

Memorandum

UTAH DEPARTMENT OF TRANSPORTATION

DATE: March 6, 1978

TO: Those Listed Below

FROM: Edwin E. Lovelace, Engineer of Materials and Research *EEL*SUBJECT: RS-0531(1) - Cache Junction towards Newton
Foundation Report - U.P.R.R. over U-23 - Station 367+89.80

SITE CONDITIONS

A single span, steel beam structure 138 feet long and 33 feet wide is proposed at this site. The structure will cross over U-23 at an angle of 56°. The structure abutments will be in natural ground.

Drainage in the general area is good.

SUBSOIL EXPLORATION

Two test holes were drilled to depths of 110 feet and 120 feet. Correlation between the two drill holes is good with only minor depositional variations and in general the subsoils are: from the ground surface to depths between 3.5 feet and 7 feet -- loose sandy silt and gravel with some clay; from these depths to depths between 64 feet and 79 feet -- medium to stiff silty clay with sandy silt lenses; from these depths to depths between 83 feet and 97 feet -- very dense sand, gravel and silt with clayey silt and sandy silt lenses; from these depths to the extent of exploration -- medium to very stiff silty clay with lenses of sandy silt. The ground water table was observed between depths of 21 feet and 24.5 feet. Refer to the Drilling Log, Figure 1, for further details.

FOUNDATION RECOMMENDATIONS

One foot diameter steel pipe piles are recommended for support of this structure. The recommended load capacity for piles founded in the very dense sand and gravel layer is 80 tons. The recommended pile tip elevation for this structure is 4364', approximately 87 feet below the natural ground surface. Piles should not be driven below 4360 feet.

These capacities are based on skin friction and point bearing with a safety factor of two. A wave equation analysis of pile driving or a suitable dynamic pile driving formula should be used to check pile capacities in the field as the recommended depth is reached.

Pile settlement should be less than one inch at the abutments and bents.

UTAH STATE DEPARTMENT OF HIGHWAYS

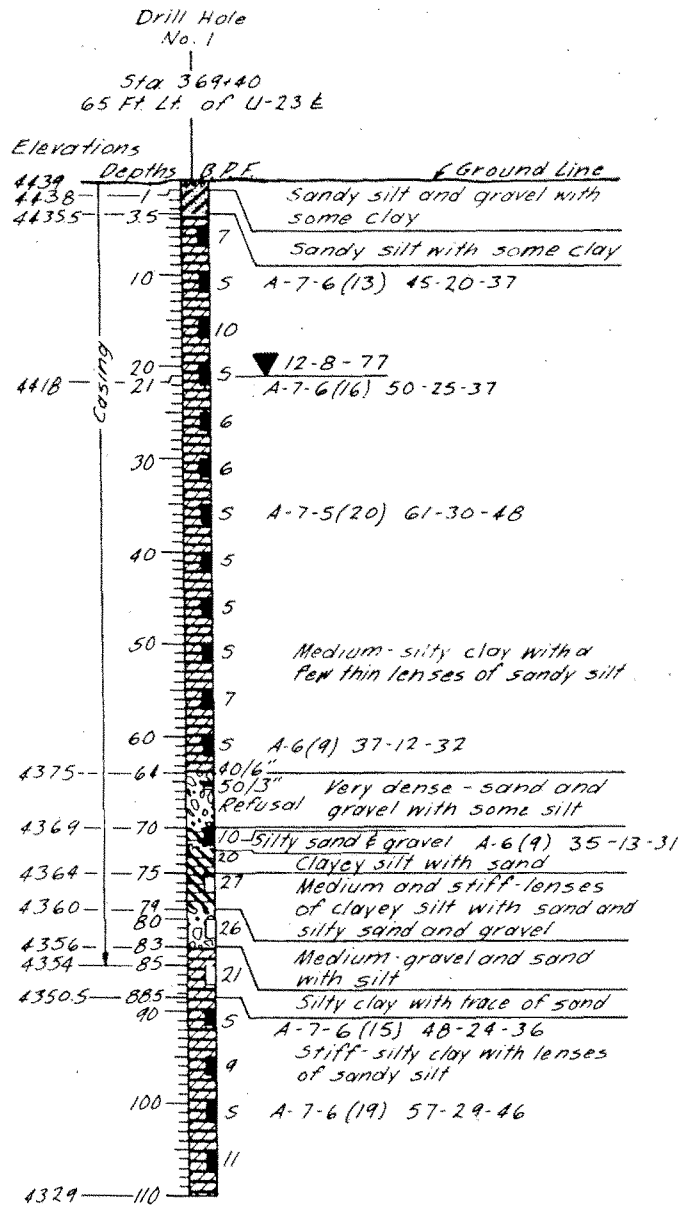
MATERIALS AND RESEARCH

Project Name Cache Jct. towards Newton
 Project No. RS-0531(1)
U.P.R.R. over SR 23

Summary of Test Data

Sheet 1 of 1 Sheets

Boring No.	Depth	Grading Analysis				Group Classification	Atterberg Limits		Water Cont. w %	Wet Unit Weight γ P.C.F.	Dry Unit Weight γ_s P.C.F.	Specific Gravity Gs	Permeability k 10^{-4} cm/sec.		Unconfined Strength q_u T.S.F.	Shear Strength					
		Percent					Liquid Limit w_L	Plastic Limit w_p					Unconsolidated			Consolidated					
		Gravel	Coarse Sand	Fine Sand	Silt and Clay								ϕ°	C T.S.F.		ϕ°	C T.S.F.	Time hrs.	Press P.S.I.		
1	12	0	0	3	97	A-7-6(13)	45	25	37	113								29	0.4		
1	22	0	0	5	95	A-7-6(16)	50	25	37	114.5	83.6			2.77							
1	37	0	1	3	96	A-7-5(20)	61	31	47.8	107.5	72.7			1.56							
1	62	0	0	0	93	A-6(9)	37	25	31.9	117.3	88.9			1.03							
1	72	0	4	13	83	A-6(9)	35	22	31.3												
1	91.9	0	0	8	92	A-7-6(15)	48	24	36.1	112.6	82.7	2.672									
1	100	0	0	3	97	A-7-6(19)	57	28	45.9	108.9	74.3			2.63							
2	12	0	1	16	83	A-6(9)	37	13	28.0												
2	57	0	0	2	98	A-7-6(19)	55	22	41.7												
2	86-90.8	57	16	14	13	A-1-a	N.A.	N.P.	11.9												
2	107	0	0	0	84	A-7-6(12)	46	28	46.5												



Elevatic
4451

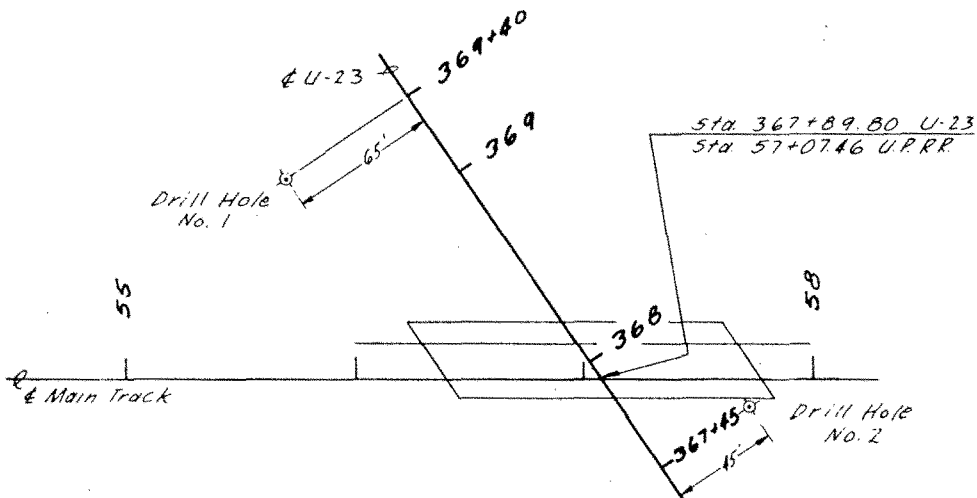
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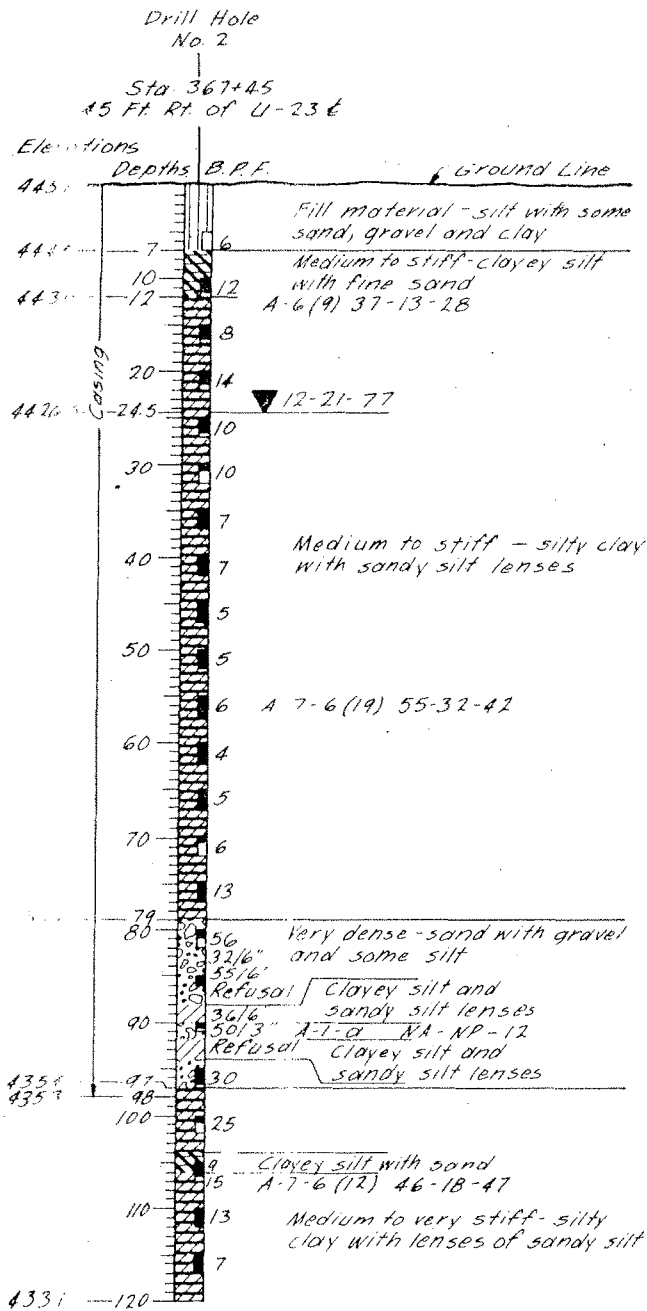
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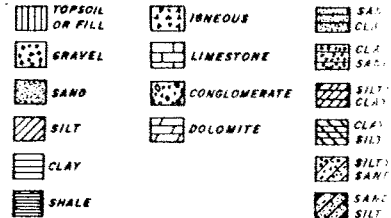
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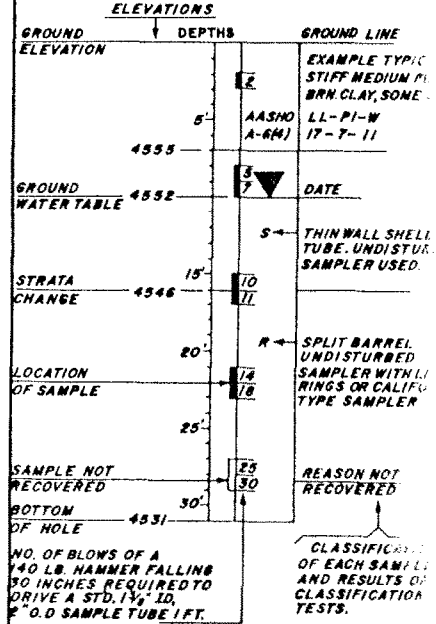


KEY TO DRILLING LOG
RELATIVE DENSITY (NON-PLASTIC SANDS)
VERY LOOSE - LESS THAN 4 BLOWS PER FOOT.
LOOSE - 4 TO 10 BLOWS PER FOOT.
MEDIUM - 10 TO 30 BLOWS PER FOOT.
DENSE - 30 TO 50 BLOWS PER FOOT.
VERY DENSE - MORE THAN 50 BLOWS PER FOOT.

CONSISTENCY (PLASTIC SILT & CLAY)
VERY SOFT - LESS THAN 2 BLOWS PER FOOT.
SOFT - 2 TO 4 BLOWS PER FOOT.
MEDIUM - 4 TO 8 BLOWS PER FOOT.
STIFF - 8 TO 15 BLOWS PER FOOT.
VERY STIFF - 15 TO 30 BLOWS PER FOOT.
HARD - MORE THAN 30 BLOWS PER FOOT.



DRILL HOLE NO. STATION 0+00 E OR LT. OR RT. IN FT. OF



ABBREVIATIONS
L.L. - LIQUID LIMIT IN %
P.I. - PLASTIC INDEX
W. - NATURAL MOISTURE CONTENT
W.G. - WELL GRADED
PEN. - PENETRATION
G.W.T. - GROUND WATER TABLE
B.P.F. - BLOWS PER FOOT.
N.P. - NON PLASTIC

UTAH STATE DEPARTMENT OF HIGHWAYS
SALT LAKE CITY, UTAH
MATERIALS AND TESTS DIVISION
CACHE JUNCTION TOWARDS NEWTON
U.P.R.R. OVER U-23

DRAWN BY <i>B.H. Miller</i>	CHECKED BY <i>Boyd Cassel</i>	RS-0531
CHECKED BY <i>G.L. Peterson</i>	CHECKED BY <i>John Hansen</i>	PROJECT NO.
CHECKED BY <i>Ed. Secac</i>	CHECKED BY <i>L.H. Reusser</i>	376 + 89
APPROVAL RECOMMENDED BY <i>Heber Viem</i>	DATE	STATION CACHE
RECEIVED	DATE	COUNTY

NO.	BY	DATE	REMARKS
REVISIONS			

Fig 1

AREA NUMBER 1174, LOCATION= 416650N, 4632500E UTM coordinates

BORING NUMBER 1
BORING DEPTH=110.25 ft. GROUND WATER DEPTH= 21.25 ft.

DEPTH (ft.)	CRITICAL ACCELERATION (a/g)	SOIL TYPE	N	N1	SILT CORRECTION
81.25	0.3049	GP	26.0	14.0	0.0

MINIMUM CRITICAL ACCELERATION FOR BORING= 0.3049

BORING NUMBER 2
BORING DEPTH=120.75 ft. GROUND WATER DEPTH= 24.50 ft.

DEPTH (ft.)	CRITICAL ACCELERATION (a/g)	SOIL TYPE	N	N1	SILT CORRECTION
96.75	0.2252	GP	30.0	14.6	0.0

MINIMUM CRITICAL ACCELERATION FOR BORING= 0.2252

MINIMUM CRITICAL ACCELERATION FOR AREA=~~0.2252~~