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Executive Summary / Introduction of the report

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Explanation _____

Comments: _____

15/15

4081

**SUBSURFACE EXPLORATION,
GEOLOGIC HAZARDS, AND PRELIMINARY
GEOTECHNICAL ENGINEERING REPORT**

**PROPOSED HORSEMAN'S TRAIL
DEVELOPMENT**

SNOHOMISH COUNTY, WASHINGTON

PREPARED FOR

Land Technologies

PROJECT NO. KE98297A

RECEIVED

NOVEMBER 1998

APR 30 1999

**PLANNING & DEVELOPMENT
SERVICES • LAND USE**

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**SUBSURFACE EXPLORATION, GEOLOGIC HAZARDS, AND
PRELIMINARY GEOTECHNICAL ENGINEERING REPORT
PROPOSED HORSEMAN'S TRAIL DEVELOPMENT
SNOHOMISH COUNTY, WASHINGTON**

November 17, 1998
Project No. KE98297A

I. PROJECT AND SITE CONDITIONS

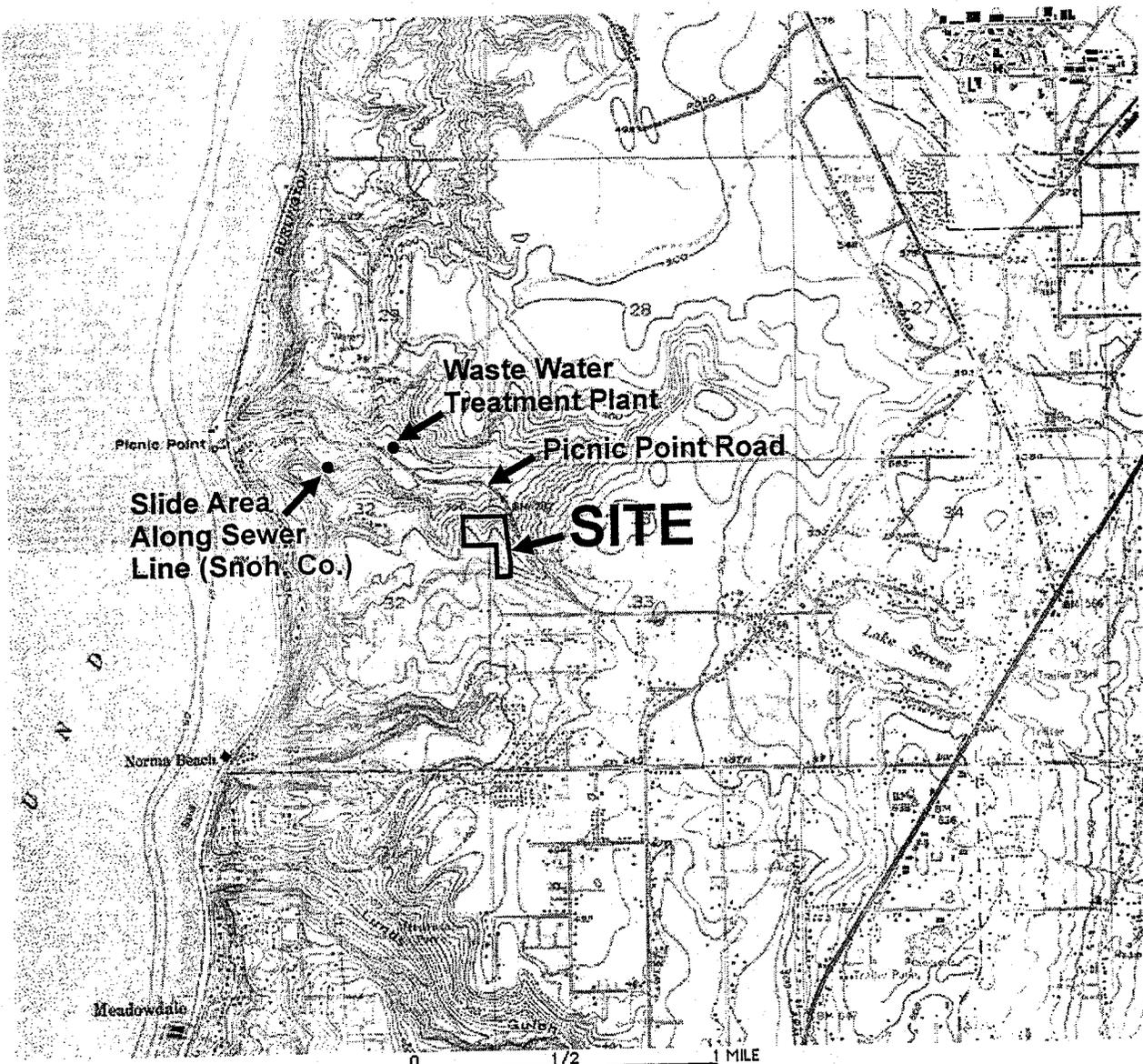
1.0 INTRODUCTION

This report presents the results of our subsurface exploration, geologic hazards, and preliminary geotechnical engineering study for the proposed Horseman's Trail Development. As shown on the Vicinity Map, Figure 1, the subject site is located west of Picnic Point Road and 58th Place West within Snohomish County, Washington. The proposed site layout and the approximate locations of the explorations accomplished for this study are presented on the Site and Exploration Plan, Figure 2. In the event that any changes in the nature, design, or layout of the project are planned, the conclusions and recommendations contained in this report should be reviewed and modified, or verified, as necessary. This report is considered preliminary since final engineering plans for the development were not available at the time of our report. Our office should review the final engineering plans to determine compliance with our report recommendations.

1.1 Purpose and Scope

The purpose of this study was to document shallow subsurface soil and ground water conditions in order to provide geotechnical recommendations for use in the design and development of the proposed residential project. As requested by Snohomish County Planning & Development Services, our report is intended to satisfy Chapter 32.10 of the Snohomish County Critical Areas regulations.

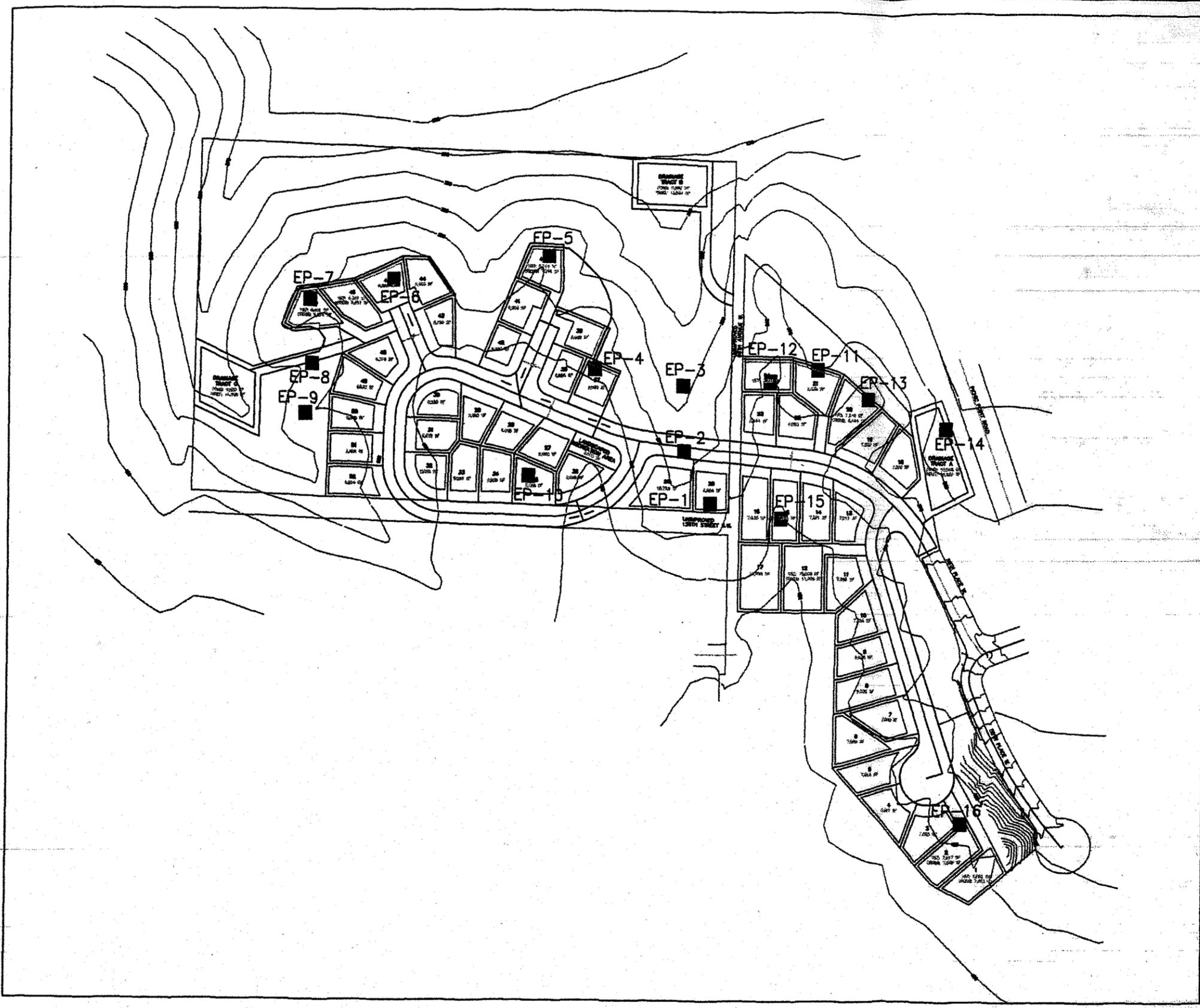
Our study included a review of available geologic literature, the excavation of exploration pits, and performing geologic studies to assess the type, thickness, distribution, and physical properties of the subsurface sediments and shallow ground water conditions. A geologic hazard study was performed to assess the potential for landslides, seismic, and erosion hazards. Geotechnical engineering studies were also conducted to determine the recommended type of suitable foundation, allowable foundation soil bearing pressures, grading recommendations, lateral earth pressures, structural fill considerations, maximum temporary and permanent cut slope and fill slope angles, and drainage considerations. This report summarizes our current fieldwork and offers development recommendations based on our present understanding of the project.



TN* / MN
19°

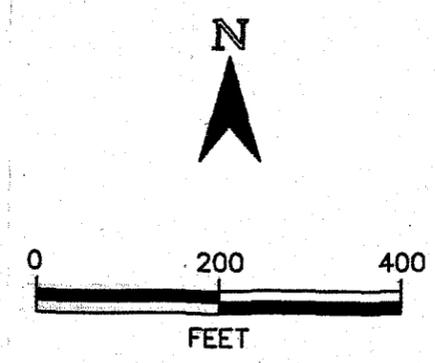
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LEGEND
 EP-1 ■ Approximate location of exploration pit

REFERENCE: BASE MAP PROVIDED BY HIGA ENGINEERING.



SITE AND EXPLORATION PLAN
HORSEMAN'S TRAIL
SNOHOMISH COUNTY, WASHINGTON

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EXPLORATION PIT LOG

Number EP-1

0	Topsoil/forest duff.
5	Loose, dry grading to damp, brown, silty SAND AND GRAVEL; medium dense below 2'; dense below 4'. (Weathered Lodgement Till)
10	Dense grading to very dense, moist, gray SAND AND GRAVEL with some silt; grading to trace or very little silt. (Advance Outwash)
15	BOH @ 11' Note: No seepage; no caving.

Number EP-2

0	Topsoil/forest duff.
5	Loose to 1-1/2' grading to medium dense, dry grading to damp, brown, silty SAND AND GRAVEL. (Weathered Lodgement Till)
10	Dense grading to very dense, moist, gray, medium SAND AND GRAVEL with trace to little silt. (Advance Outwash)
15	BOH @ 12' Note: No seepage; no caving.

Subsurface conditions depicted represent our observation at the time and location of this exploratory hole, modified by geologic interpretation, engineering analysis, and judgment. They are not necessarily representative of other times and locations. We will not accept responsibility for the use or interpretation by others of information presented on this log.

Reviewed By



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Snohomish County, WA
Project No. KE98297A
August 1998

EXPLORATION PIT LOG

Number EP-3

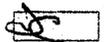
0	Topsoil/forest duff.
5	Loose to 1' grading to medium dense to 3' grading to dense below 3', dry to damp, brown, silty SAND AND GRAVEL. (Weathered Lodgement Till)
10	Dense, moist, brownish-gray, fine to medium SAND with some gravel and trace to some silt. (Advance Outwash)
15	BOH @ 13' Note: No seepage; no caving.

Number EP-4

0	Topsoil/forest duff.
5	Loose to 3' grading to medium dense, dry, light brown, silty SAND AND GRAVEL; grading to very dense and gray below 5'; upper 4' weathered. (Lodgement Till)
10	BOH @ 7' Note: No seepage; no caving.
15	

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EXPLORATION PIT LOG

Number EP-5

0

Topsoil/forest duff.

5

Loose to 1' grading to dense to 3' grading to very dense at 5', dry grading to damp to moist, brown grading to gray, silty SAND AND GRAVEL grading to SAND with some gravel, some to trace silt. (Lodgement Till)

10

Dense, moist, gray SAND AND GRAVEL with trace to little silt. (Advance Outwash)

15

BOH @ 10'
Note: No seepage; no caving.

Number EP-6

0

Topsoil/forest duff.

5

Medium dense grading to dense, dry grading to damp, brown grading to gray, silty SAND AND GRAVEL with trace cobbles; weathered above 4'. (Lodgement Till)

10

BOH @ 6'
Note: No seepage; no caving.

15

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EXPLORATION PIT LOG

Number EP-7

0

Topsoil/forest duff.

5

Loose to 1-1/2', medium dense grading to dense, dry grading to moist, light brown grading to gray, silty SAND AND GRAVEL, trace cobbles; weathered above 6'. (Lodgement Till)

10

BOH @ 8'
Note: No seepage; no caving.

15

Number EP-8

0

Topsoil/forest duff.

5

Medium dense grading to dense, dry grading to damp, light brown grading to gray, silty SAND AND GRAVEL with trace cobbles; boulders approximately 3' in diameter at 5' depth; weathered above 4'. (Lodgement Till)

10

BOH @ 5' Refusal on boulder
Note: No seepage; no caving.

15

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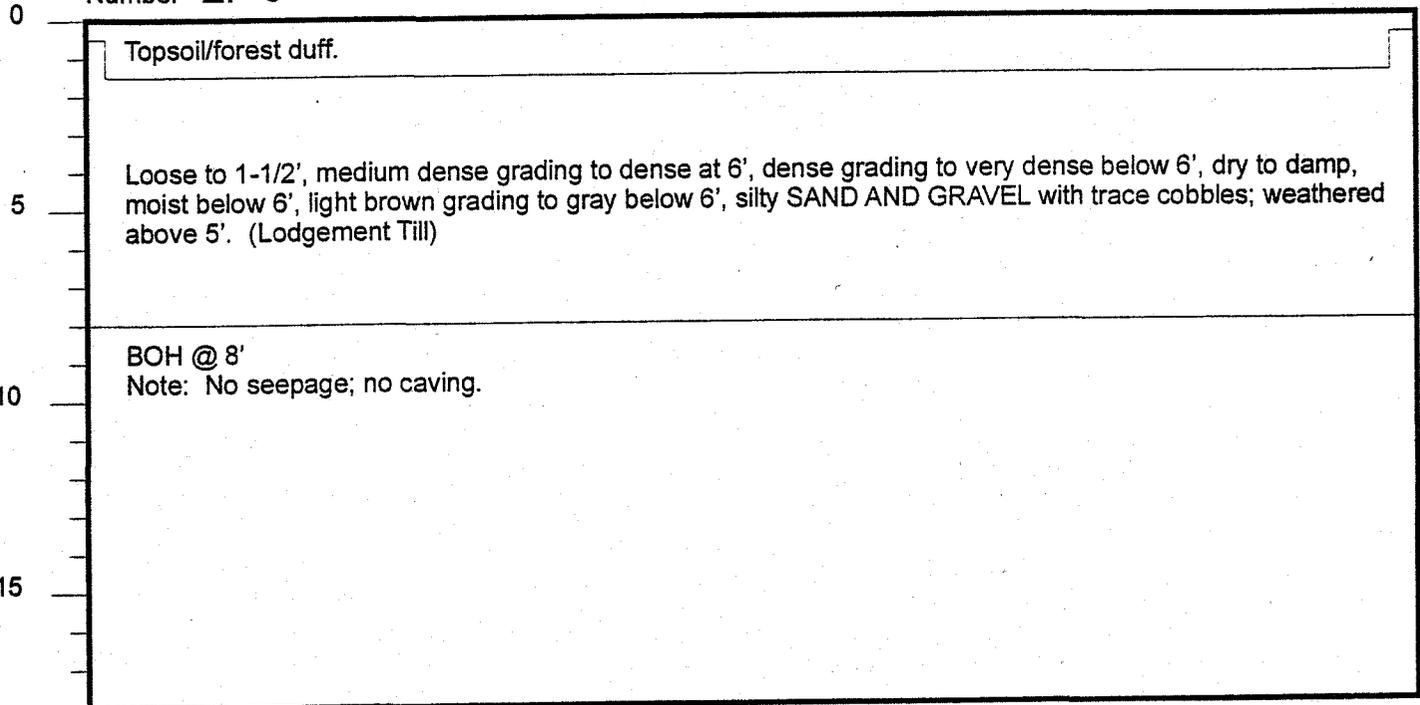
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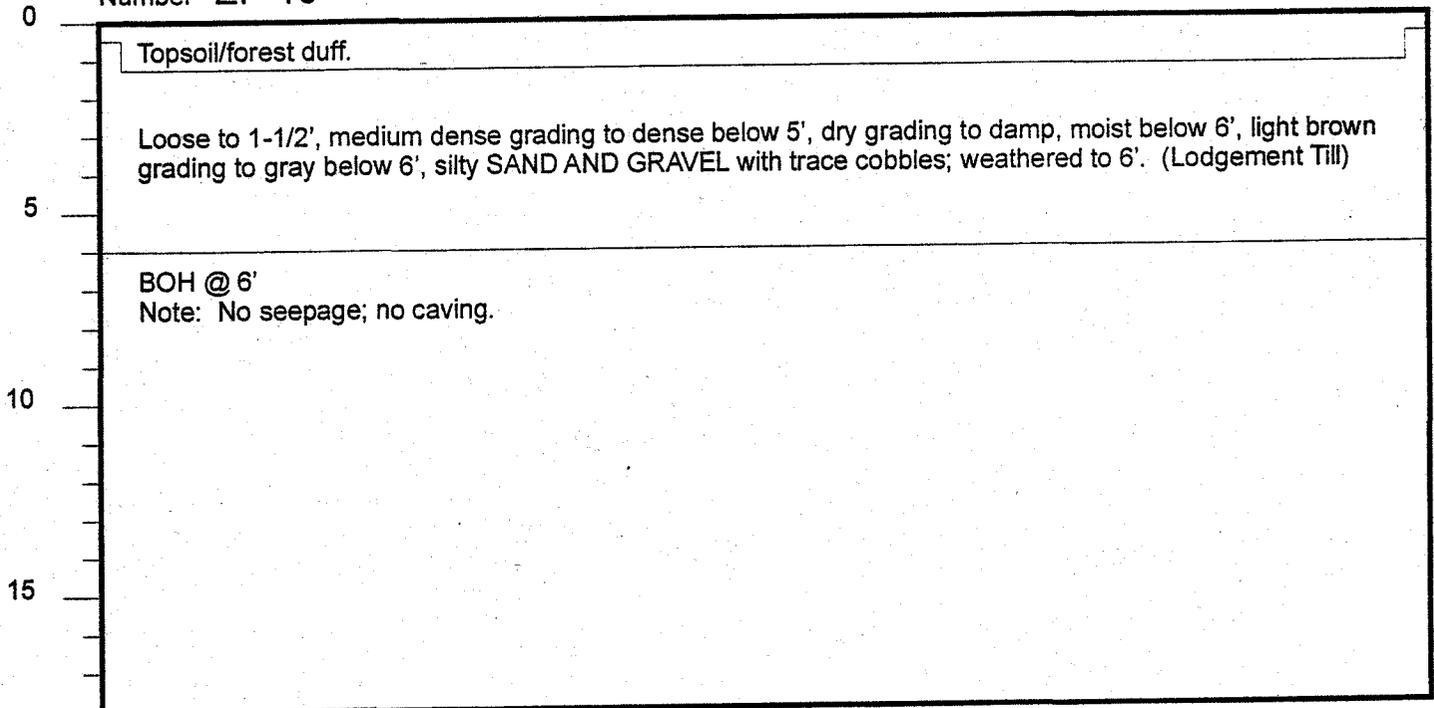
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EXPLORATION PIT LOG

Number EP-9



Number EP-10



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EXPLORATION PIT LOG

Number EP-11

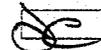
0	Topsoil/forest duff.
5	Loose grading to medium dense below 2', dry grading to damp below 3', light brown grading to gray below 6', silty SAND AND GRAVEL, trace cobbles. (Weathered Lodgement Till)
10	Dense grading to very dense, moist, gray SAND AND GRAVEL with trace to some silt. (Sandy Lodgement Till)
15	Dense, moist, gray, medium SAND, trace gravel. (Advance Outwash)
	BOH @ 14' Note: No seepage; no caving.

Number EP-12

0	Topsoil/forest duff.
5	Loose grading to medium dense below 3', dry to damp, light brown SAND with some gravel and trace to some silt. (Weathered Lodgement Till)
10	Dense, damp, grayish-brown SAND AND GRAVEL with some silt. (Sandy Lodgement Till)
15	Dense, moist, gray, medium SAND with some gravel, trace sand. (Advance Outwash)
	BOH @ 16' Note: No seepage; no caving.

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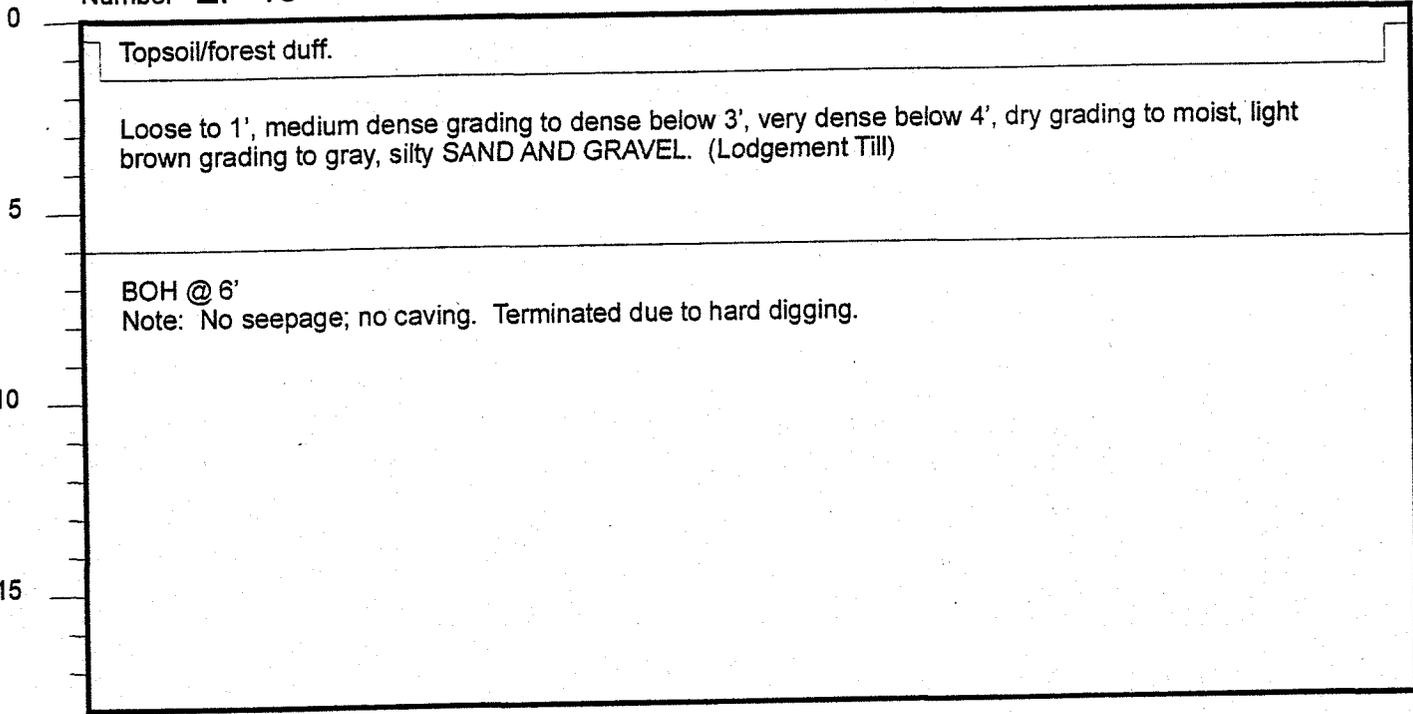


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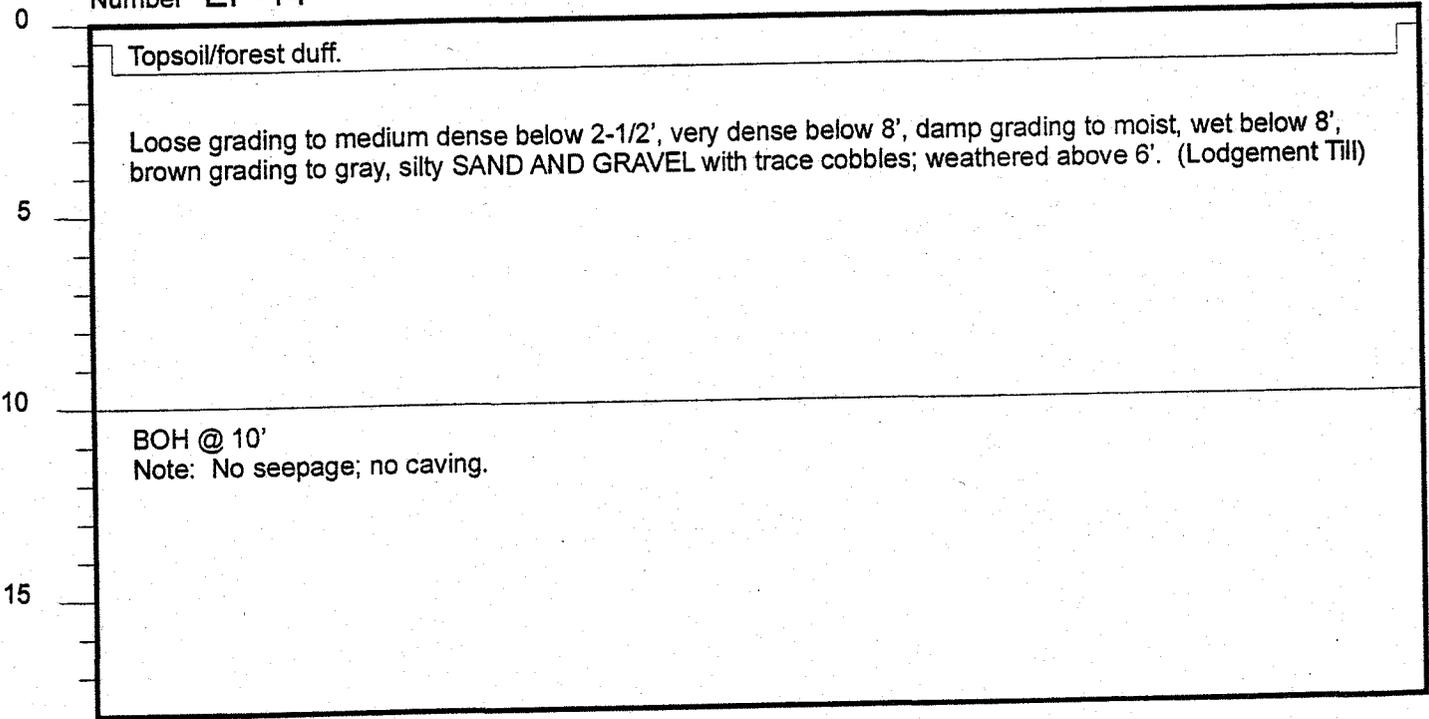
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EXPLORATION PIT LOG

Number EP-13



Number EP-14



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EXPLORATION PIT LOG

Number EP-15

0

Topsoil/forest duff.

Loose to 1' grading to very dense at 3', dry grading to moist, brown grading to gray, silty SAND AND GRAVEL with trace cobbles. (Lodgement Till)

5

BOH @ 4'
Note: No seepage; no caving.

10

15

Number EP-16

0

Topsoil/forest duff.

Medium dense grading to dense to very dense, dry grading to gray, silty SAND AND GRAVEL.
(Lodgement Till)

5

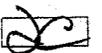
BOH @ 5'
Note: No seepage; no caving.

10

15

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