirements prior to fill placement. Benches should be cut at a maximum vertical height of 24 inches. It should be anticipated that, if steeply cut, the more granular near surface soils may be subject to caving, and sloughing will occur as the soils are exposed to drying. All temporary cuts and excavations should be sloped or shored in accordance with local, state and federal requirements.

Fill placed beneath proposed building or pavement or pavement areas should be structural fill, consisting of primarily granular material free from roots, trash or other deleterious materials. During wet weather most of the on site soils are expected to be unsuitable for use as structural fill. The fine-grained nature of these soils causes them to be moisture sensitive, which means that they are difficult to impossible to compact if they become too wet. As a result, we recommend that all site grading and preparation be undertaken and completed during dry weather. If grading in building or pavement areas is necessary during wet weather, we recommend that all excavated soil be removed from the site and replaced with imported structural fill. Imported structural fill should consist of free draining sandy gravel with a maximum particle size of 3 inches and not more than 5.0% fines (material passing a U.S. No. 200 sieve).

All structural fill should be placed in layers approximately 8 inches in loose thickness, ,conditioned to a moisture content within 2% of the optimum moisture content, and compacted to 95% of the maximum dry density as determined by ASTM D-1557. Field density tests should be made at a frequency adequate to assure that the required compaction is achieved.

To preclude the possible build-up of ground water or storm runoff in the soils adjacent to the residence, we recommend that a four inch diameter perforated, rigid pipe be placed, perforations down, around the outside of the building foundation at the footing subgrade elevation. All of the drainage system should be bedded in a drainage sand and gravel and designed to carry any accumulated water away from the structure to an appropriate discharge area. Roof drainage should not be connected to the footing drains but may use the same outfall piping provided that the connection between the systems is located at least 10 feet down grade of the house and designed to prevent water from backing up into the footing drain.

All runoff from roofs, driveways, patios and hard surfaced areas should be intercepted, collected and disposed of away from structures and site slopes, and discharged where the water will not effect down slope structures, slopes, walls or properties. Specific recommendations for and design of a storm water disposal system are beyond the scope of our services and should be prepared by other consultants fully

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familiar with design and discharge requirements. However, from a geotechnical perspective tight lining of the collected water to an infiltration system located on the flatter slopes to the east of the building site, near the present shed, would be an acceptable means of disposal.

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Building Siting

For the siting of structures we recommend that the following top of slope setback and foundation embedments be maintained. From the indicated top of the east-facing slope below the proposed building sit, as shown on Figure 2, we recommend that a minimum setback of 10 feet be maintained. In addition, all footings adjacent to gentle slopes (<15%) should bottom a minimum of 18 inches below the lowest adjacent exterior grade and 12 inches below the lowest interior grade. Footings on or within 10 feet of slopes steeper than 15% should be designed so that the bottom of the footing is a minimum of 36 inches below the lowest adjacent exterior finished grade and a minimum of 60 inches back of the finished soil slope face.

For foundations bearing on the dense to very dense in situ soils an allowable soil bearing capacity of 2,000 psf may be used. Additional foundation design considerations should be in accordance with Uniform Building Code requirements, as modified by local codes and regulations, in effect at the time of construction. We recommend that all foundation excavations be inspected by Krazan & Associates, prior to placing concrete, to verify that the bearing surface has been properly cleaned, prepared and soil conditions are as anticipated. Bearing surfaces should be firm and free of sloughed or water-softened soil.

Preliminary Cast-In-Place Retaining and Subsurface Wall Recommendations

The following earth pressures and preliminary design values are provided for cast-in-place retaining and subsurface walls up to ten feet in height. It is recommended that foundations for all retaining structures and subsurface walls be designed and constructed as previously described under the Foundation Design section of this report.

Retaining and subsurface walls should be designed for an active equivalent fluid pressure of 30 pcf, if the top of the wall is allowed to deflect, assuming a horizontal ground surface behind the wall. If the top of the wall is restrained an equivalent fluid pressure of 50 pcf is recommended. Active or at rest pressures will need to be increased for sloping ground or surcharge loads behind the wall. Allowable passive pressures for retaining structures, considering a horizontal ground surface, will be 330 pcf. The allowable passive pressure includes a safety factor of 1.5. Passive pressures will need to be reduced for a sloping ground condition in front of the wall. Additional resistance to sliding can be developed through base friction. A coefficient of friction between the footing and soil of 0.35 should be used.

The above-recommended pressures do not include the effects of hydrostatic pressure on the wall as they assume a drained condition exists. The maintenance of a dewatered/drained condition behind all retaining structures is required for the above values to be valid. The following drain system and backfill requirements are recommended.

A longitudinal subdrain with a minimum diameter of 4 inches should be constructed at the footing elevation behind the walls. This drain should be constructed of a 4-inch diameter perforated pipe laid perforations down, bedded in an eighteen-inch envelope of free-draining sand and gravel. This system

should be sloped to drain and the water disposed of in the storm drainage system. Clean-outs should be provided at bends and convenient intervals, so that the drainage system can be maintained in a well-functioning condition. Flexible plastic piping (such as corrugated ADS-type piping) should not be used behind the wall. Roof and parking area drainage systems should not be connected to the wall subdrain system, but may utilize the same tight-line outfall well away from the wall.

All wall backfill over the gravel envelope should consist of clean, free-draining, well-graded sand and gravel containing less than 2.0% fines (material passing an U.S. No. 200 sieve). This material should extend out from the rear wall face a minimum of eighteen inches. The free-draining backfill should be placed to the surface in paved areas or to within eighteen inches of the surface in non-paved areas. Backfill should be compacted as recommended above for fills. In non-paved areas the final eighteen inches of backfill should consist of topsoil or native materials firmly tamped into place.

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Construction Considerations

Based on the information obtained from our field exploration, and using Occupational Safety and Health Administration (OSHA) soil classification for temporary and permanent slopes, the native soil is a Type B soil. To comply with OSHA's regulations, temporary slopes excavated in these soils should be inclined no steeper than 1H:1V. The loose to medium dense soil in the upper 3 feet is a Type C soil. Type C soils require temporary slopes inclined no steeper than 1.5:1V. Permanent cut and fill slopes (non reinforced) should be inclined no steeper than 2H:1V. A representative of our firm should evaluate temporary and permanent slopes to insure the soils are conducive to the recommended slope configurations.

In areas where it is not possible to maintain the recommended slopes due to space constraints, temporary shoring will be required. The contractor should be responsible for design and construction of the temporary system. We recommend that a structural engineer and Krazan & Associates review the proposed shoring system prior to construction.

In no case should excavated soils be placed on the slope or stockpiled within the defined buffer or slope setback areas along the steep slopes or within 20 feet of the top of any other existing or excavated slope, rockery or retaining structure. Failure to comply with these guidelines may lead to destabilization of the slope.

The site soils may be easily eroded by channelized water or sheet flow storm runoff. Therefore, it is recommended that all site preparation and excavation work be completed during the normally drier portion of the year. During periods of heavy rainfall, ditching should be used to divert water away from stripped areas and visqueen should be used to cover the slopes and soil stockpiles to aid in preventing excessive surface erosion. This covering also aids in preventing infiltration of water into the unprotected soils. All disturbed soil areas and slopes should be replanted with fast-growing, deep-rooted grass, shrubs and other ground cover as soon after final grading as possible. If the vegetation is not fully established prior to the on set of wet weather, the slopes should be covered with visqueen to aid in preventing excessive erosion and water infiltration.

Additional site development or construction problems should be anticipated, particularly if the earthwork has not been completed and the site properly protected at the onset of wet weather.

REPORT LIMITATIONS

This report has been prepared for the exclusive use of Wes and Ruth Dunham and their agents for use in planning of the referenced development. The conclusions and recommendations in this report are based on our interpretation of site conditions as they presently exist, anticipated future construction activities, and the expectation that the exploratory efforts adequately define the subsurface conditions throughout the building site. The soil conditions described in this report and the conclusions and recommendations contained in this report are provided for this specific site only and should not be expanded for use on adjacent properties without additional exploration and review of those sites by our firm. The data and report should be provided to prospective contractors for their bidding or estimating purposes, but the report conclusions and interpretations should not be construed as a warranty of the subsurface conditions. There are possible variations in subsurface conditions. In the event that the scope or location of the project should change or subsurface conditions different from those encountered during this study be observed or suspected, we should be advised. At that time a review of the changed conditions will be made, and alternative or remedial recommendations given as required.

NOTE: Although we have explored subsurface conditions as part of this study, we have not conducted analytical laboratory testing of samples obtained, nor have we evaluated the site for the potential presence of contaminated soil, and have not evaluated or addressed ground water conditions or concerns except as noted in this report. The evaluation of possible environmental or geo-environmental considerations is beyond the scope of this report.

The owner and the contractor should make themselves aware of and become familiar with applicable local, state, and federal safety regulations, including current OSHA excavation and trench safety standards. Construction site safety generally is the sole responsibility of the contractor. The contractor shall also be solely responsible for the means, method, techniques, sequences, and operations of construction operations. The firm, Krazan & Associates, Inc., (including consultants and subcontractors) is providing the preceding information and recommendations solely as a service to Wes and Ruth Dunham. Under no circumstances should the provision of this information or recommendations be construed to mean that the firm Krazan & Associate, Inc., (including consultants and subcontractors) is assuming responsibility for construction site safety or the contractor's activities; such responsibility is not implied and should not be inferred.

Within the limitations of scope, schedule, and budget for this work, it is warranted that the work has been done in accordance with generally accepted practices followed in this area at the time this is report was made. No other warranty, expressed or implied is made.

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Should you have any questions or concerns which have not been addressed, or if we may be of additional assistance, please do not hesitate to contact our office at (360) 598-2126.

Sincerely,

Krazan & Associates, Inc.

Shawn E. Williams,R.G., R.E.A.
Senior Environmental Geologist

Todd S. Parkington, P.E.

Senior Geotechnical Engineer

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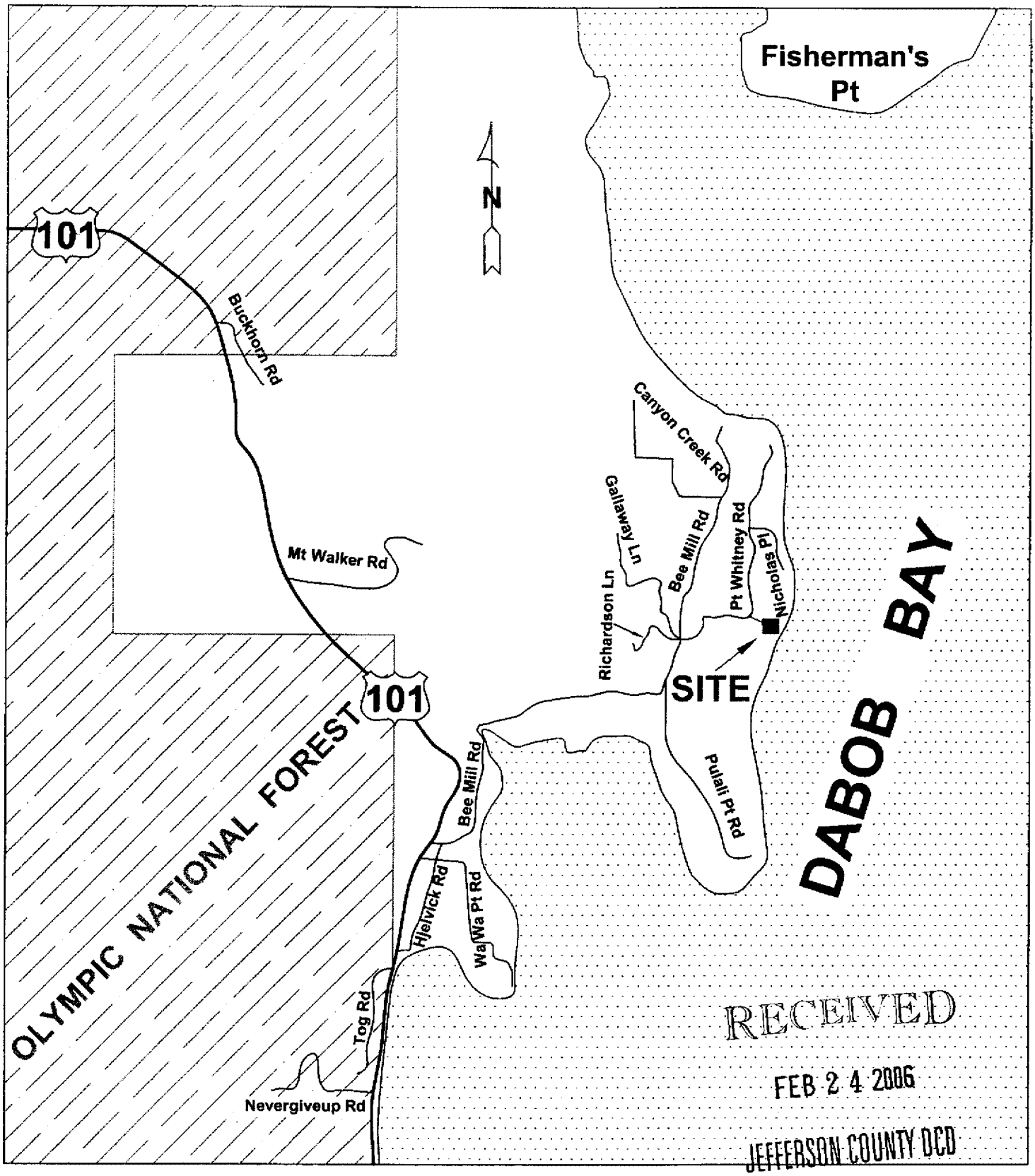

Note: Vicinity Map made from Roadrunner Maps
Adapted from Jefferson County, WA
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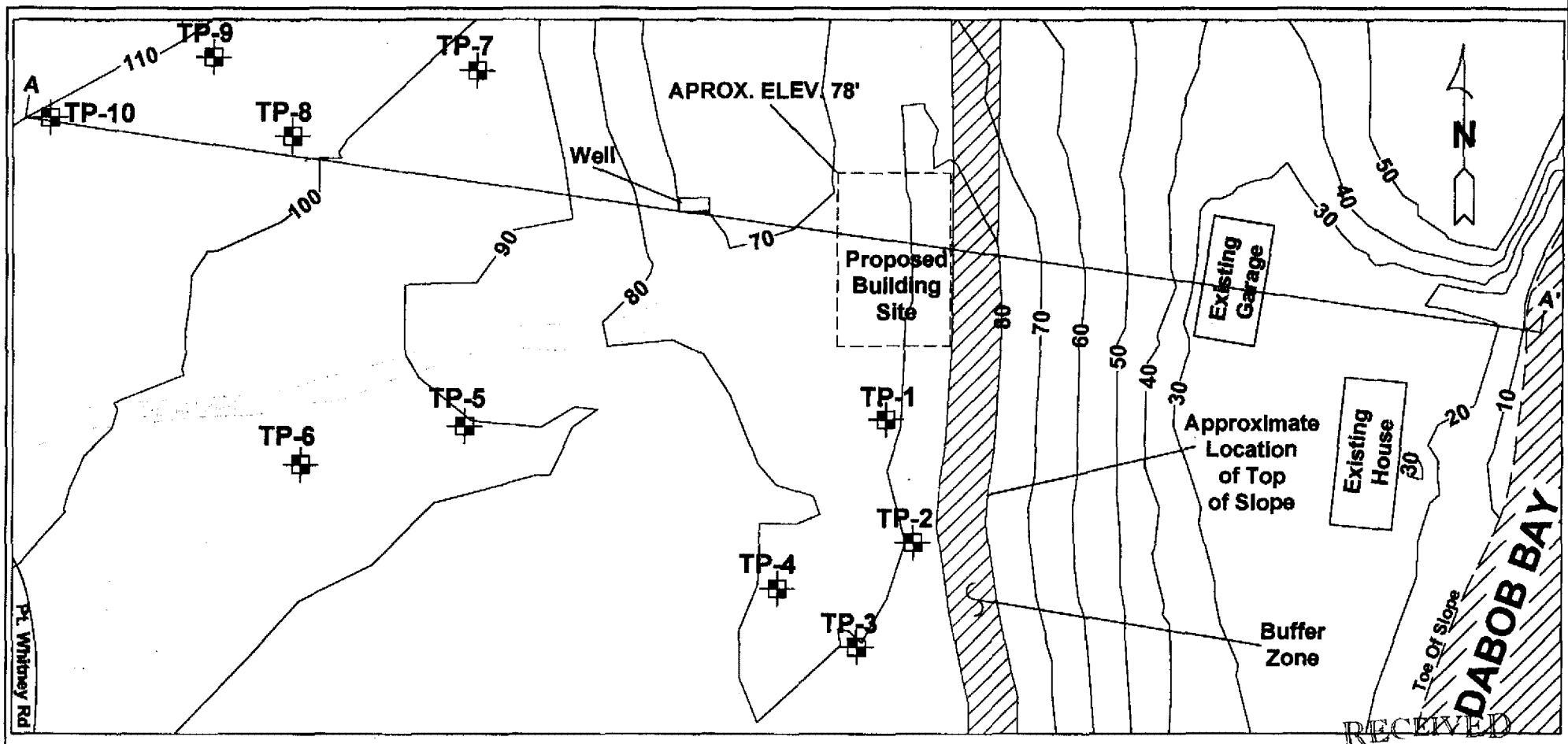
Vicinity Map		
Whitney Point Parcel		
Figure 1	Job Number: 102-01027	Drawn By: CEG Revised By: Drawing Number: 1
Date: Apr. 2, 2002	Krazan & ASSOCIATES, INC.	Drawing Type: Vicinity Map



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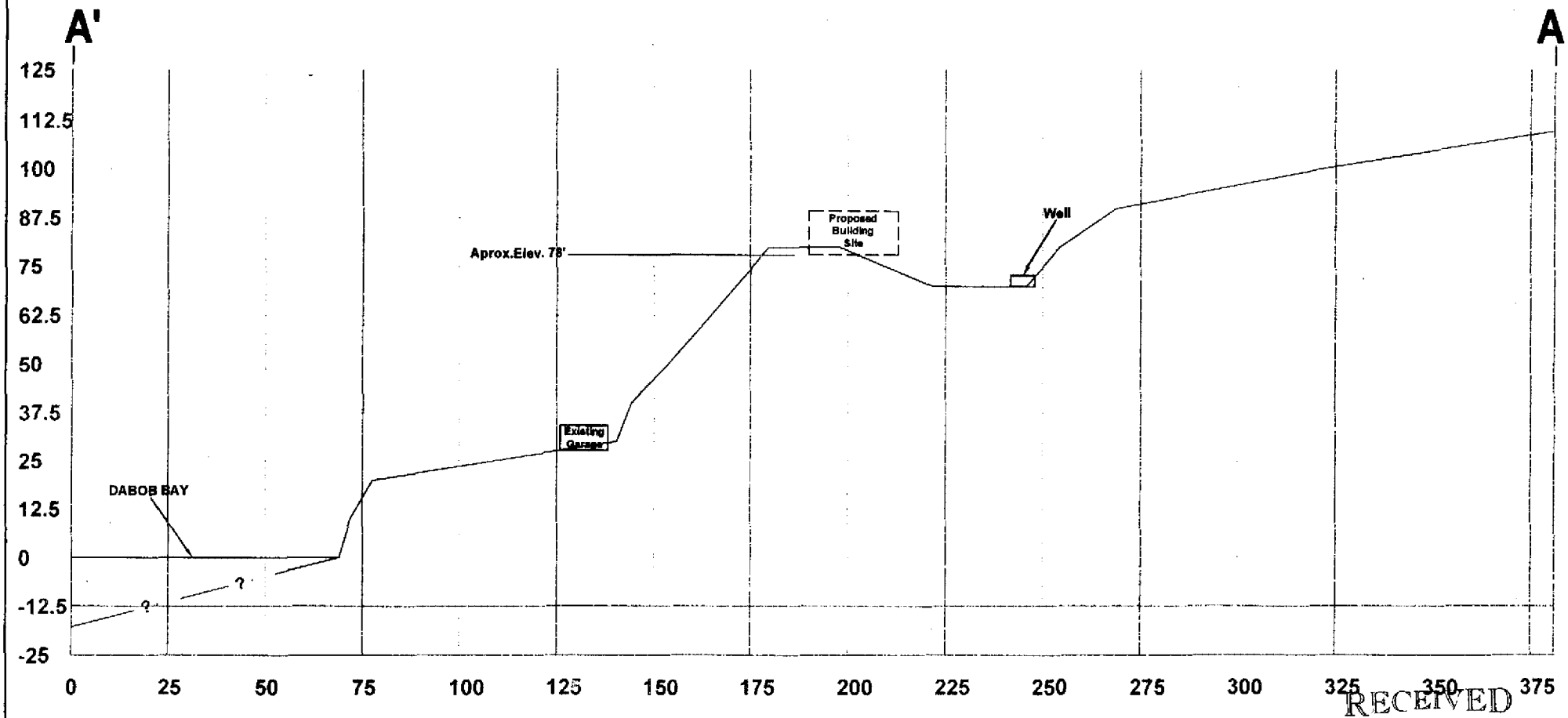
Site Plan

Whitney Point Parcel		Figure 2
Scale: 1" = 20'	Job Number: 102-01027	Drawn By: CEG
		Revised By:
Date: Apr. 9, 2002	Krazan & ASSOCIATES, INC.	Drawing Number: 2
		Drawing Type: Site Plan

Note: Site Plan was made from a Tillman Engineering, Inc. topographical map.



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Cross Section (A - A')		
Whitney Point Parcel		Figure 3
Scale: 1" = 25'	Job Number: 102-01027	Drawn By: CEG Revised By:
Date: Apr. 9, 2002	Krazan & ASSOCIATES, INC.	Drawing Number: 3 Drawing Type: X - Sec.

Note: Site Plan was made from a Tillman Engineering, Inc. topographical map.

Project: Point Whitney Road SFR

Log of Test Pit TP-1

Project No: 102-01027

Client: Dunham

Figure No.: A-1

Location: Jefferson County, WA

Logged By: S.E.W.

Depth to Water: Not Encountered

Elevation:

SUBSURFACE PROFILE			SAMPLE DATA				
Depth (ft)	Symbol	Description	Groundwater Level (ft.)	Sample Number	Type	Moisture%	Water Content (%) 10 20 30 40 50
0		Ground Surface					
		ORGANIC MAT					
1		***SILTY SAND WITH GRAVEL (SM)*** Loose, fine grained sand, reddish tan, moist. Trace of cobbles.					
2		RECESSIONAL OUTWASH		S-1	Grab	18.0	18
3							
4		Becomes medium dense to dense and cemented at 3.5 feet.					
5		TILL		S-2	Grab	14.2	14.2
6							
7		End of Test Pit					
8		No Sloughing of Test Pit Sidewalls. Groundwater Not Encountered.					
9							
10							

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Method: Backhoe

Excavator: Terry's Timber Service

Operator:

Krazan and Associates
20714 State Highway 305 N.E.
Suite 3C
Poulsbo, Washington 98370

Excavation Date: 3/24/01

Sheet: 1 of 1

Project: Point Whitney Road SFR

Log of Test Pit TP-2

Project No: 102-01027

Client: Dunham

Figure No.: A-2

Location: Jefferson County, WA

Logged By: S.E.W.

Depth to Water: Not Encountered

Elevation:

SUBSURFACE PROFILE			SAMPLE DATA				
Depth (ft)	Symbol	Description	Groundwater Level (ft.)	Sample Number	Type	Moisture%	Water Content (%) 10 20 30 40 50
0		Ground Surface					
		ORGANIC MAT					
		SILTY SAND WITH GRAVEL (SM) Loose, fine grained sand, reddish tan, moist. Trace of cobbles.					
1							
2		RECESSIONAL OUTWASH					
3							
4							
5							
		Becomes medium dense to dense and cemented at 5.5 feet.					
6		TILL					
7							
8		End of Test Pit					
9		No Sloughing of Test Pit Sidewalls. Groundwater Not Encountered.					
10							

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Method: Backhoe

Excavator: Terry's Timber Service

Operator:

Krazan and Associates
20714 State Highway 305 N.E.
Suite 3C
Poulsbo, Washington 98370

Excavation Date: 3/24/01

Sheet: 1 of 1

Project: Point Whitney Road SFR

Log of Test Pit TP-3

Project No: 102-01027

Client: Dunham

Figure No.: A-3

Location: Jefferson County, WA

Logged By: S.E.W.

Depth to Water: Not Encountered

Elevation:

SUBSURFACE PROFILE			SAMPLE DATA				
Depth (ft)	Symbol	Description	Groundwater Level (ft.)	Sample Number	Type	Moisture%	Water Content (%) 10 20 30 40 50
0		Ground Surface					
		ORGANIC MAT					
		SILTY SAND WITH GRAVEL (SM) Loose, fine grained sand, reddish tan, moist. Trace of cobbles.					
1							
2		RECESSIONAL OUTWASH					
3							
4		TILL					
		Becomes medium dense to dense and cemented at 4.5 feet.					
5							
6							
7		End of Test Pit					
8		No Sloughing of Test Pit Sidewalls.					
9		Groundwater Not Encountered.					
10							

RECEIVED
FEB 2 4 2006
JEFFERSON COUNTY DCD

Method: Backhoe

Excavator: Terry's Timber Service

Operator:

Krazan and Associates
20714 State Highway 305 N.E.
Suite 3C
Poulsbo, Washington 98370

Excavation Date: 3/24/01

Sheet: 1 of 1

Project: Point Whitney Road SFR

Log of Test Pit TP-4

Project No: 102-01027

Client: Dunham

Figure No.: A-4

Location: Jefferson County, WA

Logged By: S.E.W.

Depth to Water: Not Encountered

Elevation:

SUBSURFACE PROFILE			SAMPLE DATA				
Depth (ft)	Symbol	Description	Groundwater Level (ft.)	Sample Number	Type	Moisture%	Water Content (%) 10 20 30 40 50
0		Ground Surface					
		ORGANIC MAT					
1		***SILTY SAND WITH GRAVEL (SM)*** Loose, fine grained sand, reddish tan, moist. Trace of cobbles.					
2		RECESSIONAL OUTWASH					
3							
4							
5		Becomes medium dense to dense and cemented at 4.5 feet. TILL					
6							
7		End of Test Pit					
8		No Sloughing of Test Pit Sidewalls. Groundwater Not Encountered.					
9							
10							

RECEIVED
MAR 2 4 2005
JEFFERSON COUNTY DCD

Method: Backhoe

Excavator: Terry's Timber Service

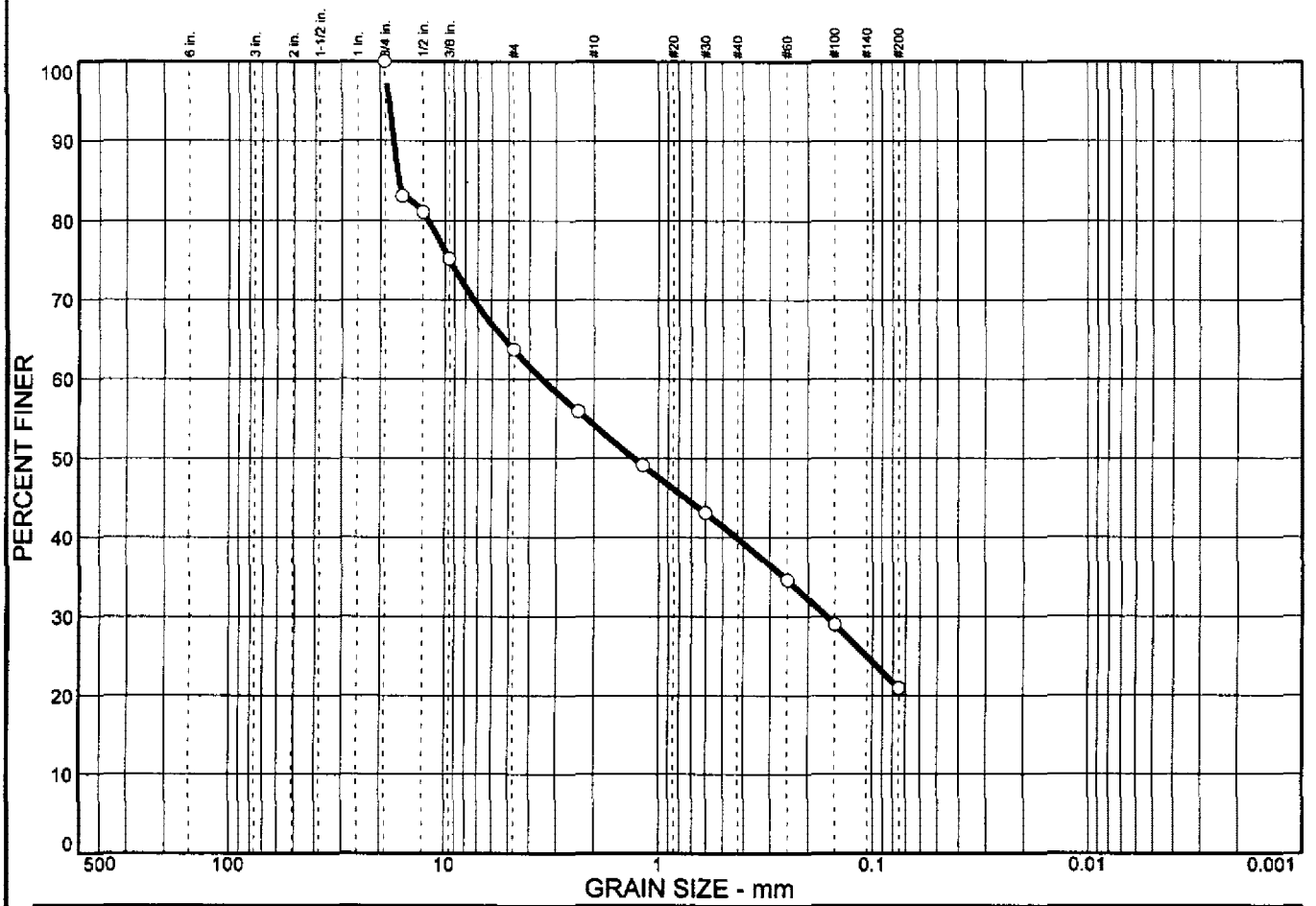
Operator:

Krazan and Associates
20714 State Highway 305 N.E.
Suite 3C
Poulsbo, Washington 98370

Excavation Date: 3/24/01

Sheet: 1 of 1

GRAIN SIZE DISTRIBUTION REPORT



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	36.3	42.8	20.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
0.75 in.	100.0		
0.625 in.	83.1		
.5 in.	81.1		
0.375 in.	75.2		
#4	63.7		
#8	55.9		
#16	49.1		
#30	43.1		
#60	34.6		
#100	29.0		
#200	20.9		

* (no specification provided)

Soil Description

SM
Silty sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 16.4 D_{60}= 3.48 D_{50}= 1.30
D_{30}= 0.164 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

RECEIVED
FEB 2 4 2006
JEFFERSON COUNTY DCD

Sample No.: TP-1;S-2 **Source of Sample:** **Date:** 4/23/01
Location: **Elev./Depth:**

KRAZAN & ASSOCIATES, INC.

Client: Dunham
Project: Dunham
Project No: 102-01027 **Plate**