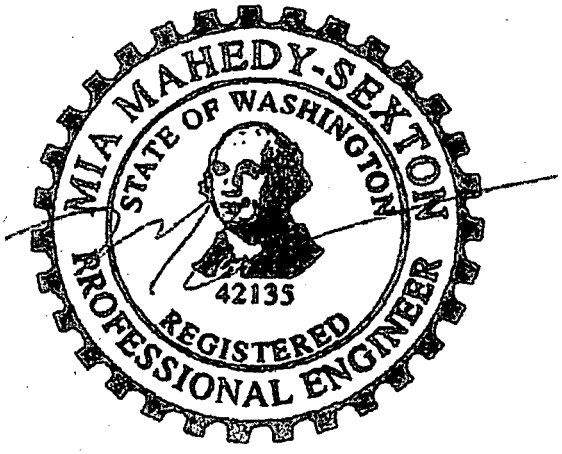
Geotechnical Investigation for Rear Addition to

101 Alpha Drive

Longview, Washington

Prepared for:
Baker Construction C/O Nedved Residence

4 June 2010
Revised 15 July 2010



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BUILDING & PLANNING

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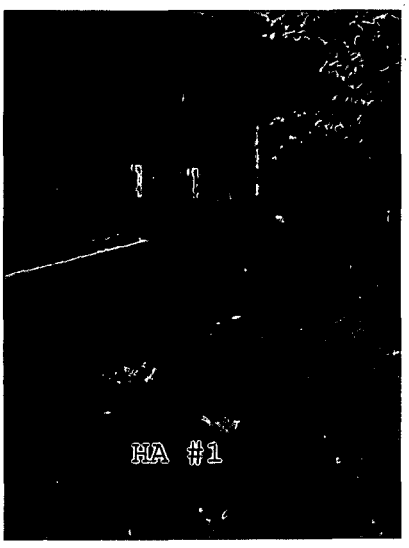
PROJECT AND SITE DESCRIPTIONS

Rapid Soil Solutions (RSS) prepared this geotechnical engineering report because the existing house is in a noted landslide area and required by Cowlitz County code 19.15.090E. The site is single family residential house on a rectangle lot along Alpha Drive in the City of Longview Washington. The project site is shown on Figure 1 in Appendix A. Figure 2 shows the proposed 9'x 24' with the proposed addition to the rear of the house.

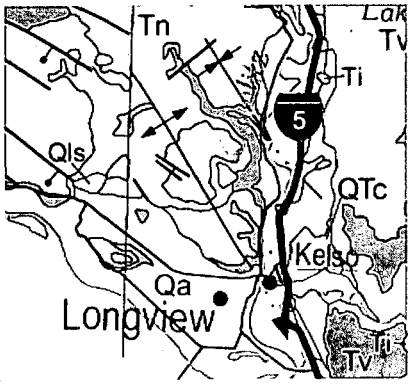
SITE CONDITIONS

Surface Conditions

The property is located in a City of Longview, Washington. The front of the house has a lawn and the rear is an open porch and shed. Then 30' away from the porch starts a moderate slope. The back yard where the addition will be placed has a lawn. See below photo's.



Regional Geology



Project area

Qf Pleistocene outburst-flood deposits

Tv Tertiary volcanic rocks

[1]

RSS found flood deposits under land slide deposits in both hand augur holes.

1 Washington State Geology Map by J Eric Schuster 2005, GM-53

Field Exploration and Subsurface Conditions
Two hand augur holes were excavated to 8ft below grade on site. Please see figure 2, in appendix for the location of the holes. Hand Augur logs detailing materials encountered is in Appendix B. The logs were created using the Unified Soil Classification and Visual Manual Procedure (ASTM-D 2488). Samples were transported to the laboratory ACS Testing of Tigard, Oregon for further classification in seal bags. Please see Appendix A for further laboratory results.

Both augur holes revealed landslide deposits then native materials to 8ft. From the field investigation on 25 May 2010 it looks like the entire building site looks is sitting upon a landslide debris pile that occurred long ago.

The existing house does not show any signs of movement. Nor do the neighboring houses. None of the trees have signs of creep and the foundation is intact.

Geologic Hazard Area
From Cowlitz County code 19.15.150 (1) a geotechnical report is required for all activities proposed within a designated landslide area. Figure 3 in appendix 'a', show the site to be within the map deep seated landslide #448. RSS points out in the sub-surface section it looks like the entire house is sitting on what looks like a debris pile from this past slide. The hand augur logs detail the varying materials to 8ft depth explored.

The purpose of a report is to evaluate the site for hazards and determine if the proposed addition will increase the potential for future slides on the site. The proposed addition is shown on figure 2 in appendix A of this report.

To do this RSS is following the code section 19.15.150 Development Standards for Landslide Hazard Areas and Erosion Hazard Areas. Any allowed or regulated activity on areas identified as susceptible to landslide or erosion hazards or their buffers shall conform to the following standards:

Grading – the only grading that will take on the project site will be the neat line excavation of soil for the new addition footing. ***All excavated soil shall be removed from the site.*** There will be the removal of one tree shown the preceding page that is in the way of the proposed addition. These actions are the plan mitigation for excavation of the new addition footing. These actions will minimize the ground disturbance to the maximum extent feasible.

Erosion – No additional disturbance of surrounding soil is planned. This will minimize erosion to the site. The reminder of the site is covered with grass, and will not be affected.

Drainage - The new footing will have installed perforated drains lines to remove water away from the structure. The current house does not have any drainage installed. See drainage section for where the drain lines shall be placed. None of the new drain lines shall disperse water directly on the site slopes.

Buffer – The current buffer is met, the new addition is only 9' and in excess of 30ft away from the rear slope of the property.

Design Guidelines – By keeping the addition small they are reducing the possible disturbance and limiting removal of existing vegetation to one tree. The addition foundation will be typical see foundation section. No roadways or pathways are being added.

RSS does not believe that installing the addition will jeopardize the safety of the original structure or the surrounding structures. The owners of the property are aware that the site sits in a landslide area. The new addition with new drain lines will remove water that is currently splashing down next to the foundation of the existing house and draining into the ground. During the field reconnaissance on 25 May 2010, RSS looked for possible triggers that could cause this to slide. The addition adds little weight to the site and improves drainage. None are noted.

There are no slopes involved with the addition to the house. The nearest slope is over 30ft away at the back side of the backyard behind a 4ft high chain link fence. There are no springs, seeps or other surface expressions of ground with within the project area the back yard of the house.

Foundation Design

As discussed above, the building foundations may be installed on firm native sub-grade that is found at a depth of about 0.5 feet. ***This depth may be locally variable and should be confirmed by a geotechnical engineer or their representative at the time of construction. Foundation excavation shall take place only during the dry months. This is one means of mitigation, working only in the dry weather.***

Continuous wall and isolated spread footings should be at least 16 to 24 inches wide, depending on loading. The bottom of exterior footings should be at least 18 inches below the lowest adjacent exterior grade. The bottom of interior footings should be at least 12 inches below the base of the floor slab.

Footings placed on engineered fill or firm native sub-grade should be designed for an allowable bearing capacity of 1,500 *pounds per square foot* (**psf**). The recommended allowable bearing pressure can be doubled for short-term loads such as those resulting from wind or seismic forces.

Lateral loads on footings can be resisted by passive earth pressure on the sides of the structures and by friction at the base of the footings. Lateral bearing can be taken as 150 psf/f below natural grade. Adjacent floor slabs, pavements or the upper 12-inch depth of adjacent, unpaved areas should not be considered when calculating passive resistance. For footings in contact with native soils, a coefficient of friction equal to 0.28 may be used when calculating resistance to sliding.

Excavation

Subsurface conditions of accessible cleared areas of the project site show predominately silty clay. Excavations in the upper soils may be readily accomplished with conventional earthwork equipment. ***All excavated soils shall be removed offsite.***

Seismic Design Criteria

The seismic design criteria, in accordance with the USGS web site for Seismic Design Values for Building are summarized in the below table.

	Short Period	1 Second
Maximum Credible Earthquake Spectral Acceleration	$S_s = 0.86$ g	$S_1 = 0.35$ g
Site Class	D	
Site Coefficient	$F_a = 1.16$	$F_v = 1.71$
Adjusted Spectral Acceleration	$S_{MS} = 1.00$ g	$S_{M1} = 0.59$ g
Design Spectral Response Acceleration	$S_{DS} = 0.66$ g	$S_{D1} = 0.39$ g

Drainage Considerations

Slope the ground surface around the structures to create a minimum gradient of 2% away from the building foundations for a distance of at least 5 feet. Surface water should be directed away from all buildings into drainage swales or into a storm drainage system. Footing drains should be installed around the building perimeter to help intercept any water migrating towards the building sub-grade. Roof drains will be directed into a diffuser pipe surrounded by rip rap to be located on the south side of the lot. The diffuser pipe will slow the force and change the direction of water. The rip rap will protect the slope from erosion. It is impossible to tell due to the vegetation where this pipe shall be placed now. ***The geotechnical technical engineer shall be called to review placement of the roof runoff once the site is cleared. This is the planned mitigation for storm water runoff of the new addition.***

Limitations

This report has been prepared for the exclusive use of the addressee, and their architects and engineers for aiding in the design and construction of the proposed development. The opinions, comments and conclusions presented in this report were based upon information derived from our literature review, field investigation, and laboratory testing. Conditions between, or beyond, our exploratory borings may vary from those encountered. Unanticipated soil conditions and seasonal soil moisture variations are commonly encountered and cannot be fully determined by merely taking soil samples or soil borings.

If there is a substantial lapse of time between the submission of this report and the start of work at the site; if conditions have changed due to natural causes or construction operations at, or adjacent to, the site; or, if the basic project scheme is significantly modified from that assumed, it is recommended this report be reviewed to determine the applicability of the conclusions and recommendations.

The work has been conducted in general conformance with the standard of care in the field of geotechnical engineering currently in practice in the Pacific Northwest for projects of this nature and magnitude. No warranty, express or implied, exists on the information presented in this report. By utilizing the design recommendations within this report, the addressee acknowledges and accepts the risks and limitations of development at the site, as outlined within the report.

APPENDIX A

Project site

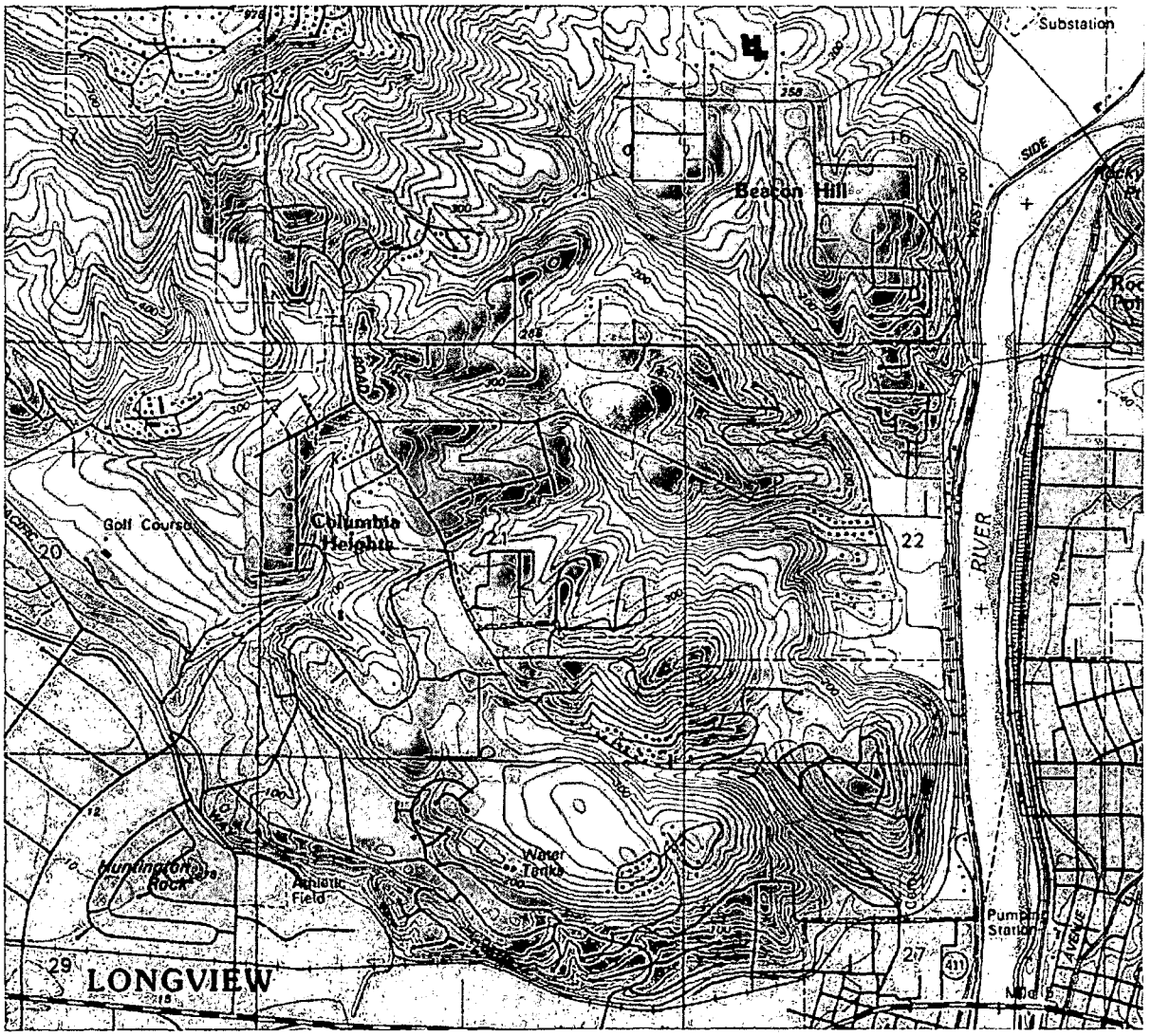


Figure 1- Site Location

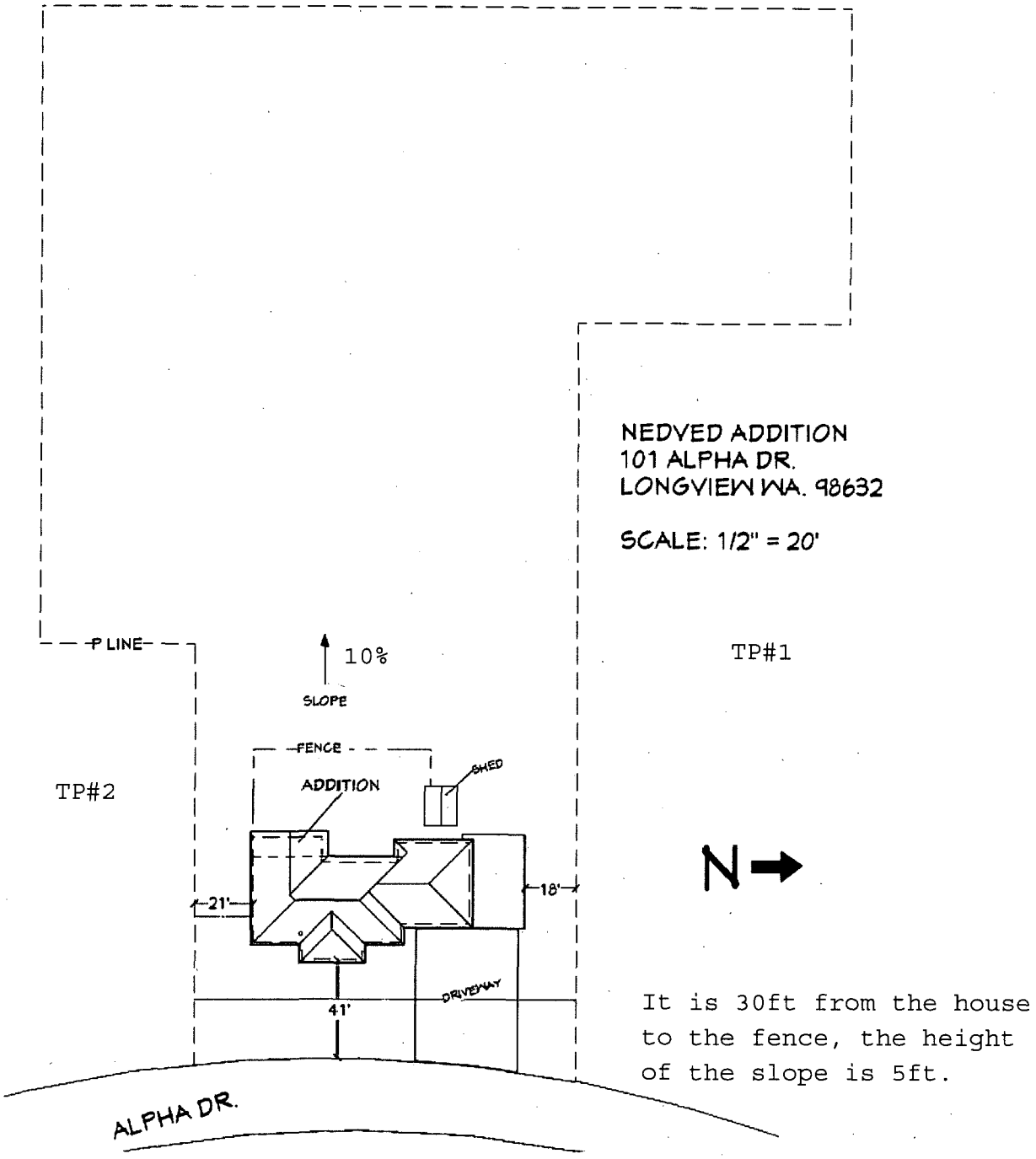


Figure 2 –site plan

EXPLANATION

Deep-seated landslides are labeled with a unique identification number (database field GIS_ID)

- Active deep-seated landslide—field verified
- Scarp of active deep-seated landslide—field verified
- Inactive deep-seated landslide—field verified
- Scarp of inactive deep-seated landslide—field verified
- Inactive deep-seated landslide—not field verified
- Scarp of inactive deep-seated landslide—not field verified
- Shallow landslide
- Potentially unstable slope
- Study area boundary

446-Deep-seated landslides are defined as slides with primary planes of failure well below the rooting depth of the vegetation and generally into the bedrock or regolith below the soil or colluvial layer (Gerstel, 1999). Varnes (1978) and Cruden and Varnes (1996) classified deep-seated landslides based upon their mechanism of movement into falls, topples, slides, and flows

Figure 3- Landslide data

[1] Karl Wegmman, 7.5 Identitied landslides in Kelso 7.5 minute Quad. 2006

Hand Augur #1

Project Addition to 101 Alpha Drive

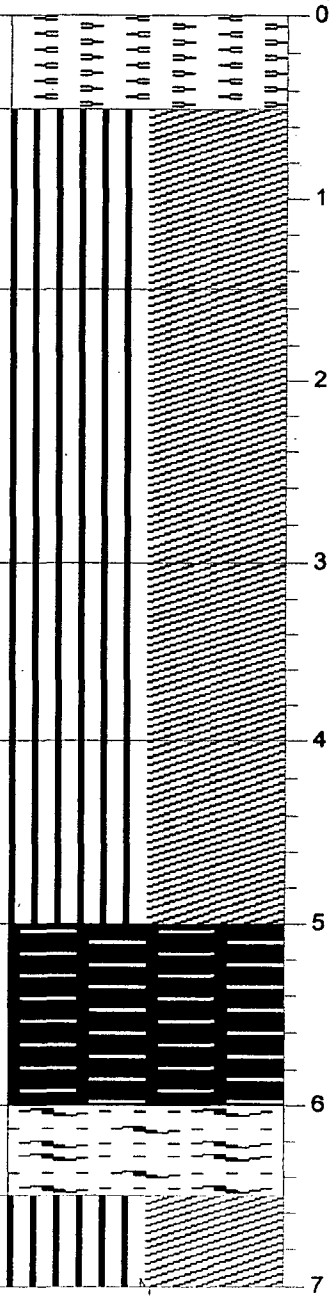
Client: Baker Construction

Elevation: 180

Exc. Date: 26 May 2010
Location: Longivew, WA
Logged By: Hand Augur
Plotted By: Mia Mahedy-Sexton, PE
Water Level: N/A

Description	Soil Type
Top Soil	
Damp, soft fine grained medium brown clayey SILT, with trace of sand	ML-CL
Damp, soft fine grained medium brown clayey SILT, with trace of sand and organics	ML-CL
Damp, soft fine grained medium brown clayey SILT, with trace of sand	ML-CL
Damp, soft fine grained medium brown clayey SILT, with trace of sand, PI=6, LL=28, mositure=35.5	ML-CL
Damp, soft fine grained redish medium brown clayey SILT, with charcoal	CO
Damp, tan weathered basalt, breaks in your hand	BA
Damp, soft fine grained medium brown clayey SILT, with trace of sand	ML-CL

Graphic Test Pit



Soil Depth | Water | Samples

Test Pit

Rapid Soil Solutions

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Users\Costco\Desktop\MIA WORK\2010\Reports\Geotech\Longview\HA1.log Date: 6/7/2010

Hand Augur #1

Project Addition to 101 Alpha Drive

Client: Baker Construction

Elevation: 180

Exc. Date: 26 May 2010
Location: Longivew, WA
Logged By: Hand Augur
Plotted By: Mia Mahedy-Sexton, PE
Water Level: N/A

Description	Soil Type	Graphic Test Pit	Soil Depth	Water	Samples
Damp, soft fine grained medium brown clayey SILT, with trace of sand	ML-CL		7		
Hand augur hole completed at depth of 8	ML-CL		8		
			9		
			10		
			11		
			12		
			13		
			14		

Test Pit

Rapid Soil Solutions

SuperLog CivilTech Software, USA www.civiltech.com File: C:\Users\Costco\Desktop\MIA WORK\2010\Reports\Geotech\Longview\HA1.log Date: 6/7/2010

Hand Augur #2

Project Addition to 101 Alpha Drive

Client: Baker Construction

Elevation: 180

Exc. Date: 26 May 2010
Location: Longivew, WA
Logged By: Hand Augur
Plotted By: Mia Mahedy-Sexton, PE
Water Level: N/A

Description	Soil Type
Top Soil	
Damp, soft fine grained medium brown clayey SILT, with trace of sand	ML-CL
Damp, soft fine grained medium brown clayey SILT, with trace of sand and organics	ML-CL
Damp, soft fine grained medium brown clayey SILT, with trace of sand	ML-CL
Damp, soft fine grained redish medium brown clayey SILT, with charcoal	CO
Damp, soft fine grained medium brown clayey SILT, with trace of roots	ML-CL
Damp, tan weathered basalt, breaks in your hand	BA
Damp, soft fine grained medium brown clayey SILT, with trace of roots	ML-CL

Graphic Test Pit | Soil Depth | Water | Samples

Test Pit

Rapid Soil Solutions

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Hand Augur #2

Project Addition to 101 Alpha Drive
Client: Baker Construction
Elevation: 180

Exc. Date: 26 May 2010
Location: Longivew, WA
Logged By: Hand Augur
Plotted By: Mia Mahedy-Sexton, PE
Water Level: N/A

Description	Soil Type	Graphic Test Pit	Soil Depth	Water	Samples
Damp, soft fine grained medium brown clayey SILT, with trace of roots	ML-CL		7		
Hand augur hole completed at depth of 8	ML-CL		8		
			9		
			10		
			11		
			12		
			13		
			14		

Test Pit

Rapid Soil Solutions

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ASPHALT CONCRETE SOILS Testing, Inc.

RAPID SOIL SOLUTIONS
3915 SW PLUM
PORTLAND, OR 97219

7409 SW Tech Center Dr, #145
Tigard, OR 97223
phn: 503-443-3799
fax: 503-620-2748

CLIENT:	RAPID SOIL SOLUTIONS	**PAGE:**	1 of 1
PROJECT:	Baker Longview	**JOB NO:**	10-2819
LOCATION:	Longview	**WORK ORDER NO:**	N/A
SAMPLE SOURCE:	SEE BELOW	**DATE ASSIGNED:**	5/28/10

MECHANICAL SIEVE ANALYSIS

				Silt or	SAND								GRAVEL									COBBLES	
				Clay	Fine			Medium			Coarse		Fine				Coarse						
Location & Depth	USCS	LL	PI	#200	#100	#50	#40	#30	#16	#10	#8	#4	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	3"	6"	Lab #

PERCENT PASSING BY WEIGHT

HA #1 (4')		28	6																				5053

MOISTURE CONTENT

BORING	DEPTH	MC%
HA #1	4'	35.5%

REVIEWED BY _____ DE/js