

**FOUNDATION AND SOILS** || Engineering, Inc.

April 11, 1994  
 Commission No. 1585-02-01-03

Springfield Sixth Filing Joint Venture  
 213 Smokey Street  
 Fort Collins, Colorado 80525

RE: Pavement Recommendations for Fox Hills P.U.D., Larimer County, Colorado

*2nd Filing*

Gentlemen:

Enclosed are the results of our investigation and recommendations for the roadways to be constructed in and for Fox Hills P.U.D., Larimer County, Colorado. These recommendations are based on software using the 1993 AASHTO "Guide for the Design of Pavement Structures".

Test results conducted by A.G. Wassenaar in Denver, Colorado indicate R-values of 7. The DTN's were provided by Larimer County.

R-values of subgrade soils = 7 ( $M_R = 3775$ )  
 Design Life = 20 years  
 Standard Deviation = 0.44  
 Structural Coefficients  
     Asphalt (HBP) = 0.44  
     Plant Mix Bituminous Base (PMBB) = 0.34  
     Aggregate Base Course (ABC) = 0.11  
     Select Subbase (SSB) = 0.10

All Interior Roadways (including Luther Lane)  
 (DTN = 5, 18k ESAL = 36,500, psi = 2.5, Reliability Factor = 70%, Design Structural Number = 2.04)

	<u>Option 1</u>	<u>Option 2</u>
HBP	3"	5"
ABC	6-1/2"	--
TOTALS	9-1/2"	5"

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County Road No. 38E

(DTN = 200, 18k ESAL = 1,460,000, psi = 2.0, Reliability Factor = 85%, Design Structural Number = 3.98)

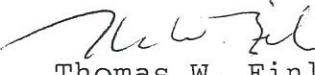
	<u>Option 1</u>	<u>Option 2</u>	<u>Option 3</u>
HBP	4"	6"	9-1/2"
ABC	6"	6"	--
SSB*	16"	7"	--
TOTALS	26"	19"	9-1/2"

\* NOTE: Existing and future embankment fill could be considered all or a portion of the Select Subbase (SSB). Further testing could be conducted as the subgrade is opened or as future borrow materials are selected. The tests will be needed to verify the materials for use as Select Subbase.

The top three (3) inches of the Hot Bituminous Pavement (HBP) shall meet Grading C (SC Type 2) or CX (SC Type 1) or equivalent of CDOT Standards. The remaining HBP shall meet Grading G of CDOT Standards. All Aggregate Base Course (ABC) shall meet Class 5 or 6 of CDOT Standards and be compacted to at least 95% or Standard Proctor. All select subbase (SSB) shall meet Class 1 of CDOT Standards or equivalent. The subgrade shall be stripped of vegetation and topsoil, scarified to a depth of six (6) inches, and recompacted to at least 95% or standard Proctor at plus or minus two percent ( $\pm 2\%$ ) of optimum moisture content. Additional stabilization of the subgrade may be required. Stabilization techniques such as lime, fly ash, cement or fabric can be recommended at a later date, if needed.

If you have any questions, please feel free to call.

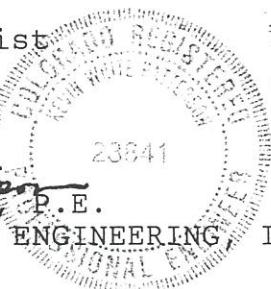
Respectfully,

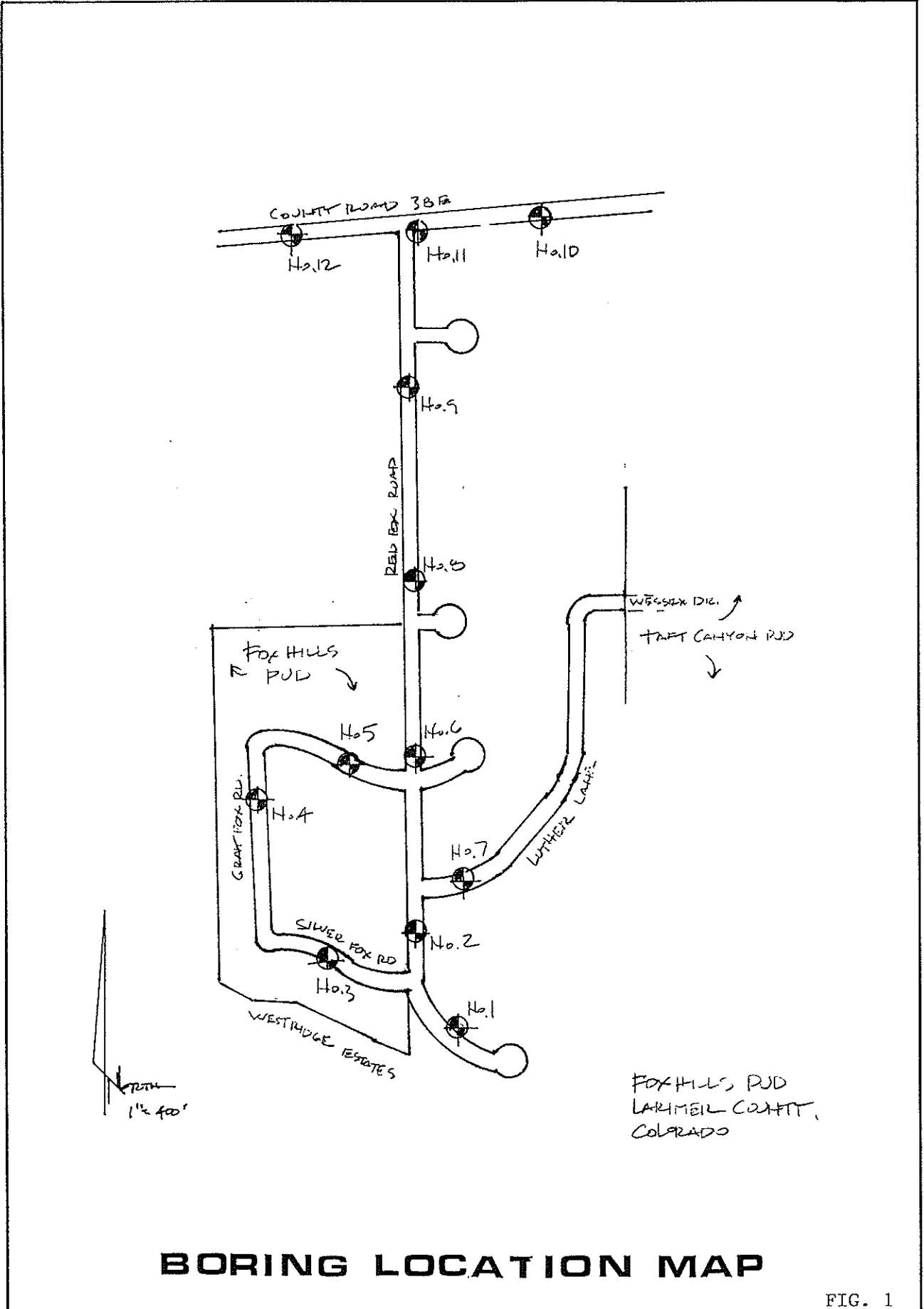
  
Thomas W. Finley,  
Engineering Geologist

Reviewed by:

  
Kevin W. Patterson, P.E.  
FOUNDATION & SOILS ENGINEERING, INC.

TWF/jlb

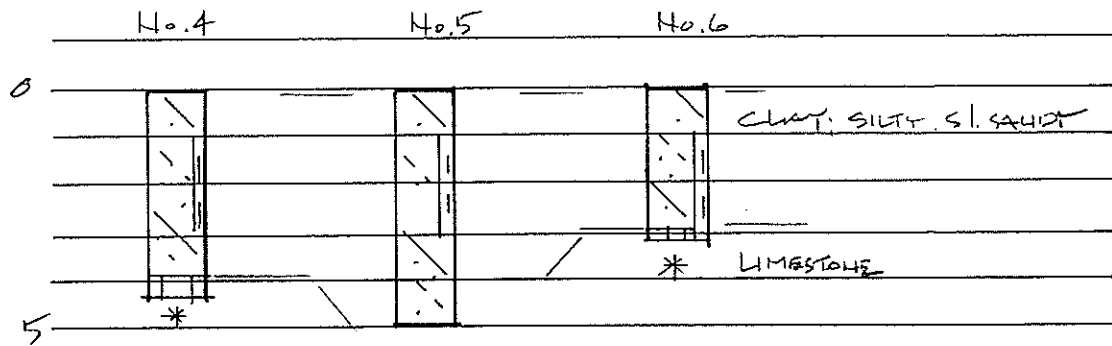
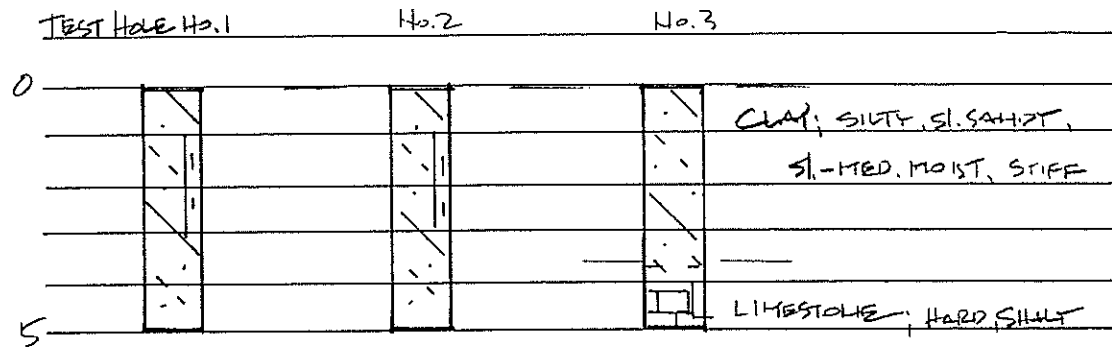




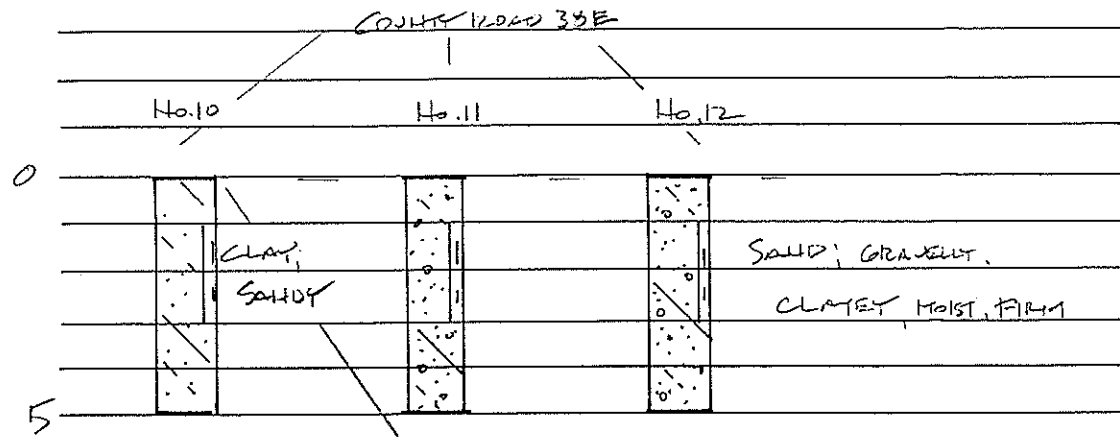
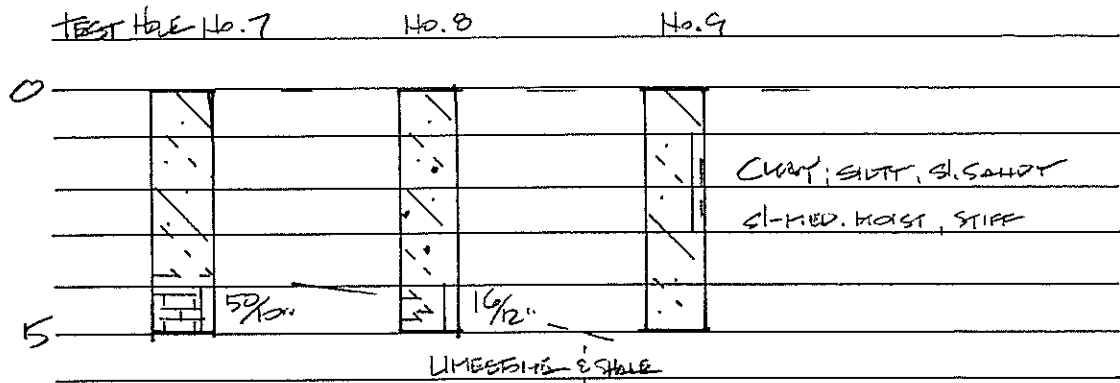
# BORING LOCATION MAP

FIG. 1

# BORING LOGS



# BORING LOGS



# FOUNDATION ENGINEERING

## SUMMARY OF LABORATORY TEST RESULTS

Date: April 11, 1994  
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Sample Location		Natural Moisture Content (%)	Natural Dry Density (PCF)	Gradation		Percent Passing No. 200 Sieve	Atterberg Limits		Unconfined Compressive Strength * (PSF)	Standard Penetration Blows/Ft.	Soil or Bedrock Type	AASHTO Classif.
Hole	Depth (Feet)			Gravel (%)	Sand (%)		Liquid Limit	Plasticity Index				
1	1-3	11.5									Sandy clay	
2	1-3	9.5									Sandy clay	
3	1-3	12.5									Clay with shale	
3	4-5	---								50/7	Limestone	
4	1-3	13.4		17	35	48	37	16		---		A-6(4)
5	1-3	18.5									Clay w/Limestone	
6	1-3	11.2		12	44	44	30	9			Sandy clay	A-4(1)
7	1-3	6.4								50/10	Limestone	
8				R = 7						16/12		
10	1-3	13.9		30	43	27	NP	NP			Clayey sand	A-2-4(0)
11	1-3	10.9									Clayey sand	
12	1-3	13.2									Clayey sand	

\*Based on Pocket Penetrometer

FIG. 4