

T235 R34
Sec 35D

5123

Memorandum

UTAH DEPARTMENT OF TRANSPORTATION

NO GW

DATE: June 2, 1986

T235
R34

TO: P.K. Monson, P.E., District Three Preconstruction Engineer

192920 Sec
Line

FROM: Heber Vlam, P.E., Engineer of Materials & Research H.V.

1935

SUBJECT: I-70-1(23)36, South Richfield to North Richfield;
Collapsible Soil Study Near W.B. I-70
Stations 1908+00 to 1922+00

1935
34' Saw

This office was requested by District No. 3 to assess the impact of impounding Dairy Canyon runoff water in a proposed detention reservoir near Sta. 1912+00 W.B. I-70. Collapsible soils have been encountered at other locations on this project (see memo. dated 2-24-86), and were suspected at this site. A collapsible soil is a soil that shows a sudden and dramatic volume decrease when saturated with water.

mmmm

Seven test holes were drilled along the I-70 alignment next to the site of the proposed detention reservoir. These holes ranged from 30 feet to 37 feet deep and correlation between test holes is good. In general, the subsoils may be described as follows: from the ground surface to the maximum depth of exploration - alternating lenses of sandy silt and silty sand with some gravel, cobbles, boulders and clay. See Fig. 1 - A & B, Log of Borings for more detailed descriptions and test hole locations.

Laboratory testing of samples taken reveals that there are collapsible soils in all seven test holes. The soils that showed collapse generally ranged from 4 feet to 31 feet in depth.

Using laboratory test results we calculate that leakage from Dairy Canyon detention basin could cause hydrocompaction of soils under the nearby I-70 embankment and result in settlement of approximately 40 inches.

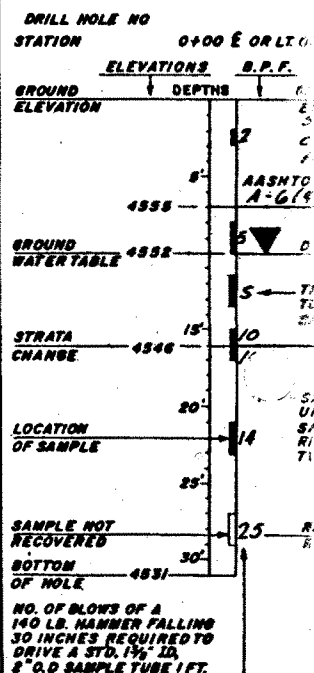
Even with a leak resistant design this reservoir could leak enough water to cause significant damage to the I-70 embankment and surfacing. We therefore recommend against placing any water retaining earth structure within 500 feet of the I-70 embankment.

In the event the Dairy Canyon detention basin cannot be eliminated or moved, we recommend flooding the I-70 right of way at this site. This should precollapse and stabilize the subsoils. The area between Sta. 1908+70 W.B. (1910+70 E.B.L.) and 1917+90 W.B.L. (1919+00 E.B.L.) should be temporarily diked off and kept covered with a minimum of 2 feet of water. The dikes should extend as close to the right of way limits as possible. The flooding should continue for a minimum of 180 days and then should be stopped only if tests show that the hydrocompaction process is complete and there is no more evidence of ground subsidence.

KEY TO DRILLING
RELATIVE DENSITY (NON-PLASTIC)
 VERY LOOSE - LESS THAN 4 B.L.
 LOOSE - 4 TO 10 B.L.
 MEDIUM - 10 TO 30 B.L.
 DENSE - 30 TO 50 B.L.
 VERY DENSE - MORE THAN 50 B.L.

CONSISTENCY (PLASTIC-SILT)
 VERY SOFT - LESS THAN 2 B.L.
 SOFT - 2 TO 4 B.L.
 MEDIUM - 4 TO 8 B.L.
 STIFF - 8 TO 15 B.L.
 VERY STIFF - 15 TO 30 B.L.
 HARD - MORE THAN 30 B.L.

	TOPSOIL OR FILL		IGNEOUS
	GRAVEL		LIMESTONE
	SAND		CONGLOMERATE
	SILT		DOLOMITE
	CLAY		SANDSTONE
	SHALE		SILTSTONE



ABBREVIATIONS
 L.L. - LIQUID LIMIT
 P.I. - PLASTIC INDEX
 N. - NATURAL MOISTURE
 Ref. - REFUSAL ≥ 50
 PEN. - PENETRATION
 G.W.T. - GROUND WATER TABLE
 B.P.F. - BLOWS PER FOOT
 N.P. - NON PLASTIC
 AASHTO - SOIL CLASS.

Ground Line
 A-2-4 --NP-9

silt with some sand and gravel
 A-4(4) 25-8-12
 sampler

A-4(1) --NP-8
 sampler

A-4(1) 23-4-7
 sampler

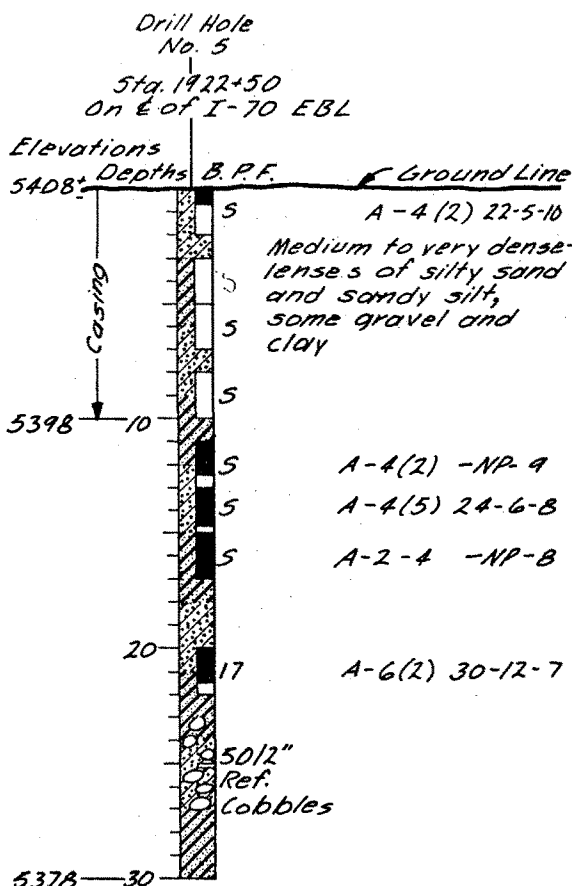
A-4(4) --NP-3
 sampler

(Cobble)
 sampler

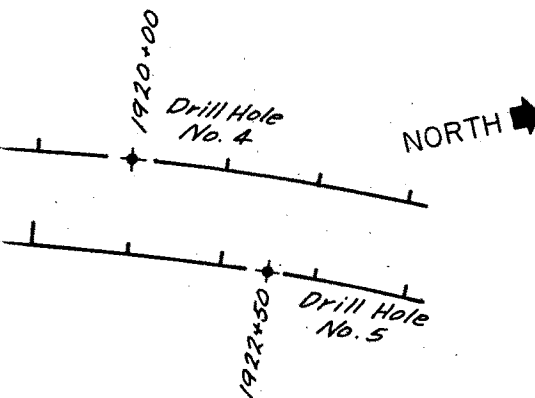
A-4(2) --NP-7
 sampler

sampler

silt with a lot of gravel



NOTE: Blows per foot on the Calif. Sampler should not be used with the charts given in the key which are for use with the Standard Penetration Test.



NOTE: A ground water table was not encountered in any of these holes.

Date Drilled: March & April 1986

NOTE: The water table depths shown on the drill logs represent hole conditions on the date shown, either with casing still in place or with perforated plastic pipe installed. It should be noted however, that other locations away from the test holes or at other times of the year the water table elevation may vary significantly.

NO.	BY	DATE
REVISIONS		

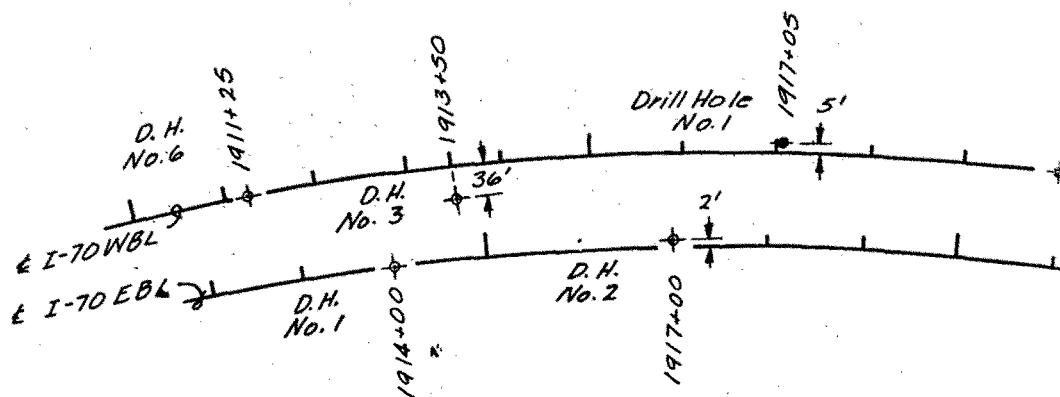
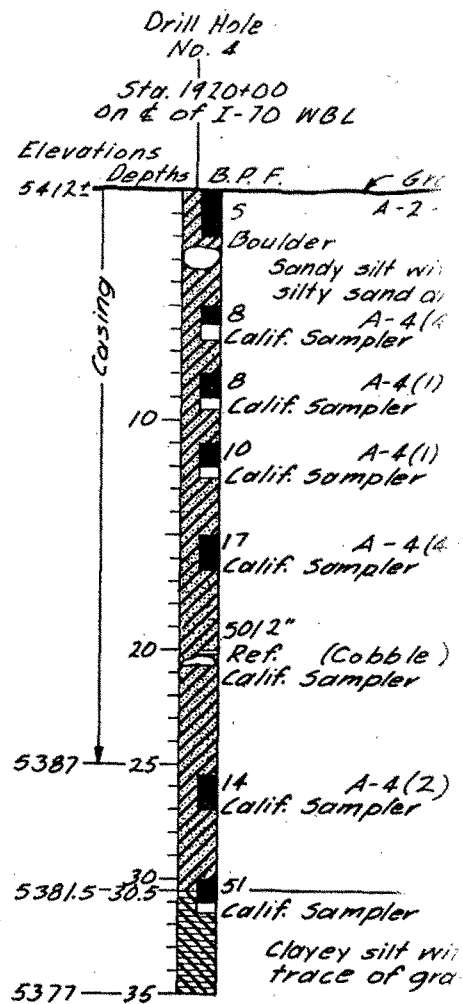
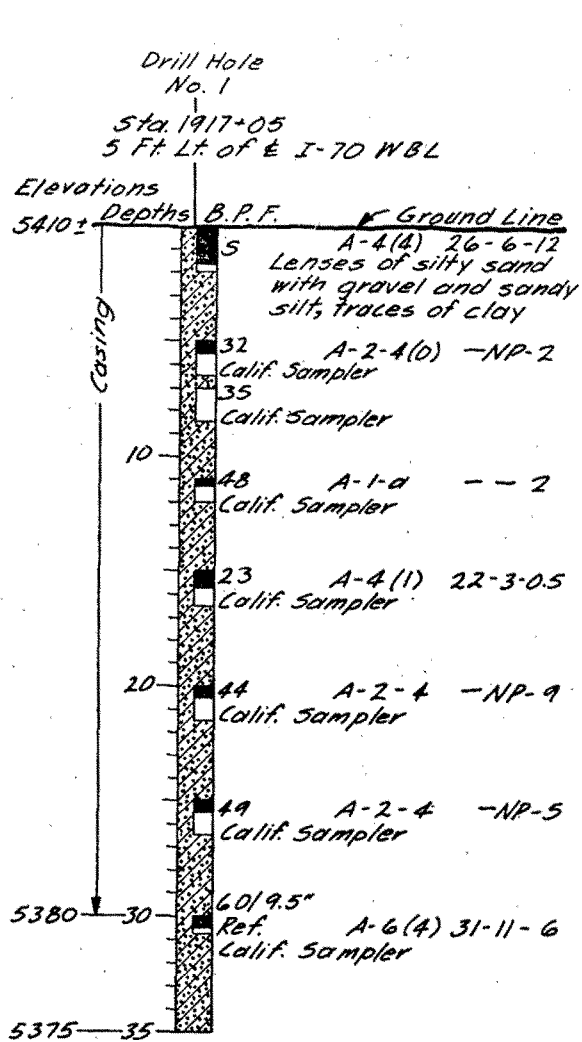
UTAH STATE DEPARTMENT OF TRANSPORTATION
 SALT LAKE CITY, UTAH

MATERIALS and RESEARCH

SOUTH RICHFIELD TO NORTH RICHFIELD
 COLLAPSIBLE SOILS STUDY

Drawn By: *R. Sizemore* Checked By: *R. Sizemore*
 Checked By: *M. Basha* Checked By: *M. Basha*
 Approved Recommended By: *Lynn H. Krush*
 Received: _____ Date: _____ Chief Structural Engineer

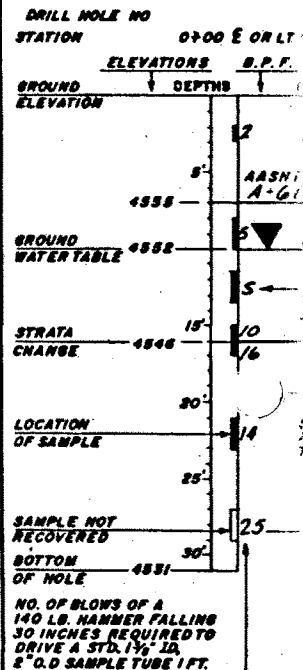
85-7-FS-56
 Foundations File No. _____



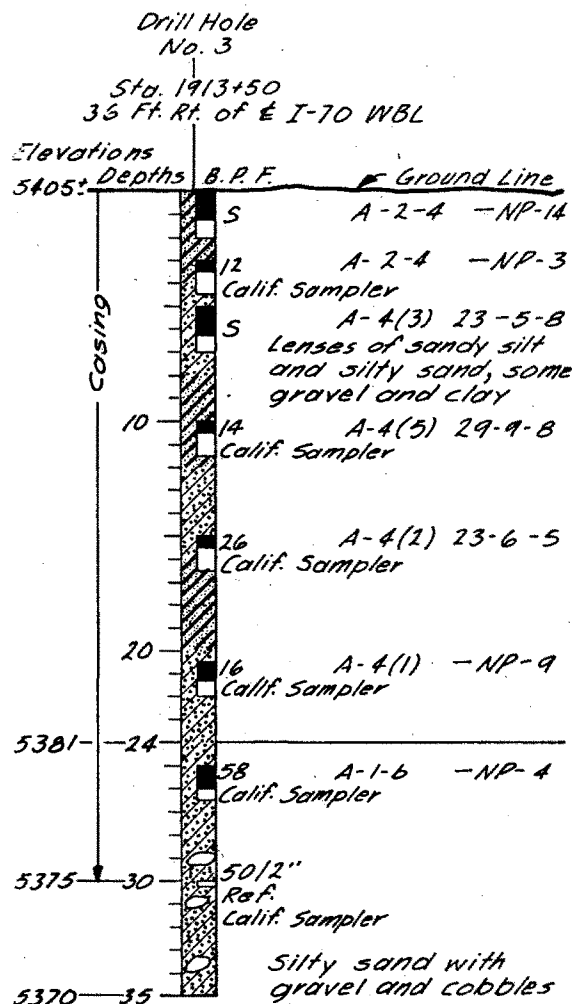
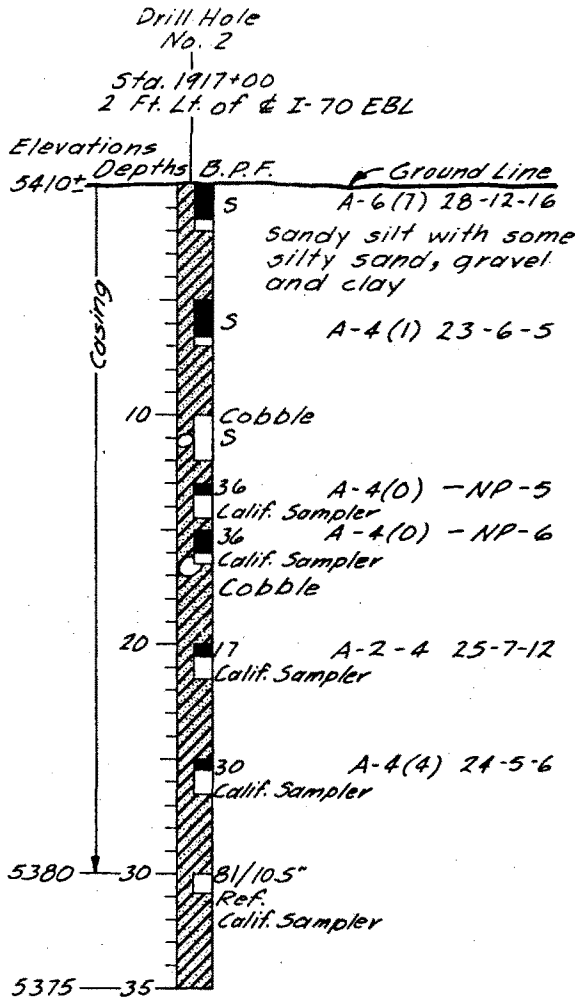
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- | | |
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UTAH STATE DEPARTMENT OF MATERIALS and RESEARCH
 SALT LAKE CITY, UTAH
 SOUTH RICHFIELD TO KANAB
 COLLAPSIBLE SOILS

Drawn By KISTLER Checked By
 Checked By P. STEPHENS Checked By
 Checked By AL. BASHA Checked By
 Approved Recommended By
 Received Date Chief Structural
 Foundations File No. 85-7-FS-56 Org. No.

