

Source: Snohomish County PDS

File No. (ID#1) 98 105275

(ID#2) _____

near

Site Address Locust Wy & 201st St SWDate Copied 6-20-01 By Meek **Title page with the following information:**

- Company (Author) name*
- Report date*
- Project Name*
- Company's job number*
- Site address*

- Executive Summary / Introduction of the report
- Table of contents
- Project Location Map / Vicinity Map
- Site / Exploration Plans, Boring Location Plans**
- Cross-sections / Subsurface profiles
- Exploration Logs**
- Monitoring Well Logs
- Cone Penetrometer Logs
- Groundwater Elevation Tables / Data

 Includes data from Previous Reports No new data / data review Missing Data / Illegible Data
Explanation _____

Comments: _____

April 25, 2000

FES Development, LLC
13632 Northeast 177th Place, Suite 200
Woodinville, Washington 98072

Attention: Francis Styren

Report
Geologic and Geotechnical Evaluation
Preliminary Plat of Locust Crossing
Brier, Washington
File No. 6643-001-03

INTRODUCTION

GeoEngineers is pleased to present this report summarizing our evaluation of slope and drainage issues associated with the proposed Locust Crossing Development near Brier, Washington. Our services were verbally requested by Francis Styren, of FES Development, LLC, during a meeting with Galan McNelly and Craig Erdman of GeoEngineers on April 12, 2000. The scope of our services is summarized in our proposal dated April 13, 2000, and signed by Mr. Styren on April 14, 2000. A preliminary set of plans detailing the proposed development and preliminary drainage channel design was provided to us during the April 12, 2000 meeting.

We understand that the project engineer, Donna L. Breske of Western Engineers, submitted an application for the Preliminary Plat of the Locust Crossing to Snohomish County on March 8, 2000. We also understand that Snohomish County Planning and Development Services (SCPDS) requested additional information related to slope and drainage issues within the planned development in a letter dated April 5, 2000. The slope issues include concerns related to the construction of proposed trail, sanitary sewer, and storm sewer alignments within a steep slope area in the development. The drainage issues include concerns related to the design, stability, and water temperature associated with a planned drainage channel and the amount of potential water flow from crawlspaces and drains within selected lots. A copy of the April 5, 2000 letter was provided to us during the April 12, 2000 meeting.

GEI previously completed geotechnical engineering studies for the proposed Locust Crossing Development titled "Report, Geotechnical Engineering Services, Proposed Locust Crossing Development, Locust Way and 201st Street Southwest, Snohomish Washington" dated March 18, 1999 and "Preliminary Infiltration Considerations, Geotechnical Engineering Services, Proposed Locust Crossing Development, Locust Way and 201st Street Southwest, Snohomish, Washington" dated February 29, 2000. GeoEngineers completed a study for the Locust Ridge Development,

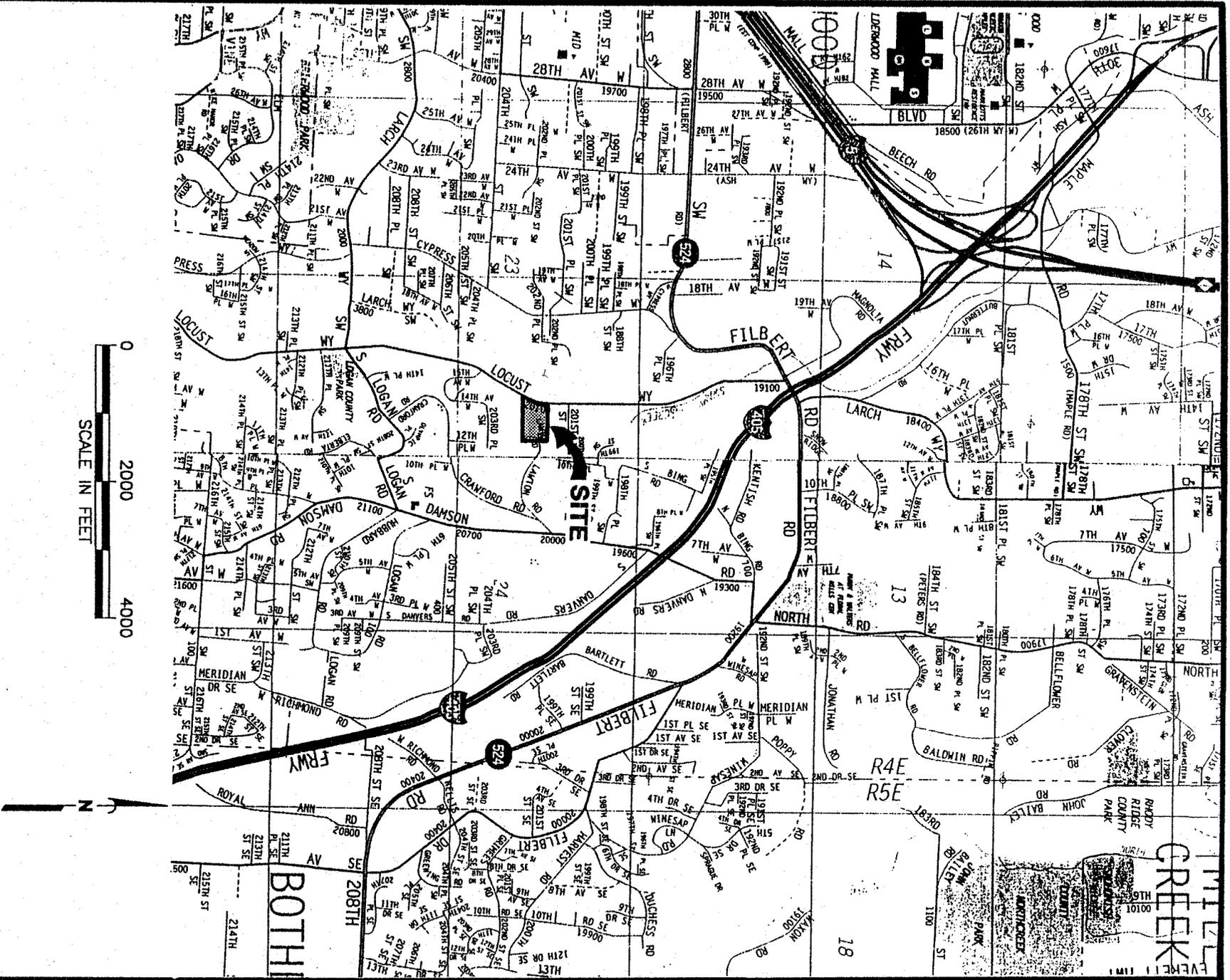
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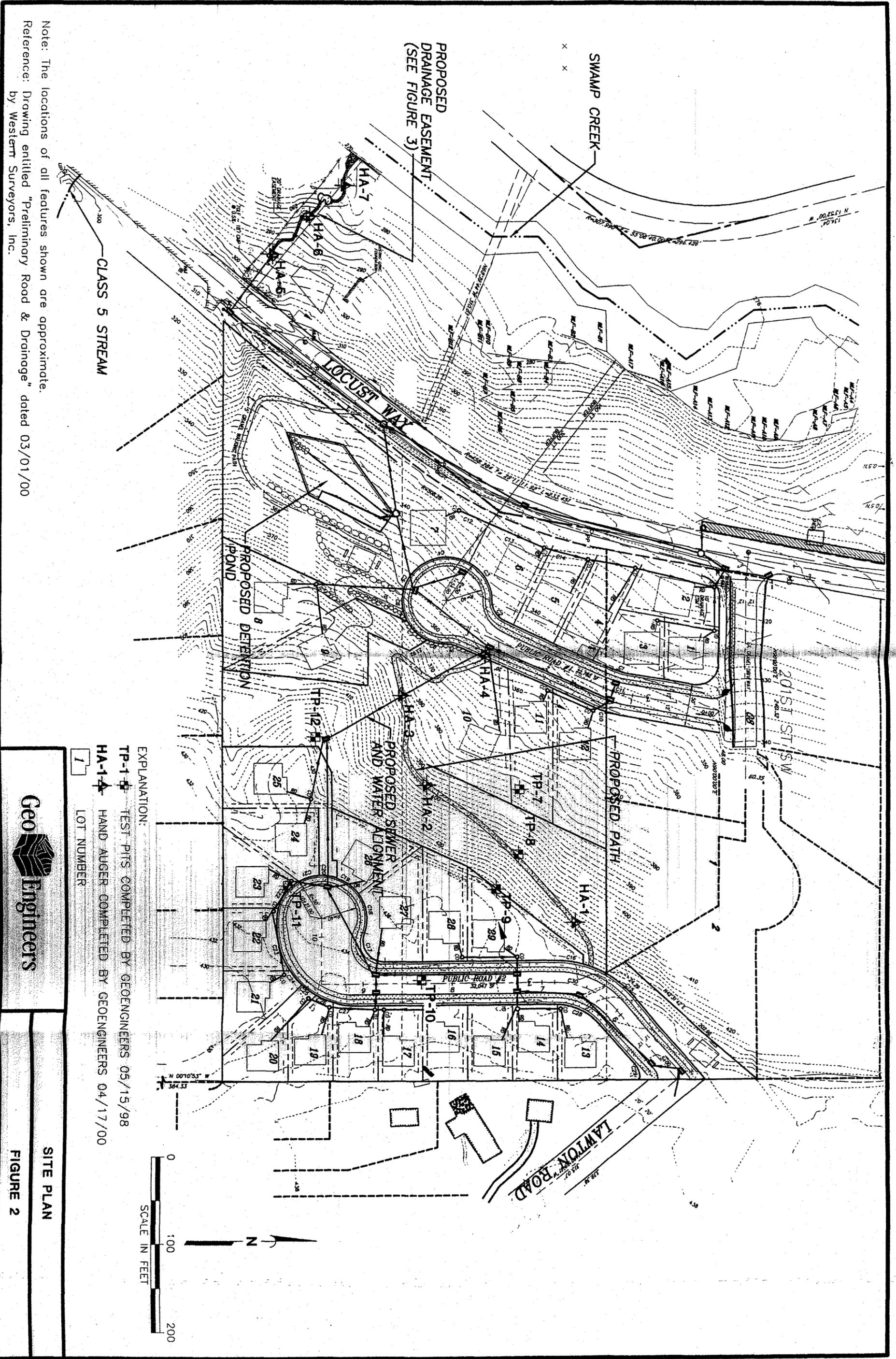
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VICINITY MAP

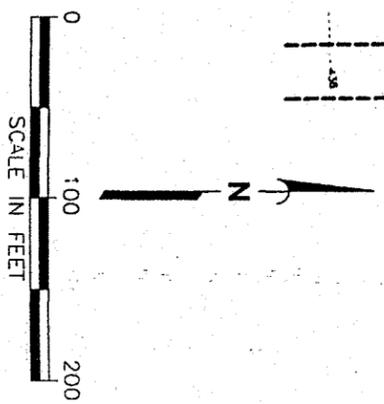
FIGURE 1





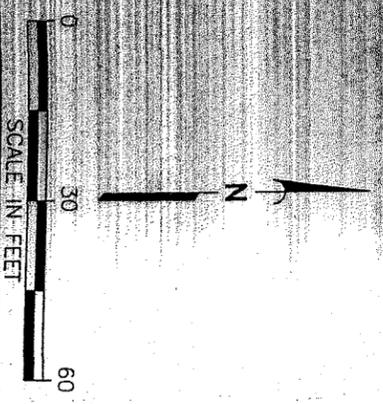
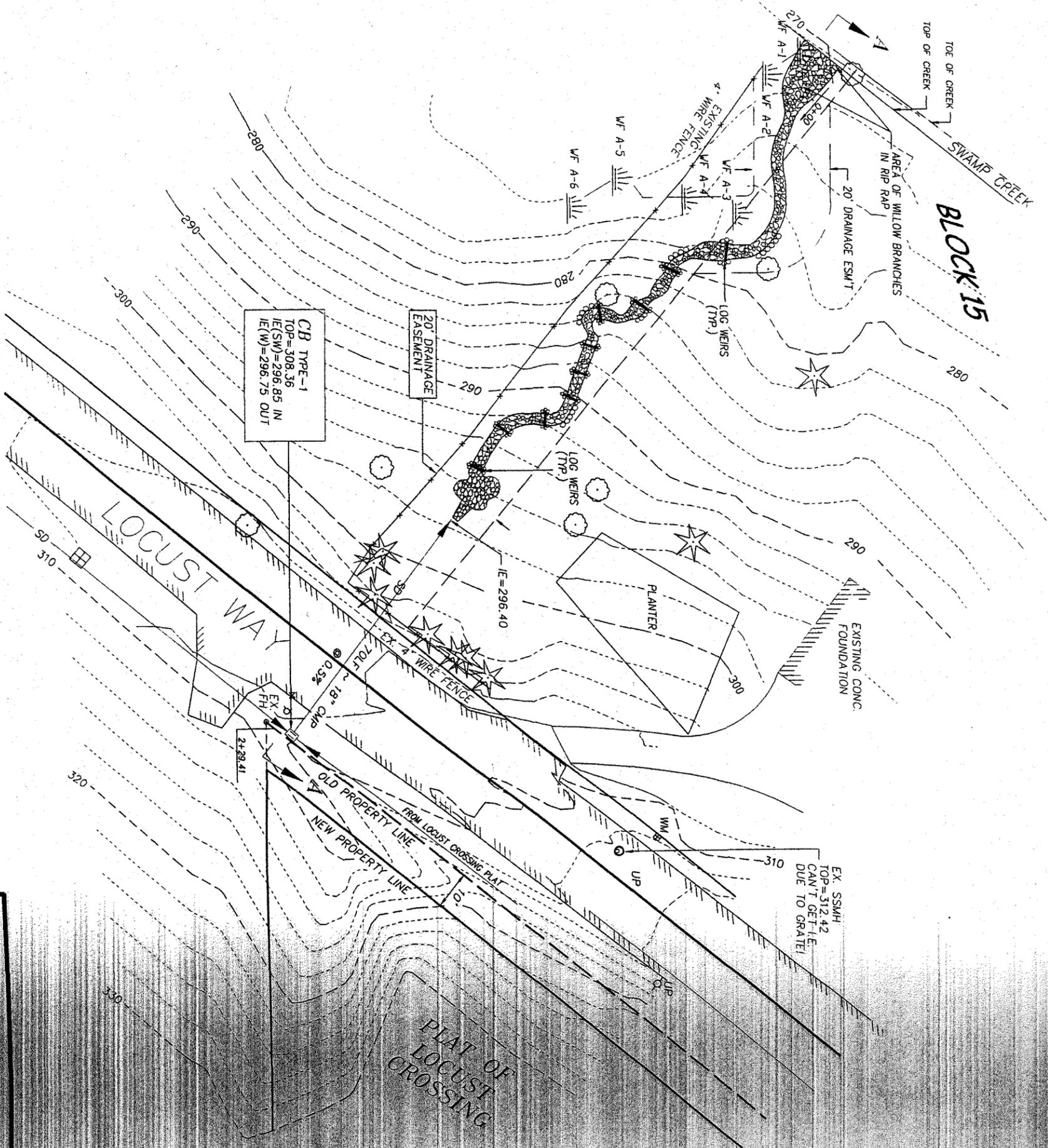
Note: The locations of all features shown are approximate.
 Reference: Drawing entitled "Preliminary Road & Drainage" dated 03/01/00 by Westcott Surveyors, Inc.

- EXPLANATION:
- TP-1 TEST PITS COMPLETED BY GEOENGINEERS 05/15/98
 - HA-1 HAND AUGER COMPLETED BY GEOENGINEERS 04/17/00
 - 1 LOT NUMBER



SITE PLAN
 FIGURE 2

Note: The locations of all features shown are approximate.
Reference: "Proposed Stream Outfall for Locust Ridge by Western Engineers Inc., dated 03/20/00.



Geo Engineers

PROPOSED DRAINAGE EASEMENT
FIGURE 3

Project Locust Crossing	Job Number 6643-001-03	Location Property Trail
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LOG OF HAND AUGER HA-1

Date Excavated: 4/17/00 Logged by: BEB
 Equipment: _____ Surface Elevation (ft): _____

DEPTH IN FEET	Sample No.	Blows per foot	Sample	Graphic Log	USCS Group Symbol	Material Description	Moisture Content (%)	Pocket Penetrometer (Tons/ft ²)	Field Vane Shear (psf)	Other Tests And Notes	DEPTH IN FEET
0					SM	Dark brown forest duff (very soft, moist)					0
					SM	Light brown silty fine to medium sand with occasional fine to coarse gravel and roots (loose to medium dense, moist)					
					SM	Light brownish gray silty fine to medium sand with occasional fine to coarse gravel (medium dense, moist)					
					SM	Gray silty fine to medium sand with fine to coarse gravel and cobbles (medium dense, moist) (till)					
5						Refusal on gravel and cobbles at 5.0 feet Test pit completed at 5.0 feet on 04/17/00 No ground water seepage observed					5

Notes: The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF HAND AUGER HA-2

Date Excavated: 4/17/00 Logged by: BEB
 Equipment: _____ Surface Elevation (ft): _____

DEPTH IN FEET	Sample No.	Blows per foot	Sample	Graphic Log	USCS Group Symbol	Material Description	Moisture Content (%)	Pocket Penetrometer (Tons/ft ²)	Field Vane Shear (psf)	Other Tests And Notes	DEPTH IN FEET
0					SM	Dark brown forest duff with rotten orange wood fragments (very soft, moist)					0
					SM	Light brown silty fine to medium sand with occasional gravel and fine roots (loose to medium dense, moist)					
					SM	Gray silty fine to medium sand with occasional gravel and cobbles (medium dense, moist) (till)					
5						Refusal on gravel and cobbles at 5.3 feet Test pit completed at 5.3 feet on 04/17/00 No ground water seepage observed					5

Notes: The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.



LOG OF HAND AUGER

FIGURE A-2

SELECTED LOGS 6643-001-03 SEE CORP. GBT 4/24/00 6643-001-03

Project Locust Crossing	Job Number 6643-001-03	Location Property Trail
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LOG OF HAND AUGER HA-3

Date Excavated: 4/17/00 Logged by: BEB
 Equipment: _____ Surface Elevation (ft): _____

DEPTH IN FEET	Sample No.	Blows per foot	Sample	Graphic Log	USCS Group Symbol	Material Description	Moisture Content (%)	Pocket Penetrometer (tons/ft ²)	Field Vane Shear (psf)	Other Tests And Notes	DEPTH IN FEET
0						Dark brown forest duff with roots (very soft, moist)					0
					SM	Light brown silty fine to medium sand with occasional fine gravel and cobbles (loose to medium dense, moist)					
					SM	Gray silty fine to medium sand with fine to coarse gravel and occasional cobbles (medium dense, moist) (till)					
5						Refusal on gravel and cobbles at 4.6 feet Test pit completed at 4.6 feet on 04/17/00 No ground water seepage observed					5

Notes: The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF HAND AUGER HA-4

Date Excavated: 4/17/00 Logged by: BEB
 Equipment: _____ Surface Elevation (ft): _____

DEPTH IN FEET	Sample No.	Blows per foot	Sample	Graphic Log	USCS Group Symbol	Material Description	Moisture Content (%)	Pocket Penetrometer (Tons/ft ²)	Field Vane Shear (psf)	Other Tests And Notes	DEPTH IN FEET
0						Dark brown forest duff with roots (very soft, moist)					0
					SM	Light brown silty fine to medium sand with occasional roots and gravel (loose to medium dense, moist)					
					ML	Gray silt with fine sand (medium stiff, moist)					
					SM	Gray silty fine to medium sand with fine gravel and cobbles (medium dense, moist) (till)					
5						Refusal on gravel and cobbles at 4.1 feet Test pit completed at 4.1 feet on 04/17/00 No ground water seepage observed					5

Notes: The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.



LOG OF HAND AUGER

FIGURE A-3

GEI TEST PIT LOGS 6643001.GPJ (SEI CORP.GDI 4/24/00 6643-001-03)

Project Locust Crossing	Job Number 6643-001-03	Location Property Trail
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LOG OF HAND AUGER HA-5

Date Excavated: 4/17/00 Logged by: BEB
 Equipment: _____ Surface Elevation (ft): _____

DEPTH IN FEET	Sample No.	Blows per foot	Sample	Graphic Log	USCS Group Symbol	Material Description	Moisture Content (%)	Pocket Penetrometer (Tons/ft ²)	Field Vane Shear (psf)	Other Tests And Notes	DEPTH IN FEET
0					OL	0.2 inches sod					0
					GM	Brown silty fine to coarse gravel with fine to coarse sand (loose to medium dense, moist) (fill)					
					SM	Gray and orange mottled silty sand with occasional fine to coarse gravel and cobbles (medium dense, moist) (weathered till)					
					SM	Gray silty fine to medium sand with fine to coarse gravel and cobbles (medium dense, moist) (till)					
5						Refusal on gravel at 4.1 feet Test pit completed at 4.1 feet on 04/17/00 Ground water observed at 1 inch below ground surface in adjacent hand hole excavated on 04/14/00					5

Notes: The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF HAND AUGER HA-6

Date Excavated: 4/17/00 Logged by: BEB
 Equipment: _____ Surface Elevation (ft): _____

DEPTH IN FEET	Sample No.	Blows per foot	Sample	Graphic Log	USCS Group Symbol	Material Description	Moisture Content (%)	Pocket Penetrometer (Tons/ft ²)	Field Vane Shear (psf)	Other Tests And Notes	DEPTH IN FEET
0					OL	0.2 feet sod					0
					SW-SM	Gray fine to coarse sand and fine to coarse gravel with silt and occasional cobbles (medium dense, moist to wet) (fill)					
					SM	Brown silty fine to medium sand with fine to coarse gravel and occasional cobbles (medium dense to dense, moist)					
5						Refusal on gravel and cobbles at 4.1 feet Test pit completed at 4.1 feet on 04/17/00 No ground water seepage observed					5

Notes: The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.



LOG OF HAND AUGER

FIGURE A-4

GEL TEST PIT LOGS 6643001.GPJ GEL CORP.GDT 4/24/00 6643-001-03

Project Locust Crossing	Job Number 6643-001-03	Location Property Trail
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LOG OF HAND AUGER HA-7

Date Excavated: 4/17/00 Logged by: BEB
 Equipment: _____ Surface Elevation (ft): _____

DEPTH IN FEET	Sample No.	Blows per foot	Sample	Graphic Log	USCS Group Symbol	Material Description	Moisture Content (%)	Pocket Penetrometer (Tons/ft ²)	Field Vane Shear (psf)	Other Tests And Notes	DEPTH IN FEET
0					OH	0.2 feet sod					
					SM	Brownish gray silty fine to coarse sand with fine to coarse gravel and occasional wood fragments (medium dense, moist to wet) (fill)					
					PT	Brown non-fibrous peat with occasional fine sand layers (soft, wet)					
5					SP-SM	Light gray fine to medium sand with silt (medium dense, wet)					5
						Refused on gravel at 6.3 feet Test pit completed at 6.3 feet on 04/17/00 Moderate ground water seepage observed at 2.4 feet and below					

Notes: The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.



LOG OF HAND AUGER

FIGURE A-5

GEI TEST PIT LOGS 6643001.GPJ GEI CORP GDT 4/24/00 6643-001-03

Project Locust Crossing	Job Number 6643-001-03	Location Property Trail
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LOG OF TEST PIT TP-7

Date Excavated: 5/15/98 Logged by: REC
 Equipment: Trackhoe Surface Elevation (ft): Not Determined

DEPTH IN FEET	Sample No.	Blows per foot	Sample	Graphic Log	USCS Group Symbol	Material Description	Moisture Content (%)	Pocket Penetrometer (tons/ft)	Field Vane Shear (psf)	Other Tests And Notes	DEPTH IN FEET
0					SP-SM	Forest duff and root zone					0
					SP-SM	Reddish brown fine to medium sand with silt and gravel (medium dense, moist) (weathered glacial till)					
					SP-SM	Gray fine to coarse sand with silt, gravel and cobbles (dense to very dense, moist) (glacial till)					
5	1		☒								5
						Test pit completed at 7.0 feet on 05/15/98 No ground water seepage observed					
10											10
15											15

Notes: The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF TEST PIT TP-8

Date Excavated: 5/15/98 Logged by: REC
 Equipment: Trackhoe Surface Elevation (ft): Not Determined

DEPTH IN FEET	Sample No.	Blows per foot	Sample	Graphic Log	USCS Group Symbol	Material Description	Moisture Content (%)	Pocket Penetrometer (tons/ft)	Field Vane Shear (psf)	Other Tests And Notes	DEPTH IN FEET
0					SP-SM	Forest duff and root zone					0
					SP-SM	Reddish brown fine to medium sand with silt and gravel (medium dense, moist) (weathered glacial till)					
					SP-SM	Gray fine to coarse sand with silt, gravel and cobbles (dense to very dense, moist) (glacial till)					
5						Test pit completed at 5.0 feet on 05/15/98 No ground water seepage observed					5
10											10
15											15

Notes: The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.



LOG OF TEST PIT

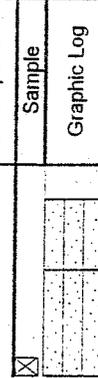
FIGURE A-6

G:\TEST PIT LOGS\6643001.GPJ GEI CORP.GDT 4/24/00 6643-001-03

Project Locust Crossing	Job Number 6643-001-03	Location Property Trail
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LOG OF TEST PIT TP- 9

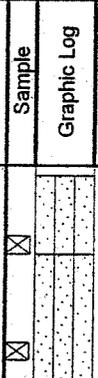
Date Excavated: 5/15/98 Logged by: REC
 Equipment: Trackhoe Surface Elevation (ft): Not Determined

DEPTH IN FEET	Sample No.	Blows per foot	Sample	Graphic Log	USCS Group Symbol	Material Description	Moisture Content (%)	Pocket Penetrometer (Tons/ft ²)	Field Vane Shear (psf)	Other Tests And Notes	DEPTH IN FEET
0						Forest duff and root zone					0
					SM	Reddish brown silty fine to medium sand with trace of gravel and roots (medium dense, moist) (weathered glacial till)					
					SM	Gray fine to medium sand with coarse sand and gravel (dense to very dense, moist) (glacial till)					
5	1		⊗								5
						Test pit completed at 6.0 feet on 05/15/98 No ground water seepage observed					
10											10
15											15

Notes: The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF TEST PIT TP-10

Date Excavated: 5/15/98 Logged by: REC
 Equipment: Trackhoe Surface Elevation (ft): Not Determined

DEPTH IN FEET	Sample No.	Blows per foot	Sample	Graphic Log	USCS Group Symbol	Material Description	Moisture Content (%)	Pocket Penetrometer (Tons/ft ²)	Field Vane Shear (psf)	Other Tests And Notes	DEPTH IN FEET
0						Forest duff and root zone					0
					SM	Reddish brown silty fine to medium sand with trace of gravel (loose to medium dense, moist) (weathered glacial till)					
					SM	Gray silty fine to coarse sand with gravel (dense, moist) (glacial till)					
5	2		⊗								5
					SP	Gray fine to medium sand with coarse sand, trace of silt and occasional gravel (dense to very dense, moist) (glacial till)					
						Test pit completed at 10.0 feet on 05/15/98 No ground water seepage observed					
10											10
15											15

Notes: The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.



LOG OF TEST PIT

FIGURE A-7

GEI TEST PIT LOGS 6643001.GPJ GEI CORP.GDT 4/24/00 6643-001-03

Project Locust Crossing	Job Number 6643-001-03	Location Property Trail
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LOG OF TEST PIT TP-11

Date Excavated: 5/15/98 Logged by: REC
 Equipment: Trackhoe Surface Elevation (ft): Not Determined

DEPTH IN FEET	Sample No.	Blows per foot	Sample	Graphic Log	USCS Group Symbol	Material Description	Moisture Content (%)	Pocket Penetrometer (Tons/ft ²)	Field Vane Shear (psf)	Other Tests And Notes	DEPTH IN FEET
0					SM	Forest duff and root zone					0
					SM	Reddish brown silty fine to medium sand with gravel (loose to medium dense, moist) (weathered glacial till)					
					SM	Gray silty fine to medium sand with coarse sand and gravel (very dense, moist) (glacial till)					
5	1		☒								5
						Test pit completed at 6.5 feet on 05/15/98 No ground water seepage observed					
10											10
15											15

Notes: The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

LOG OF TEST PIT TP-12

Date Excavated: 5/15/98 Logged by: REC
 Equipment: Trackhoe Surface Elevation (ft): Not Determined

DEPTH IN FEET	Sample No.	Blows per foot	Sample	Graphic Log	USCS Group Symbol	Material Description	Moisture Content (%)	Pocket Penetrometer (Tons/ft ²)	Field Vane Shear (psf)	Other Tests And Notes	DEPTH IN FEET
0					SM	Forest duff and root zone					0
					SM	Light brown silty fine to medium sand with trace of gravel (loose to medium dense, moist) (weathered glacial till)					
					SM	Gray silty fine to coarse sand with some gravel (dense to very dense, moist) (glacial till)					
5	1		☒								5
						Test pit completed at 12.0 feet on 05/15/98 No ground water seepage observed					
10											10
15											15

Notes: The depths of the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.



LOG OF TEST PIT

FIGURE A-8

GEL TEST PIT LOGS 6643001.GPJ_GEL CORP.GDT 4/24/00 6643-001-03