

ROLLINS, BROWN AND GUNNELL, INC.
PROFESSIONAL ENGINEERS

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OCTOBER 13, 1978

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GENTLEMEN:

IN ACCORDANCE WITH YOUR REQUEST, A SOILS INVESTIGATION HAS BEEN COMPLETED FOR A PROPOSED SITE OF A NEW HOSPITAL IN AMERICAN FORK, UTAH. WE UNDERSTAND THAT A FINAL SELECTION OF THE PROPOSED SITE HAS NOT BEEN MADE AND THAT THIS INVESTIGATION CONSTITUTES A PRELIMINARY STUDY TO DETERMINE THE LIKELY COSTS FOR SITE PREPARATION AND FOUNDATION DESIGN FOR A FACILITY AT THIS LOCATION; AND THAT IF THIS SITE IS FINALLY SELECTED FOR THE PROPOSED STRUCTURE, ADDITIONAL BORINGS WILL BE PERFORMED WHEN THE EXACT LOCATION HAS BEEN DETERMINED. THE LOCATION AND DEPTH OF BORINGS HAS BEEN SPECIFIED BY THE ARCHITECT, AND THE INVESTIGATION HAS BEEN COMPLETED IN A MANNER TO ACCOMPLISH THE BASIC OBJECTIVE.

THE DETAILS OF THE INVESTIGATION ALONG WITH THE PERTINENT RECOMMENDATIONS FOR FOUNDATION DESIGN AT THIS SITE ARE OUTLINED IN THE FOLLOWING SECTIONS OF THIS REPORT. THE INFORMATION CONTAINED IN THE REPORT IS DISCUSSED UNDER THE FOLLOWING HEADINGS: (1) EXISTING SITE CONDITIONS, (2) SUBSURFACE SOIL AND WATER CONDITIONS, (3) RECOMMENDED FOUNDATION TYPES AND BEARING CAPACITIES, (4) SITE PREPARATION AND COMPACTED FILL REQUIREMENTS AND (5) THE RESULTS OF FIELD AND LABORATORY TESTS.

1. EXISTING SITE CONDITIONS

THE PROPOSED SITE IS LOCATED IN THE VICINITY OF 500 EAST AND 500 SOUTH IN AMERICAN FORK, UTAH. THIS ADDRESS CORRESPONDS TO A LOCATION ON THE EASTERLY SIDE OF THE ACCESS ROAD TO THE FREEWAY ON THE SOUTH SIDE OF AMERICAN FORK AND IMMEDIATELY NORTH OF THE SAVAGE BROTHERS TRUCKING COMPANY FACILITY.

THE SUBSURFACE MATERIALS THROUGHOUT THIS AREA ARE LACUSTRINE DEPOSITS LAID DOWN DURING THE LAKE BONNEVILLE PERIOD. THE PROPOSED SITE HAS BEEN USED AS PASTURELAND FOR A NUMBER OF YEARS, AND THE VEGETATIVE COVER THROUGHOUT THE AREA CONSISTS OF A HEAVY STAND OF GRASS. THE TOPOGRAPHY OF THE SITE IS GENERALLY FLAT AND A SWAMP TRAVERSES THE SITE IN A NORTH-SOUTH DIRECTION.

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THE WATER TABLE THROUGHOUT THE AREA DURING PERIODS OF HIGH PRECIPITATION IS RELATIVELY CLOSE TO THE GROUND SURFACE IN THIS AREA AND AT SOME SEASONS OF THE YEAR, THE AREA IS DIFFICULT TO TRAVERSE WITH ANY TYPE OF VEHICLE. A LAYER OF SLAG SEVERAL FEET THICK HAS BEEN PLACED THROUGHOUT THE SITE WHERE THE SAVAGE BROTHERS TRUCKING COMPANY IS LOCATED IN ORDER TO PROVIDE THE NECESSARY STABILITY FOR THAT SITE. IT IS ANTICIPATED THAT SOME DRAINAGE WILL BE REQUIRED AT THIS LOCATION IN ORDER TO ELIMINATE THE PRESENT FLOW THROUGH THE SWAMP AREA.

NO MANMADE FILL EXISTS THROUGHOUT THE SITE AND ALL OF THE SUBSURFACE MATERIALS THROUGHOUT THIS AREA ARE NATURAL DEPOSITS.

OTHER THAN THE INFORMATION PROVIDED ABOVE, NO ENVIRONMENTAL FACTORS APPEAR TO EXIST AT THIS SITE WHICH WOULD ADVERSELY AFFECT FOUNDATION PERFORMANCE.

2. SUBSURFACE SOIL AND WATER CONDITIONS

THE CHARACTERISTICS OF THE SUBSURFACE MATERIAL THROUGHOUT THE PROPOSED SITE WERE DEFINED BY DRILLING 6 TEST BORINGS VARYING IN DEPTH FROM 16 TO 50 FEET AT LOCATIONS AS SHOWN IN FIGURE NO. 1. THE LOGS FOR THE 6 TEST BORINGS ARE PRESENTED IN FIGURES NO. 2 THROUGH NO. 5, AND IT WILL BE OBSERVED THAT THE SUBSURFACE PROFILE THROUGHOUT THE SITE GENERALLY CONSISTS OF A SURFACE LAYER OF COHESIVE MATERIAL VARYING IN THICKNESS FROM APPROXIMATELY 2 FEET IN TEST BORING NO. 1 TO 19 FEET IN TEST BORING NO. 3, UNDERLAIN BY A GRANULAR ZONE WHICH EXTENDED TO THE DEPTH AT WHICH THE BORINGS WERE TERMINATED AT THIS LOCATION. THE DEPTH OF THE COHESIVE ZONE IS THINNEST IN THE VICINITY OF TEST BORINGS NO. 1 AND NO. 2, WHICH ARE LOCATED ON THE EASTERLY SIDE OF THE INVESTIGATIVE AREA. THIS SUGGESTS PERHAPS THAT THE GRANULAR MATERIAL MAY BE RELATIVELY CLOSE TO THE GROUND SURFACE IN THE AREA IMMEDIATELY EAST OF THESE TWO BORINGS. THE COHESIVE ZONE IS RELATIVELY SOFT AT MANY LOCATIONS THROUGHOUT THE SOIL PROFILE, AND THIS MATERIAL IS NOT CAPABLE OF SUPPORTING HIGH LOAD INTENSITIES.

DURING THE SUBSURFACE INVESTIGATION, SAMPLING WAS PERFORMED AT 3-FOOT INTERVALS THROUGHOUT THE UPPER 15 FEET OF THE SOIL PROFILE AND AT 5-FOOT INTERVALS THEREAFTER. SAMPLES WERE OBTAINED BY DRIVING A 2-INCH SPLIT-SPOON SAMPLING TUBE THROUGH A DISTANCE OF 18 INCHES USING A 140-POUND WEIGHT DROPPED FROM A DISTANCE OF 30 INCHES. THE NUMBER OF BLOWS TO DRIVE THE SAMPLING SPOON THROUGH EACH 6 INCHES OF PENETRATION IS PRESENTED ON THE BORING LOGS. THE SUM OF THE LAST TWO BLOW COUNTS, WHICH REPRESENTS THE NUMBER OF BLOWS TO DRIVE THE SAMPLING SPOON THROUGH EACH 6 INCHES OF PENETRATION IS DEFINED AS THE STANDARD PENETRATION VALUE. THE STANDARD PENETRATION VALUE PROVIDES A REASONABLE INDICATION OF THE IN-PLACE DENSITY OF SANDY-TYPE SOILS; HOWEVER ESTIMATING THE IN-PLACE DENSITY OF COHESIVE-TYPE

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SOILS AND GRAVELLY SOILS FROM STANDARD PENETRATION DATA WOULD NEED TO BE ACCOMPLISHED WITH SOME CARE. IN COHESIVE-TYPE SOILS, THE PENETRATION RESISTANCE IS A FUNCTION OF THE MOISTURE CONTENT AND WHILE THE STANDARD PENETRATION VALUE PROVIDES AN INDICATION OF THE RELATIVE STIFFNESS OF THESE MATERIALS IT DOES NOT PROVIDE A GOOD INDICATION OF THE IN-PLACE DENSITY OF THESE MATERIALS. IN GRAVELLY-TYPE SOILS WHERE THE PARTICLE SIZES ARE CONSIDERABLY GREATER THAN THE INSIDE DIAMETER OF THE SPLIT-SPOON SAMPLING TUBE, A LARGE PARTICLE FREQUENTLY LODGES BENEATH THE END OF THE SAMPLING SPOON WHICH RESTRICTS MOVEMENT OF THE SPOON AND PREVENTS THE RECOVERY OF ANY SAMPLES. THE STANDARD PENETRATION VALUE IS NOT A RELIABLE INDICATION OF THE IN-PLACE DENSITY OF THE GRANULAR MATERIAL UNDER THIS CONDITION.

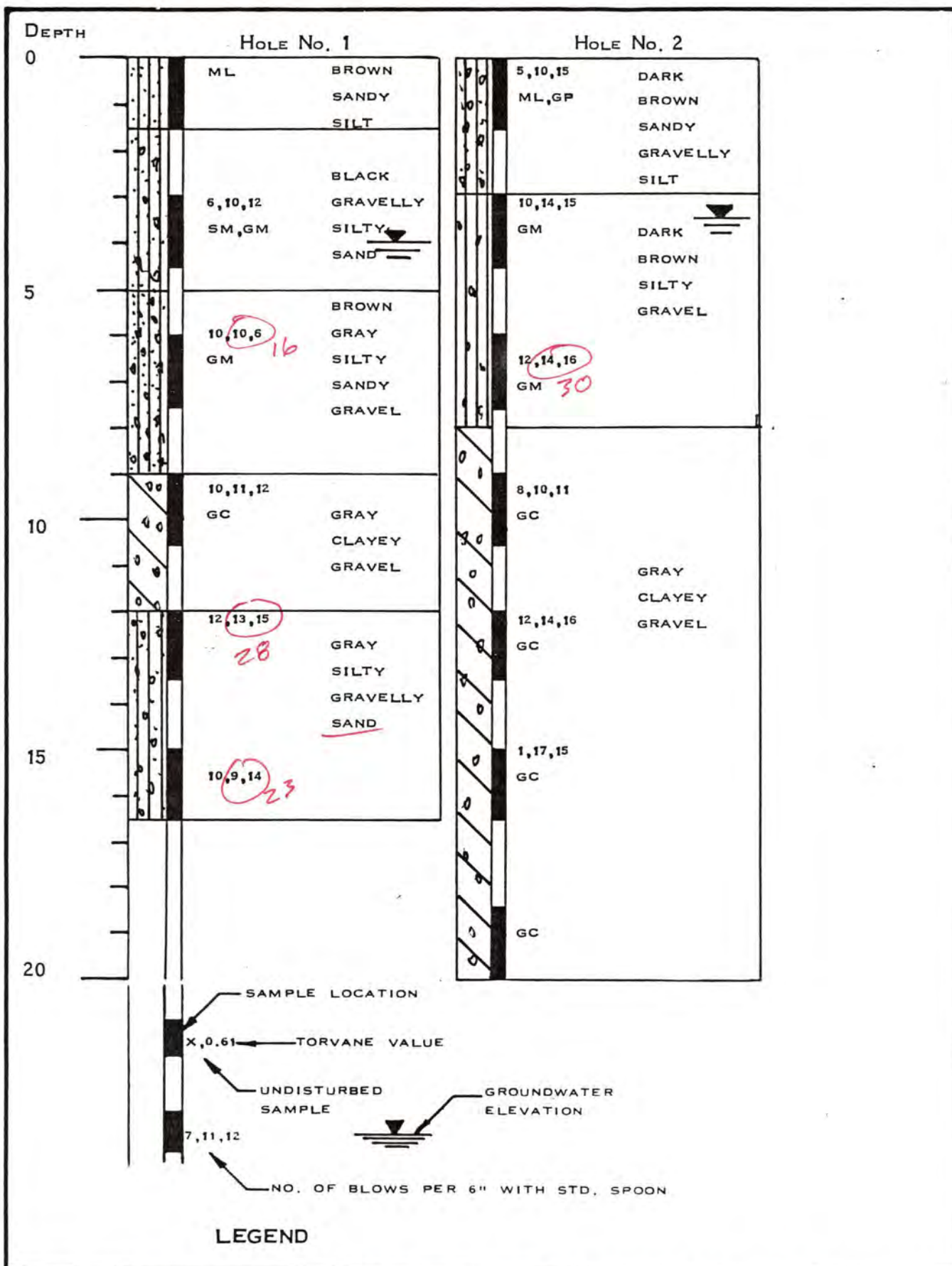
THE RESULTS OF BOTH FIELD AND LABORATORY TESTS INDICATE THAT THE SUBSURFACE CLAYS THROUGHOUT THE SITE VARY FROM A SOFT TO A MEDIUM STIFF CONDITION AND THAT THE GRANULAR MATERIAL IN THE LOWER PORTION OF THE SOIL PROFILE IS IN A MEDIUM DENSE STATE.

EACH SAMPLE OBTAINED IN THE FIELD WAS CLASSIFIED IN THE LABORATORY ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM. THE SYMBOL DESIGNATING THE SOIL TYPE ACCORDING TO THIS SYSTEM IS PRESENTED ON THE BORING LOGS. A DESCRIPTION OF THE UNIFIED SOIL CLASSIFICATION SYSTEM IS PRESENTED IN FIGURE NO. 6, AND THE FULL MEANING OF THE VARIOUS SYMBOLS CAN BE OBTAINED FROM THIS FIGURE. IT WILL BE NOTED THAT THE COHESIVE MATERIAL IN THE UPPER PORTION OF THE SOIL PROFILE IS LOW PLASTICITY CLAYS AND SILTS, AND GENERALLY CLASSIFIES AS CL-1 OR ML-TYPE MATERIALS. THE GRANULAR MATERIAL IN THE LOWER PORTION OF THE SOIL PROFILE IS GENERALLY A COARSE TO FINE SAND WITH SOME GRAVEL INTERMIXED WITH THE SAND AT SOME LOCATIONS THROUGHOUT THE PROFILE.

THE GROUNDWATER TABLE AT THE SITE WAS LOCATED AT A DEPTH OF APPROXIMATELY 4 FEET BELOW GROUND SURFACE DURING THE TIME AT WHICH THE BORINGS WERE PERFORMED. SINCE THE PAST SUMMER WAS RELATIVELY DRY, IT CAN BE ANTICIPATED THAT THE GROUNDWATER LEVEL AT THIS LOCATION WILL EXIST AT A HIGHER ELEVATION THAN WAS ENCOUNTERED DURING THIS INVESTIGATION AT SOME TIME IN THE FUTURE WHEN THE PRECIPITATION THROUGHOUT THE AREA IS HEAVY.

3. RECOMMENDED FOUNDATION TYPES AND BEARING CAPACITIES

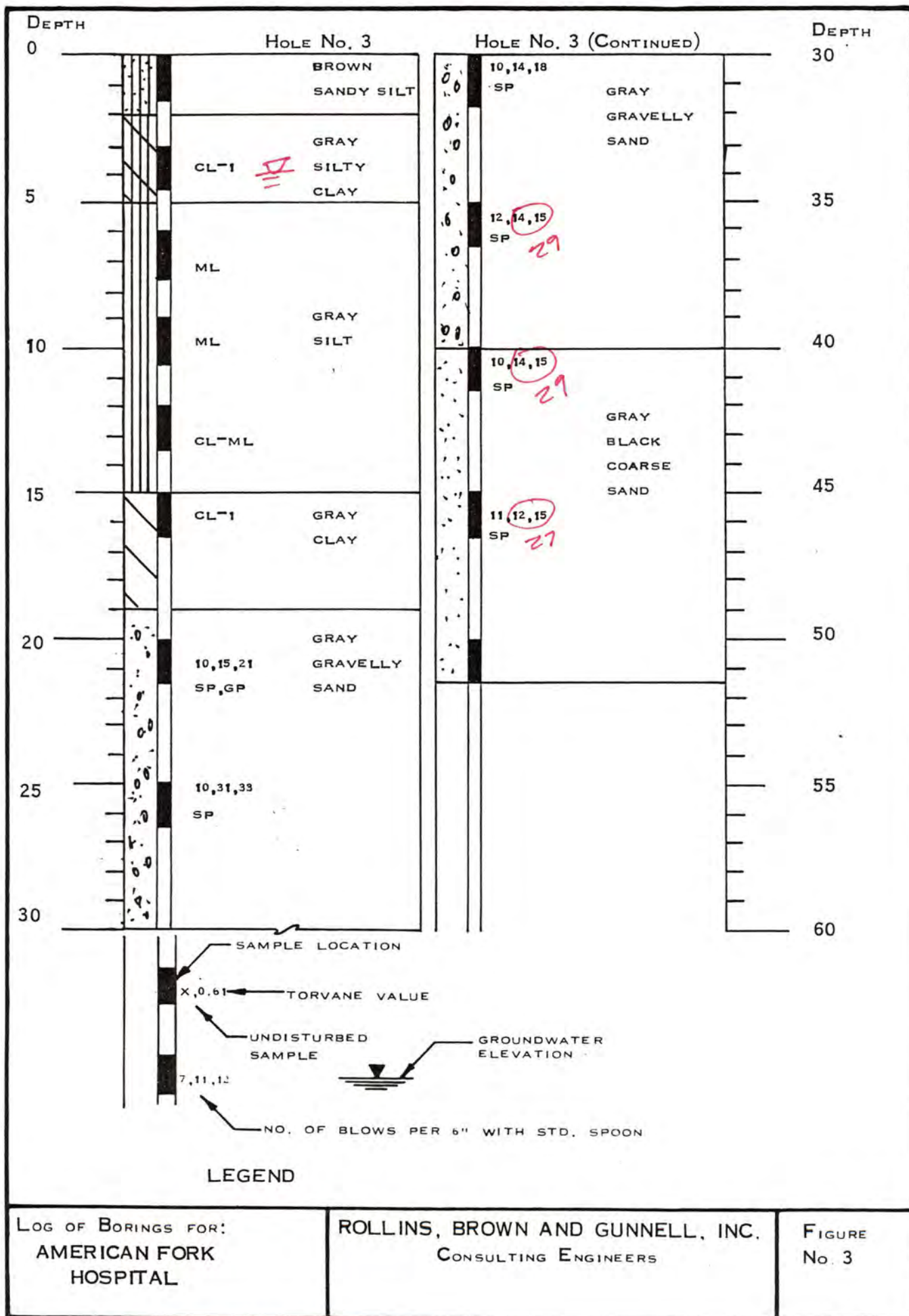
INASMUCH AS THIS INVESTIGATION CONSTITUTES A PRELIMINARY STUDY, NO INFORMATION IS AVAILABLE AT THE PRESENT TIME REGARDING THE DIMENSIONS OF THE PROPOSED FACILITY AS WELL AS THE MAGNITUDE OF THE STRUCTURAL LOADS, AND NO SPECIFIC RECOMMENDATIONS ARE MADE RELATIVE TO THE FOUNDATION TYPES AND BEARING CAPACITIES.

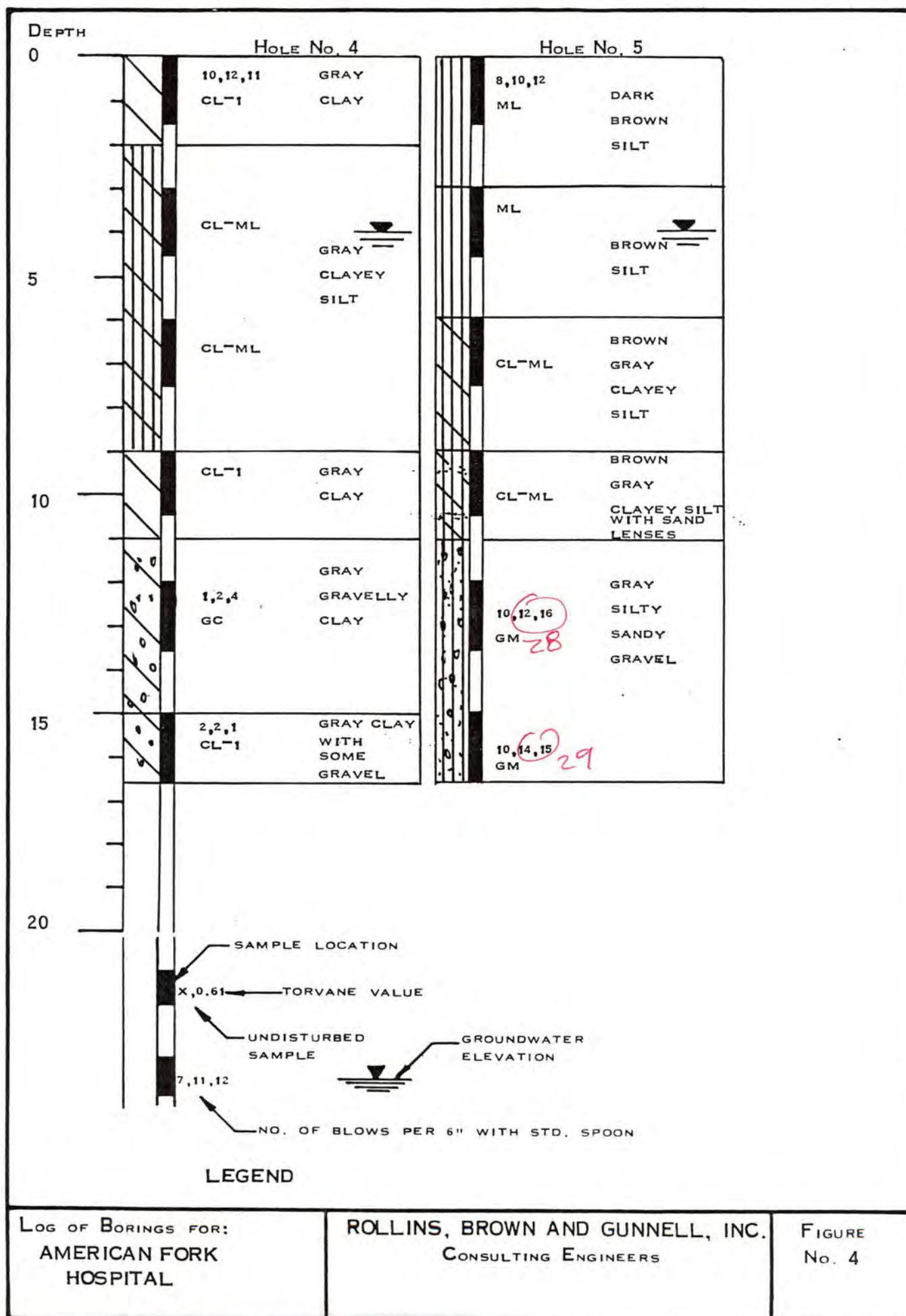


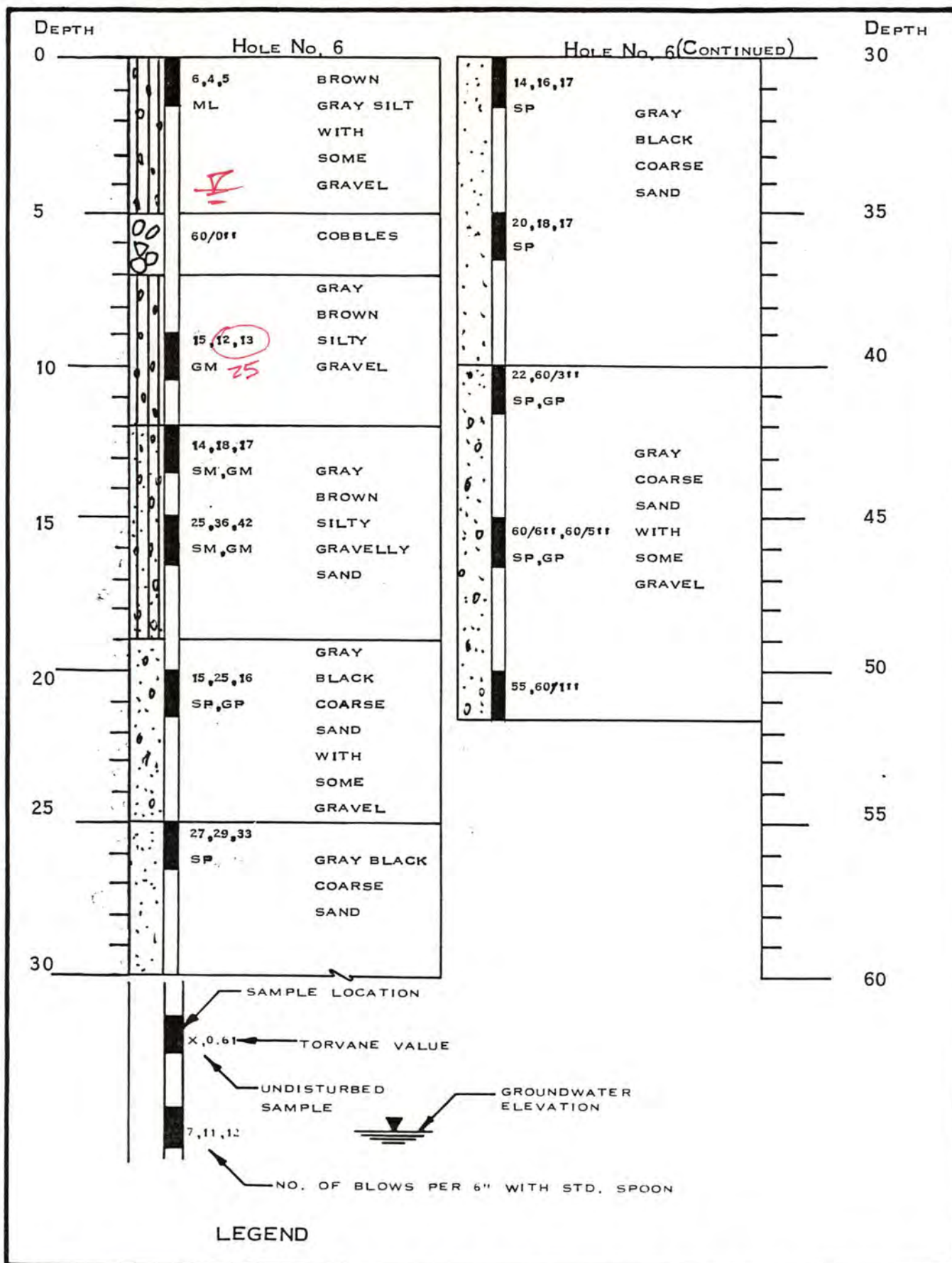
LOG OF BORINGS FOR:
AMERICAN FORK
HOSPITAL

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FIGURE
No. 2







LOG OF BORINGS FOR:
AMERICAN FORK
HOSPITAL

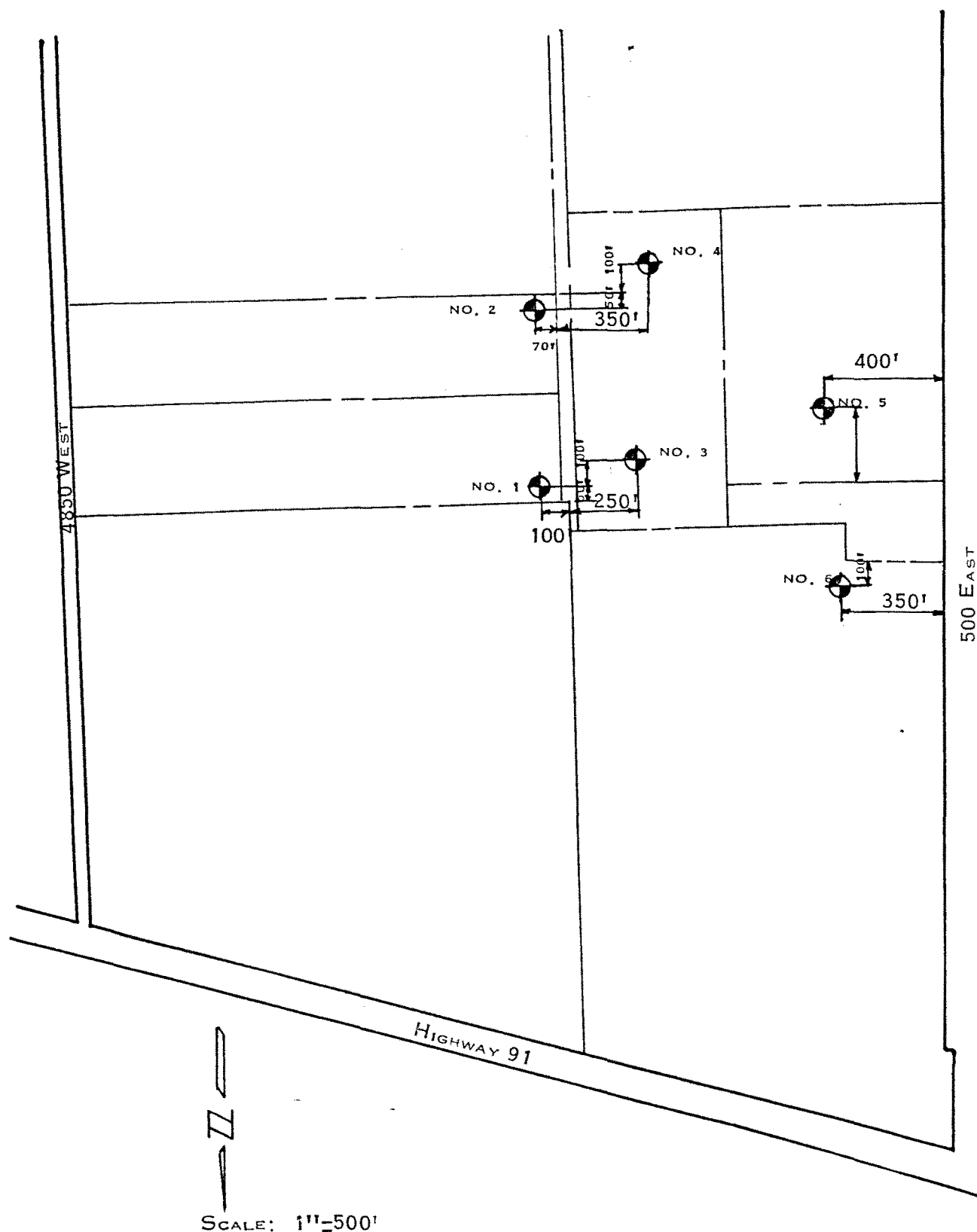
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FIGURE
No. 5

TABLE 1 SUMMARY OF TEST DATA

PROJECT AMERICAN FORK
HOSPITALFEATURE .. FOUNDATIONSLOCATION AMERICAN FORK, UTAH

HOLE NO.	DEPTH BELOW GROUND SURFACE	STANDARD PENETRA. BLOWS PER FT.	IN-PLACE			UNCONFINED COMPRESSIVE STRENGTH LB/FT ²	FRICTION ANGLE ϕ	CONSISTENCY LIMITS			MECHANICAL ANALYSIS			SOIL CLASSIFICATION UNIFIED SYSTEM
			UNIT WEIGHT LB/FT ³	MOISTURE PERCENT	VOID RATIO			L.L. %	P.L. %	P.I. %	% GRAVEL	% SAND	% SILT & CLAY	
3	3- 4.5		93.5	28.3		700		30.1	20.1	10.0				CL-1
	6- 7.5		102.6	23.6		1215		20.8	20.6	0.2				ML
	9-10.5		97.3	27.2		1068		21.4	21.0	0.4				ML
4	3- 4.5							26.8	23.2	3.6				
	6- 7.5							38.6	25.5	13.1				
	9-10.5							34.7	21.4	13.3				
5	3- 4.5		92.2	28.4		3365		37.2	27.2	10.0				ML
	6- 7.5					242		30.8	19.0	11.8				
	9-10.5					1739		30.1	20.1	10.0				



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LOCATION OF TEST HOLES FOR THE
AMERICAN FORK HOSPITAL IN
AMERICAN FORK, UTAH

FIGURE
No. 1