

T2S R6E

Sec 21C

ROLLINS, BROWN AND GUNNELL, INC.

PROFESSIONAL ENGINEERS

7801-177

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TP
No GU

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MARCH 14, 1979

SILVER AND ALLSOP, ARCHITECTS
550 WEST 700 SOUTH STREET
SALT LAKE CITY, UT 84101

GENTLEMEN:

IN ACCORDANCE WITH YOUR REQUEST, A SOILS INVESTIGATION HAS BEEN COMPLETED AT THE PROPOSED SITE OF THE KAMAS MIDDLE SCHOOL IN KAMAS, UTAH. THE PRIMARY PURPOSE OF THE INVESTIGATION WAS TO DETERMINE THE CHARACTERISTICS OF THE SUBSURFACE MATERIAL SO THAT SATISFACTORY SUBSTRUCTURES COULD BE DESIGNED FOR THE PROPOSED FACILITY.

SECONDARY OBJECTIVES OF THE INVESTIGATION WERE TO DETERMINE THE SUITABILITY OF THE SUBSURFACE MATERIAL FOR COMPACTED FILL TO SUPPORT STRUCTURES AND TO DETERMINE THE PERCOLATION CHARACTERISTICS OF THE SUBSURFACE SOILS.

THE INVESTIGATION HAS BEEN COMPLETED IN A MANNER TO ACCOMPLISH THE OBJECTIVES OUTLINED ABOVE, AND THE DETAILS OF THE INVESTIGATION ALONG WITH PERTINENT RECOMMENDATIONS FOR FOUNDATION DESIGN ARE OUTLINED IN THE FOLLOWING SECTIONS OF THIS REPORT.

1. EXISTING SITE CONDITIONS

THE PROPOSED STRUCTURE IS LOCATED ON THE NORTH SIDE OF 300 SOUTH STREET AND EAST OF 300 EAST STREET IN KAMAS, UTAH. THE SUBSURFACE MATERIALS THROUGHOUT THE PROPOSED SITE ARE ALLUVIAL DEPOSITS LAID DOWN BY STREAMFLOW FROM BEAVER CREEK. THE EXISTING CHANNEL OF BEAVER CREEK IS LOCATED IN A NORTHERLY DIRECTION FROM THE PROPOSED SITE AND THE TOPOGRAPHY SLOPES GRADUALLY FROM 300 SOUTH STREET TOWARD BEAVER CREEK. IT IS ANTICIPATED THAT AN ELEVATION DIFFERENCE OF 3 OR 4 FEET WILL EXIST ACROSS THE PROPOSED SITE.

OTHER THAN BEAVER CREEK, NO IRRIGATION CANALS OR OTHER WATER BODIES EXIST IN THE IMMEDIATE VICINITY OF THE PROPOSED FACILITY. THE ELEVATION OF BEAVER CREEK IS SUFFICIENTLY BELOW THE EXISTING SITE THAT IT DOES NOT APPEAR THAT THE ZONE OF SIGNIFICANT STRESS WILL BE SATURATED AT THIS LOCATION FROM WATER IN BEAVER CREEK.

MARCH 14, 1979

THE PROPOSED SITE HAS BEEN FARMED DURING PAST PERIODS OF TIME; AND INsofar AS WE CAN DETERMINE, NO MANMADE FILL EXISTS THROUGHOUT THE AREA AND ALL OF THE SUBSURFACE MATERIALS ARE NATURAL DEPOSITS.

NO MAJOR STRUCTURES ARE LOCATED IN THE IMMEDIATE VICINITY OF THE PROPOSED SITE FROM WHICH FOUNDATION PERFORMANCE IN THIS AREA CAN BE INFERRED.

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

2. SUBSURFACE SOIL AND WATER CONDITIONS

THE CHARACTERISTICS OF THE SUBSURFACE MATERIAL THROUGHOUT THE SITE WERE INVESTIGATED BY DRILLING 3 TEST PITS TO A DEPTH OF APPROXIMATELY 12 FEET AND 1 TEST PIT TO A DEPTH OF APPROXIMATELY 10 FEET. THE LOCATIONS OF THE TEST PITS ARE PRESENTED IN FIGURE No. 1, AND THE LOGS FOR THE 4 TEST PITS ARE PRESENTED IN FIGURES No. 2 AND No. 3. IT WILL BE NOTED THAT THE SUBSURFACE MATERIAL THROUGHOUT THE ENTIRE DEPTH INVESTIGATED CONSISTS OF GRANULAR-TYPE SOILS, EXCEPT FOR A THIN LAYER OF SANDY SILT WHICH EXISTS NEAR THE GROUND SURFACE.

DURING THE SUBSURFACE INVESTIGATION, IN-PLACE DENSITY TESTS WERE PERFORMED AT 3-FOOT INTERVALS THROUGHOUT THE DEPTH INVESTIGATED. THE RESULTS OF THESE TESTS ARE PRESENTED ON THE BORING LOGS. SINCE THE SUBSURFACE MATERIAL AT THE PROPOSED SITE CONTAINS AN APPRECIABLE AMOUNT OF LARGE-SIZE MATERIAL, OBTAINING IN-PLACE DENSITIES WAS RELATIVELY DIFFICULT. THE RESULTS OF THE IN-PLACE DENSITY TESTS, HOWEVER, INDICATE THAT THE SUBSURFACE GRANULAR MATERIAL IS IN A MEDIUM DENSE STATE AND IS CAPABLE OF SUPPORTING MODERATELY HIGH LOAD INTENSITIES. IT WILL BE NOTED THAT THE IN-PLACE DENSITY OF THE SUBSURFACE MATERIAL GENERALLY VARIED FROM ABOUT 116 POUNDS PER CUBIC FOOT TO 123 POUNDS PER CUBIC FOOT.

REPRESENTATIVE SAMPLES OF THE SAND AND GRAVEL AT EACH SAMPLING LOCATION WERE OBTAINED IN THE FIELD FOR LABORATORY ANALYSIS. EACH SAMPLE OBTAINED IN THE FIELD WAS CLASSIFIED IN ACCORDANCE WITH THE UNIFIED SOIL CLASSIFICATION SYSTEM, AND 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. 4, AND THE MEANING OF THE VARIOUS SYMBOLS SHOWN ON THE BORING LOGS CAN BE OBTAINED FROM THAT FIGURE.

IT WILL BE NOTED THAT THE SUBSURFACE MATERIAL GENERALLY CLASSIFIES AS GC, GM OR GW-TYPE MATERIAL.

MARCH 14, 1979

NO GROUNDWATER WAS ENCOUNTERED IN ANY OF THE TEST HOLES EXCAVATED AT THIS LOCATION, AND IT IS NOT ANTICIPATED THAT THE ZONE OF SIGNIFICANT STRESS WILL BE SUBMERGED THROUGHOUT THE LIFE OF THE STRUCTURE AT THIS SITE UNLESS A SUBSTANTIAL CHANGE OCCURS IN THE ENVIRONMENTAL CONDITIONS THROUGHOUT THE AREA.

3. RECOMMENDED FOUNDATION TYPES AND BEARING CAPACITIES

AS OF THE PREPARATION OF THIS REPORT, THE SIZE OF THE STRUCTURE AND THE STRUCTURAL LOADS IS NOT KNOWN. IT IS ANTICIPATED THAT THE COLUMN LOADS WILL NOT LIKELY EXCEED 150 KIPS AND THAT WALL LOADS WILL NOT LIKELY EXCEED 5 TO 6 KIPS PER LINEAL FOOT. IT IS ANTICIPATED THAT THE PROPOSED FACILITY WILL FACE ON 300 SOUTH STREET AND SINCE THE ELEVATION OF THE SITE SLOPES TOWARD BEAVER CREEK, WITH AN ESTIMATED ELEVATION DIFFERENCE OF BETWEEN 3 AND 4 FEET ACROSS THE PROPOSED STRUCTURE, IT IS ENTIRELY POSSIBLE THAT FILL MATERIAL WILL BE REQUIRED ON THE NORTHERLY PORTION OF THE SITE TO PROVIDE A LEVEL PAD FOR THE PROPOSED STRUCTURE. IT IS NOT ANTICIPATED THAT THE DEPTH OF FILL ON THE NORTHERLY PORTION OF THE SITE WILL EXCEED APPROXIMATELY 4 FEET, HOWEVER.

IF THE FOUNDATIONS FOR THE PROPOSED FACILITY ARE LOCATED AT A DEPTH JUST SUFFICIENT TO PROVIDE FROST PROTECTION IN THIS AREA, WHICH IS APPROXIMATELY 4 FEET BELOW THE GROUND SURFACE, IT APPEARS THAT ALL OF THE FOUNDATIONS FOR THE PROPOSED FACILITY WILL BE LOCATED ON THE NATURAL MATERIAL. IT WILL BE NOTED FROM THE BORING LOGS THAT A DARK BROWN SILTY LAYER, APPROXIMATELY 1 FOOT THICK, GENERALLY COVERS THE SITE. THIS MATERIAL IS NOT SATISFACTORY TO SUPPORT STRUCTURAL FOUNDATIONS.

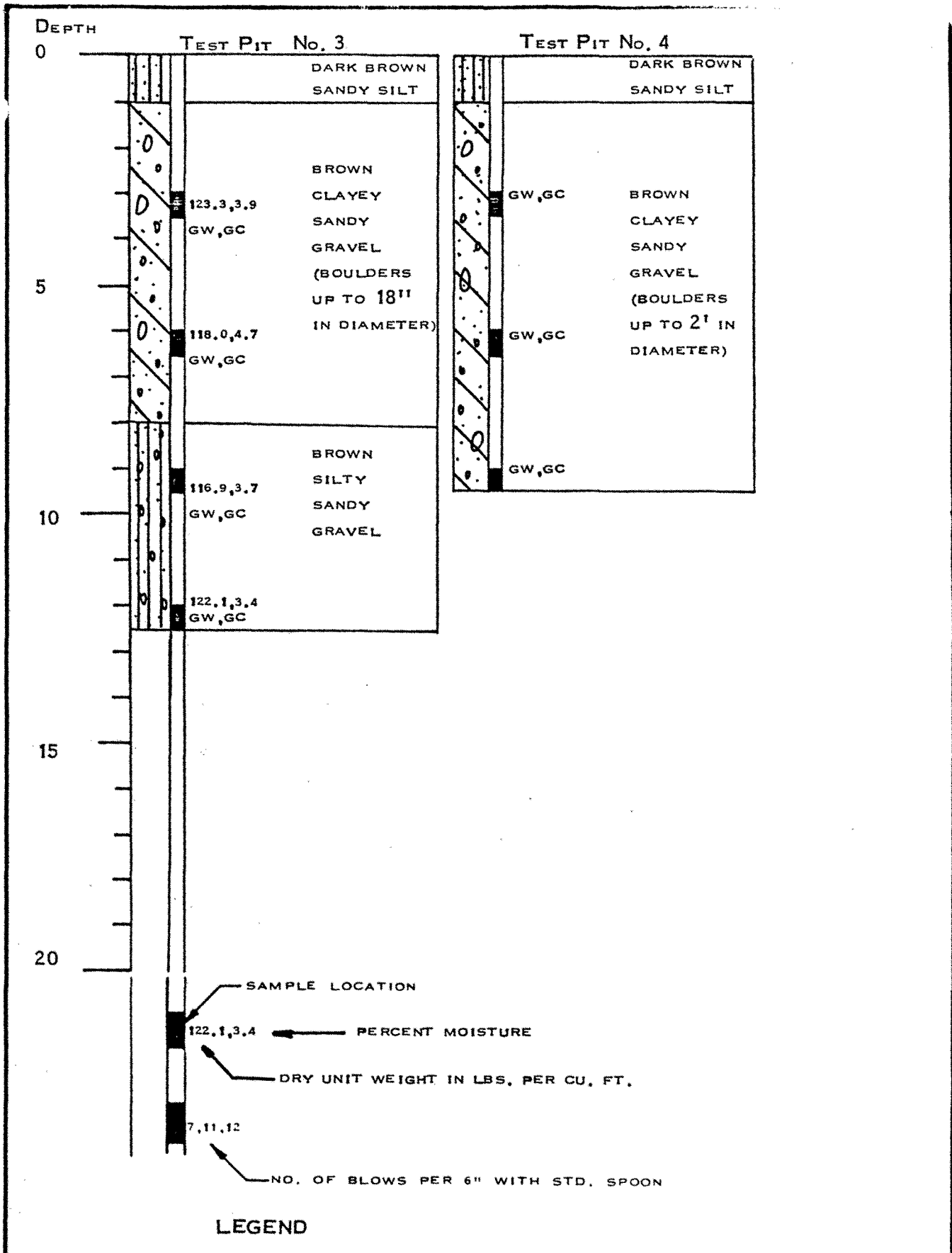
IF THE FOUNDATIONS ARE LOCATED AT APPROXIMATELY 4 FEET BELOW THE GROUND SURFACE ON THE NORTHERLY SIDE OF THE STRUCTURE AND IF THE FILL DEPTH IN THIS AREA IS ALSO APPROXIMATELY 4 FEET, IT IS APPARENT THAT THE FOUNDATIONS COULD BE LOCATED ON THE BROWN SILT. WHERE SITUATIONS OF THIS TYPE OCCUR, WE RECOMMEND THAT THE BROWN SILT BE EXCAVATED AND REPLACED WITH GRANULAR MATERIAL OR THAT THE FOUNDATIONS EXTEND TO THE GRANULAR MATERIAL UNDERLYING THE SILT LAYER.

IN ORDER TO PROPORTION FOUNDATIONS FOR THE PROPOSED FACILITY, A BEARING CAPACITY CHART AS SHOWN IN FIGURE NO. 5 HAS BEEN PREPARED FOR THIS SITE. IN PREPARING THE BEARING CAPACITY CHART, IT HAS BEEN ASSUMED THAT THE FOUNDATIONS WOULD BE LOCATED ON THE GRANULAR MATERIAL BENEATH THE SILT LAYER. ALLOWABLE SOIL BEARING PRESSURES HAVE BEEN PREPARED GIVING DUE CONSIDERATION TO BOTH SHEAR FAILURE AND DIFFERENTIAL SETTLEMENT. THE LINES SLOPING UPWARD TO THE RIGHT DEFINE THE ALLOWABLE SOIL BEARING PRESSURE WITH RESPECT TO SHEAR FAILURE USING A FACTOR OF SAFETY OF 2.5, WHILE THE CURVE SLOPING DOWNWARD

TABLE 1 SUMMARY OF TEST DATA

PROJECT KAMAS MIDDLE SCHOOL FEATURE FOUNDATIONS LOCATION KAMAS, 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		118.3	3.9		33.0				72.8	19.9	7.3	GM,GC	
	6		119.5	4.7		33.5				67.4	23.9	8.7	GW,GC	
	9		117.8	3.7		33.0				57.1	37.2	5.7	GW,GC	
	12		121.0	3.4		34.0				59.1	35.5	5.4	GW,GC	

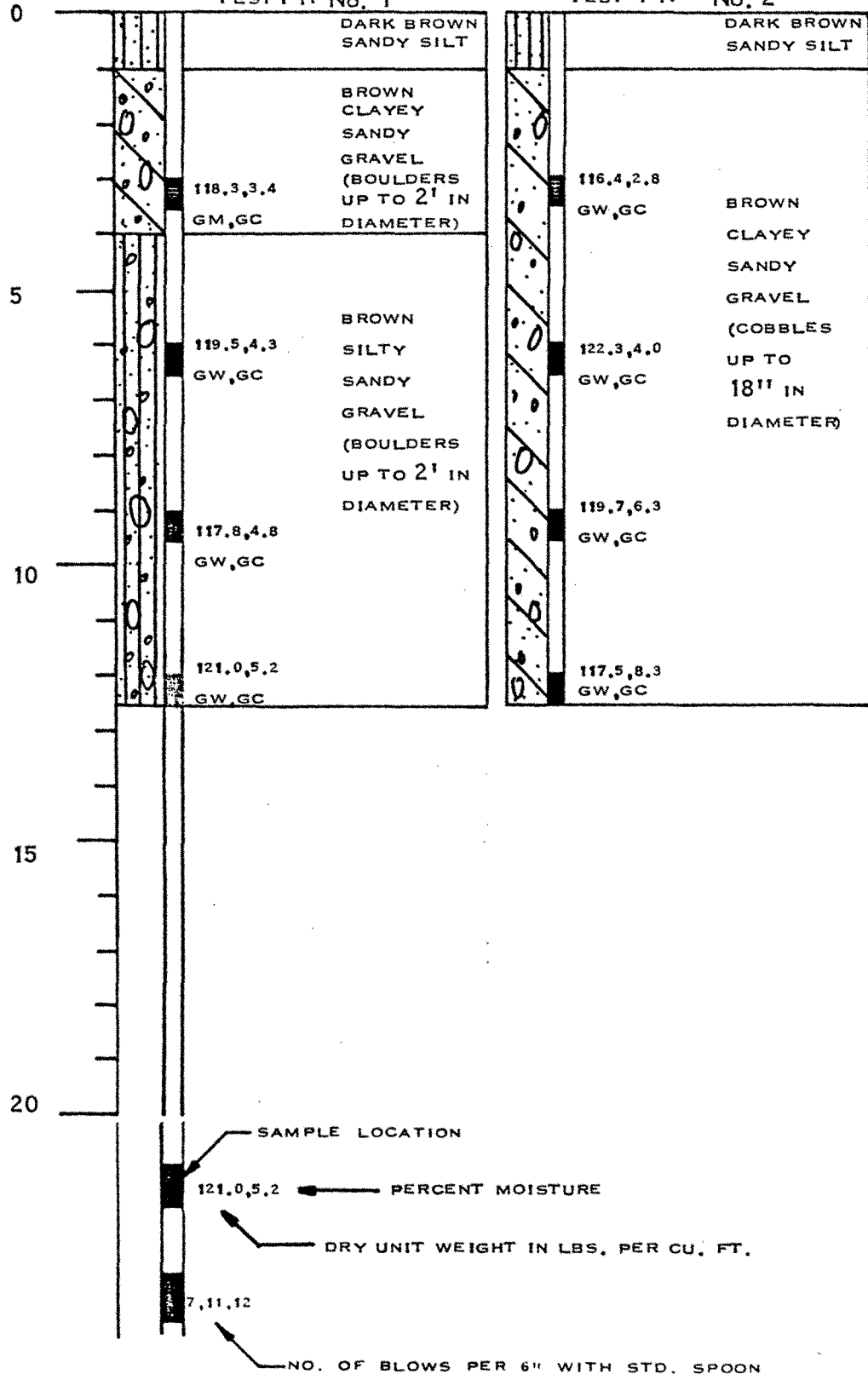


LOG OF BORINGS FOR: KAMAS MIDDLE SCHOOL	ROLLINS, BROWN AND GUNNELL, INC. CONSULTING ENGINEERS	FIGURE No. 3
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DEPTH

TEST PIT No. 1

TEST PIT No. 2



LEGEND

SAMPLE LOCATION

121.0, 5.2 ← PERCENT MOISTURE

← DRY UNIT WEIGHT IN LBS. PER CU. FT.

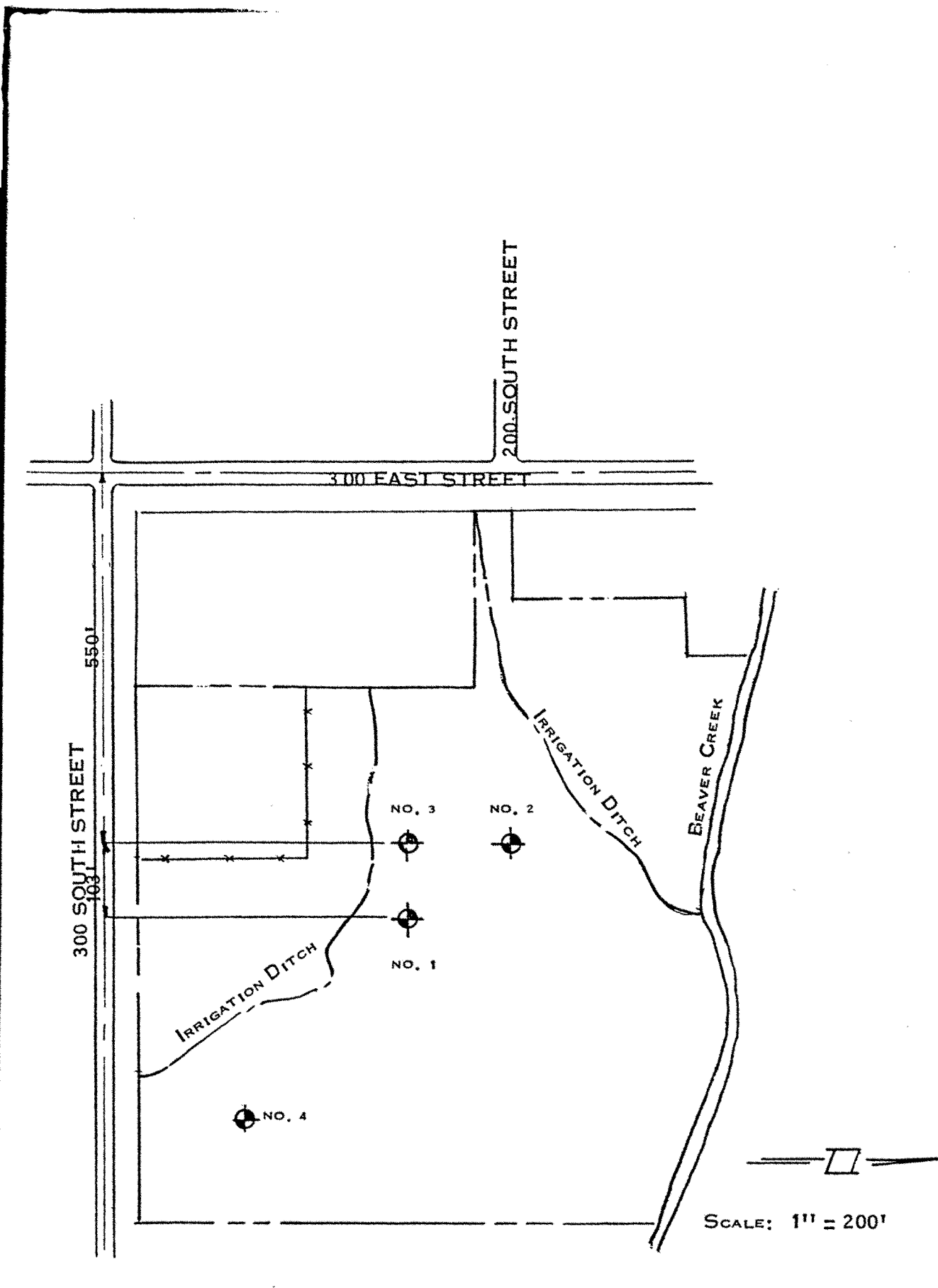
7, 11, 12 ← NO. OF BLOWS PER 6" WITH STD. SPOON

LOG OF BORINGS FOR:
KAMAS MIDDLE SCHOOL

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FIGURE
No. 2

BRUNING 40-105 37146



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LOCATION OF TEST HOLES FOR
THE KAMAS MIDDLE SCHOOL IN
KAMAS, UTAH

FIGURE
No. 1