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*Civil Engineering*

FOUNDATION INVESTIGATION

STATE OF NEVADA  
DEPARTMENT OF HIGHWAYS

PANTHER VALLEY INTERCHANGE  
I1093N and I1093S

*Foundation Engineering*  
*Engineering Reports*  
*Materials Testing*  
*Surveying*

1715 - 1725 "B" STREET

SPARKS, NEVADA

LICENSED

NEVADA CALIFORNIA ARIZONA OREGON WYOMING UTAH IDAHO

FOUNDATION INVESTIGATION

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PANTHER VALLEY INTERCHANGE  
I1093N and I1093S



CIVIL ENGINEERING  
ENGINEERING REPORTS  
SURVEYING

# SPROUT ENGINEERS, INC.

1715 - 1725 "B" STREET • SPARKS, NEVADA

PHONE 358-6931 • 358-6930

FOUNDATION ENGINEERING  
MATERIALS TESTING  
CONCRETE DESIGN

Job No. 8065-T-64  
June 3, 1964

Mr. W. O. Wright  
State Highway Engineer  
Nevada State Department of Highways  
Carson City, Nevada

Dear Mr. Wright:

SUBJECT: Foundation Investigation  
Panther Valley Interchange

We are submitting herewith, the foundation report for the Panther Valley Interchange, I1093N and I1093S, located approximately six (6) miles north of Reno, Nevada, on U. S. Highway 395.

The report presents the results of the study and recommendations for foundation design.

We wish to thank you for the opportunity to prepare this report and wish to advise that we will be available for discussion or to answer any questions which may arise.

Respectfully submitted,

Richard W. Arden  
Registered Civil  
Engineer No. 1643

RWA:jl

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NEVADA CALIFORNIA ARIZONA OREGON WYOMING UTAH IDAHO

FOUNDATION INVESTIGATION

STATE OF NEVADA  
DEPARTMENT OF HIGHWAYS

PANTHER VALLEY INTERCHANGE  
I1093N and I1093S

Presented herein are the results of a foundation investigation for the Panther Valley Interchange, I1093N and I1093S.

The investigation was made during the second week of April, 1964, by the soils and foundation section of the consulting engineering firm of Sprout Engineers, Inc.

The study was made in accordance with an Agreement entered into by the Consultants and the State of Nevada Department of Highways.

A Registered Professional Civil Engineer supervised the exploration and testing at all times.

Scope:

The scope of the study consisted of field and laboratory sampling and testing of the soils at the site in order to determine a safe and economical substructure design.

The results of the field investigation and laboratory tests which form the basis of our recommendations are included in this report.

Site Conditions:

The site for the proposed Panther Valley Interchange is approximately six(6) miles north of Reno, and is located immediately east of the existing U. S. Highway 395 at a point near the exit to the Rolling Hills Estate, Panther Valley Mobile Village.

The existing Highway 395 is build on the eastern slope of a knoll which is comprised of rhyolite rock. The highway embankment at that point rises roughly fifteen (15) to twenty (20) feet above the gentle sloping ground of the proposed structure.

The average elevation of test borings drilled on the site range from 5056 to 5064 feet above sea level.

Soils and Local Geological Conditions:

Physiographically, the area of the proposed Panther Valley Interchange lies on what once was an elevated plateau-like land, rising in the middle of the chain of mountains on both sides. The plateau was badly dissected along numerous faults and shear zones. It eventually was subjected to intensive erosion, resulting in the present gentle rolling relief.

There are a number of outcrops of dark brown, badly disintegrated and decomposed rhyolite on top of ridges, knolls, and along the existing road cuts in the immediate area.

The soils encountered at the site consisted of a dry sand-gravel-clay mixture underlain by a very dense, reddish-brown decomposed rhyolite.

Structural Considerations:

The proposed Interchange is to consist of two (2) parallel four-span structures constructed of reinforced concrete elevated over access roads to U. S. Highway 395. The two end spans of each structure will be cantilevered to the approach fills which will be about twenty (20) feet high. There will be no abutment blocks on these structures.

The maximum elevation of the proposed footings is to be 5051 to 5056, with sufficient cover so as to be below the frost zone. The north bound footing will vary from 5051 for Pier No. 1 to 5053 for Pier No. 2. The south bound footing will vary from 5054 for Pier No. 1 to 5056 for Pier No. 2.

Discussion:

The very dense, sand-gravel-clay mixture and decomposed rhyolite encountered at the site will provide good support for the proposed Interchange. The footings can be placed at the maximum proposed elevation.

The only special condition for these structures is to provide good drainage away from the footings which will prevent saturation of the soil below the footing. The decomposed rhyolite consists of clay size particles which tend to compress if they become saturated. Under normal conditions, there will be very little settlement using the recommended footing loads.

Alternate methods of footing design should not be necessary because the soil is capable of providing good support for spread footing and a high bearing value is recommended. If piles were to be used, we would recommend a 10 B.P. 42 steel H Pile, which is driven to a design load of forty-five (45) tons per pile. If it is considered more economical to use piles, we will supply estimated tip elevations when requested.

Recommendations:

1. A bearing value of five (5) tons per square foot can be used for spread footings at the recommended footing elevations shown in Plate 1.
2. Good drainage should be maintained away from the structure.

The following Plates and Appendix are attached and complete  
this report:

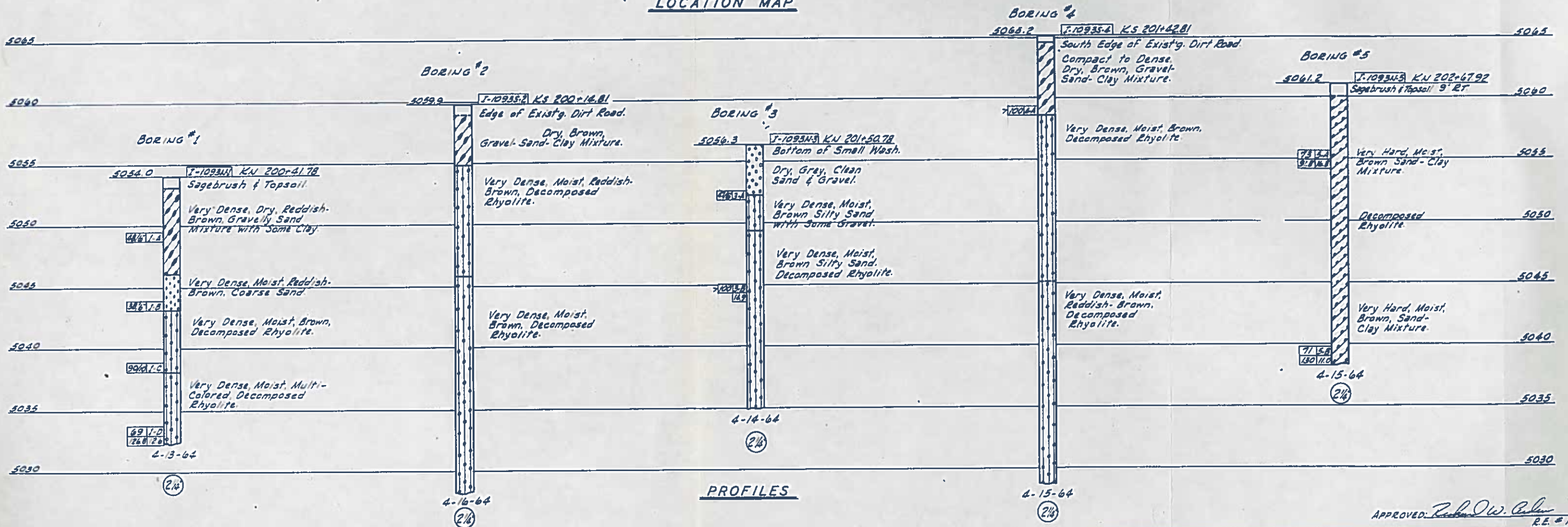
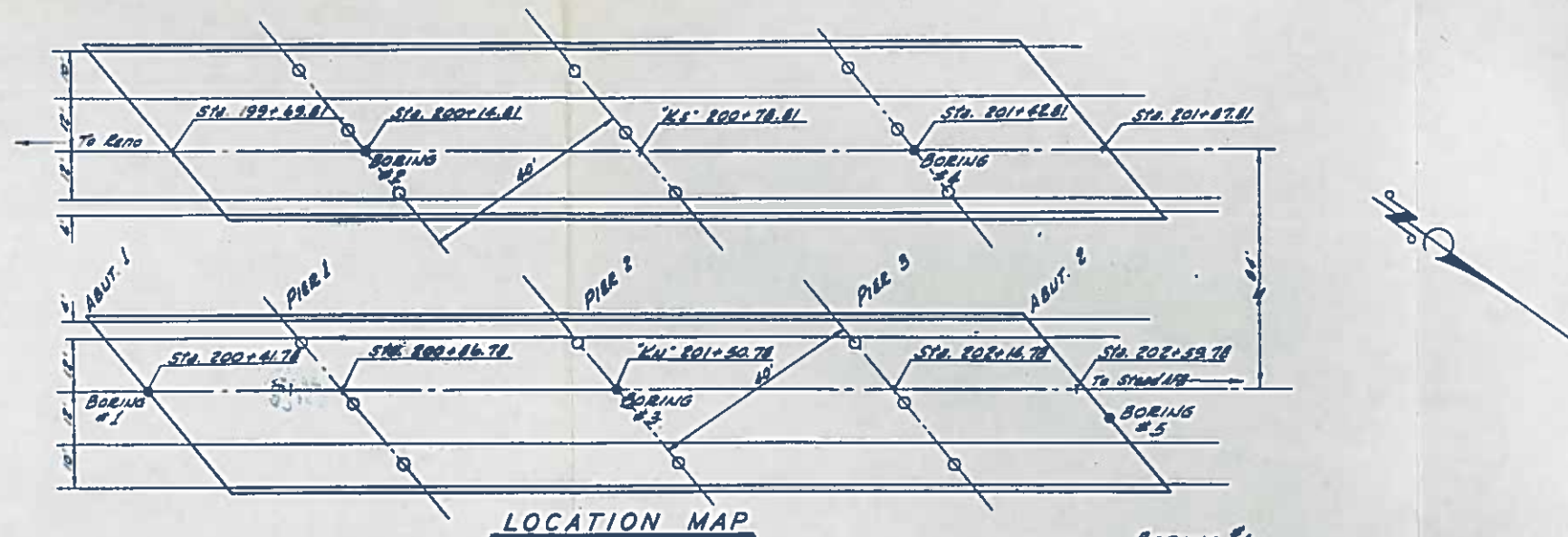
Plate 1	Tabular Summary of Foundation Recommendations
Plate 2	Log of Borings
Appendix I	Exploration and Laboratory Tests



## TABULAR SUMMARY - FOUNDATION RECOMMENDATIONS

DESIGNATION	SUPPORT STATION	RECOMMENDED SUPPORT TYPE	SAFE ALLOWABLE DESIGN LOAD	ESTIMATED PILE TIP PENETRATION OR SPREAD FOOTING BLOCK ELEVATION	ALTERNATE SUPPORT TYPE	ESTIMATED TIP PENETRATION FOR ALTERNATE SUPPORT	SPECIAL CONSIDERATIONS
North Bound Pier No. 1	K <sub>n</sub> 200+86.78	Spread Footing	5 Tons per Square Foot	5049.0	None	-	-
North Bound Pier No. 2	K <sub>n</sub> 201+50.78	Spread Footing	5 Tons per Square Foot	5052.0	None	-	-
North Bound Pier No. 3	K <sub>n</sub> 202+14.78	Spread Footing	5 Tons per Square Foot	5053.0	None	-	-
South Bound Pier No. 1	K <sub>s</sub> 200+14.81	Spread Footing	5 Tons per Square Foot	5054.0	None	-	-
South Bound Pier No. 2	K <sub>s</sub> 200+78.81	Spread Footing	5 Tons per Square Foot	5055.0	None	-	-
South Bound Pier No. 3	K <sub>s</sub> 201+42.81	Spread Footing	5 Tons per Square Foot	5056.0	None	-	-

FED. ROAD DIST. NO.	STATE	PROJECT NO.	COUNTY	CONTROL SECTION	ROUTE	SHEET NO.	TOTAL SHEETS
7	NEVADA						



LEGEND OF SOILS	
	No. 10 graded gravels or coarse sand in fines 1% or no fines
	Poorly graded gravels or silty sand mixtures, 1% or no fines
	Silty gravel-sand and silty mixtures
	Clayey gravel-sand mixtures
	Inorganic silts and very fine sands, silty or clayey fine sands or clayey silts
	Sandy clays, silty clays, lean clays
	Organic silts and organic silt clays of low plasticity
	Inorganic silts, micaceous or diatomaceous fine sand or silty soils
	Inorganic clays of high plasticity for clays
	Organic clays of medium to high plasticity, organic silts
	Peat and other highly organic soils
	Fill material

LEGEND OF BORING OPERATION	
	Confirmed material change
	Estimated material change
	Confirmed material change
	DATE OF BORING
	SIZE AUGER BORING
	SIZE ROTARY BORING

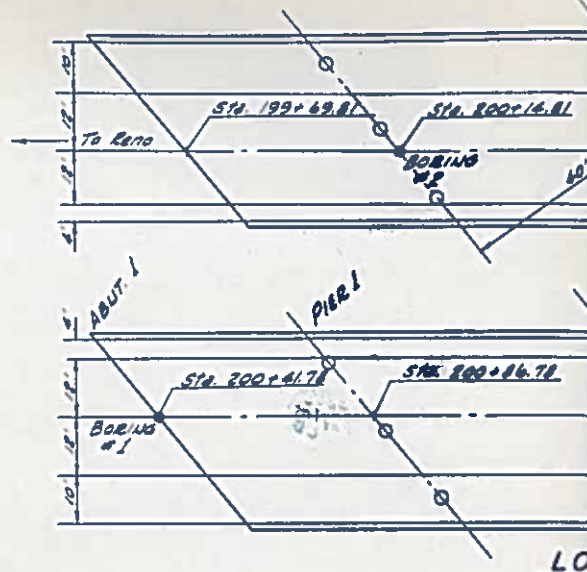
STATE OF NEVADA  
DEPARTMENT OF HIGHWAYS

PANTHER VALLEY INTERCHANGE  
I-1093N & I-1093S

LOG OF TEST BORINGS

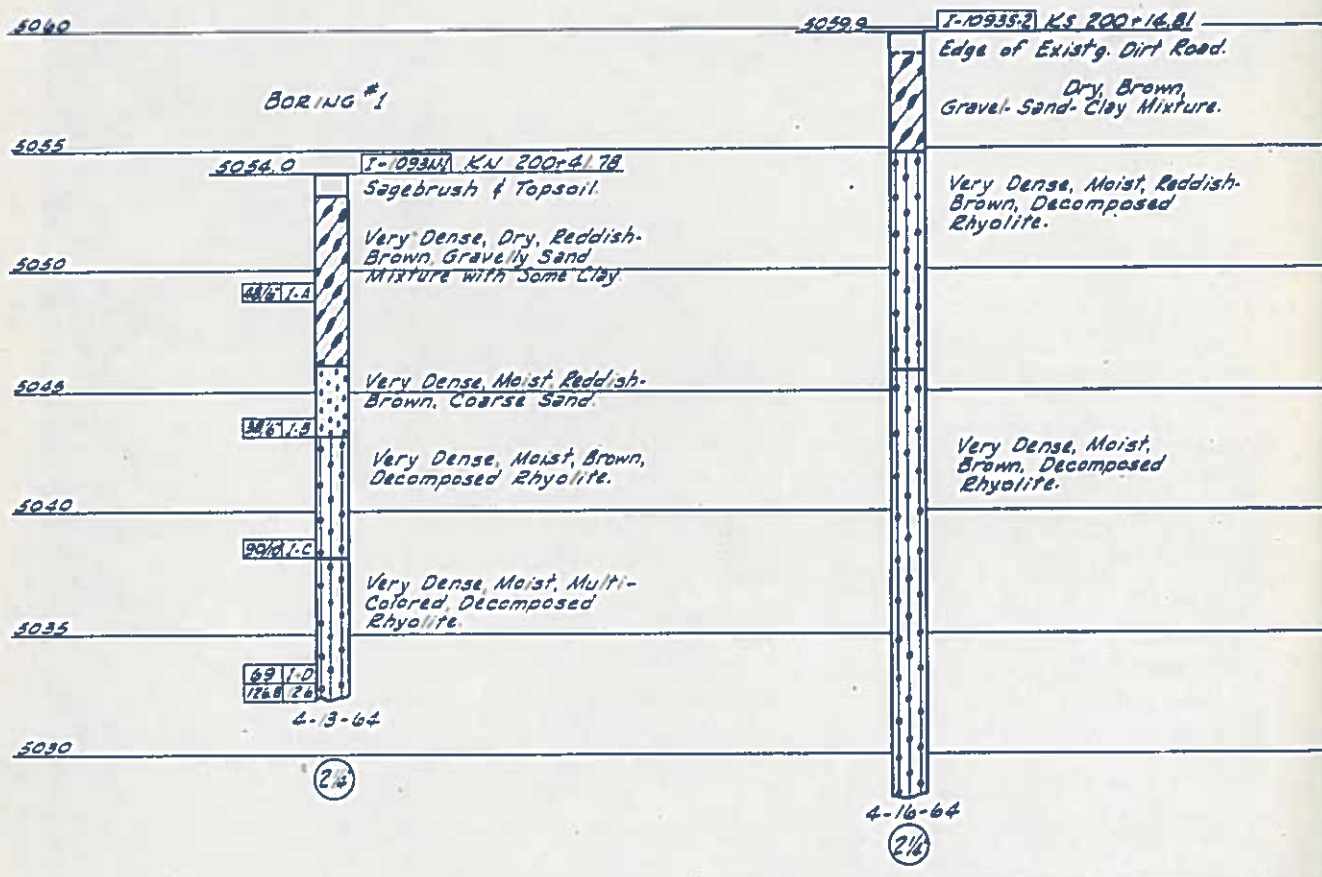
SPROUT ENGINEERS, INC. MAY 7, 1964  
1715 'B' STREET JOB 8065-T-64  
SPARKS, NEVADA JN/LMN

APPROVED: *Richard W. Carlson*  
P.E. #1643



5065

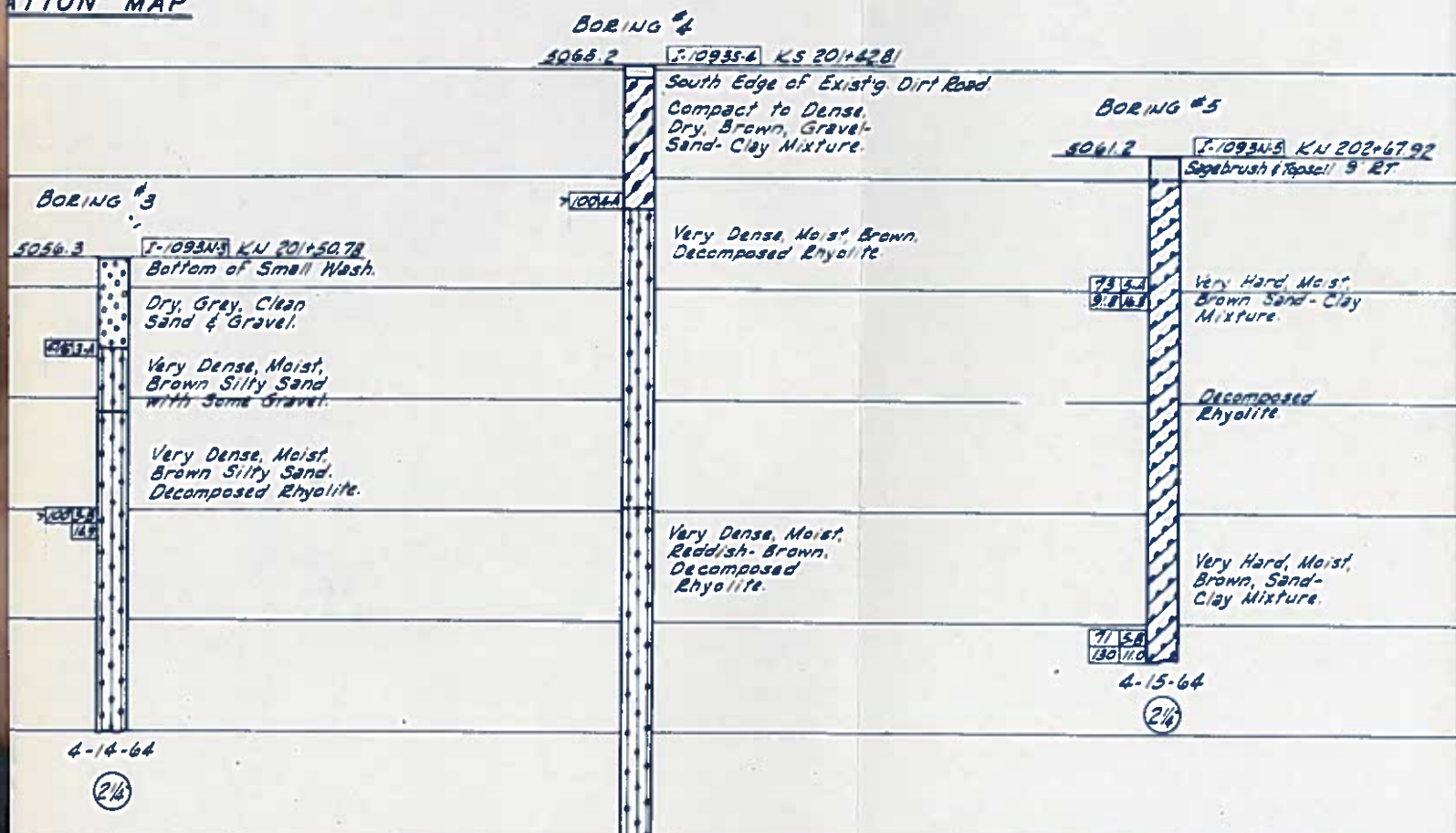
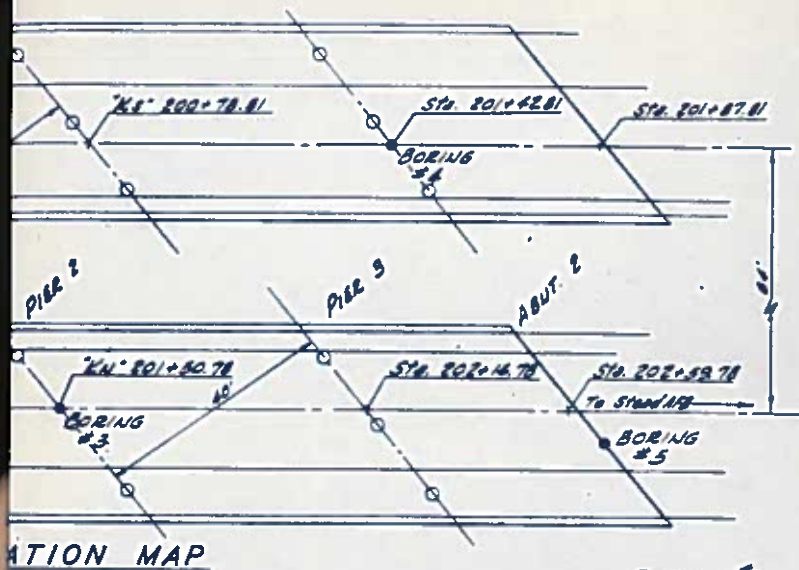
BORING #2



BRIDGE DEPARTMENT	CHECKED BY	DATE
DESIGN		
DRAWING		
TRACING		

LEGEND OF SOILS


FED. ROAD REQ. NO.	STATE	PROJECT NO.	COUNTY	CONTROL SECTION
7	NEVADA			



PROFILES

APPROVED: *Robert W.*

LEGEND OF BORING OPERATION		LEGEND OF BORING OPERATION	
TOP OF HOLE ELEV.	BORING NO. LOCATION	TOP OF HOLE ELEV.	BORING NO. LOCATION
SAMPLE NO. UNCOMPENSATED BLOW COUNT COMPRESSION DEPTH STRAINING DATE OF BORING SIZE AUGER BORING SIZE ROTARY BORING	Confirmed material change Estimated material change Unfavorable material change	BLOW PER FOOT PENETRATION BORING	BLOW PER FOOT PENETRATION BORING

STATE OF NEVADA  
DEPARTMENT OF HIGHWAYS

PANTHER VALLEY INTERCHANGE  
I-1093N & I-1093S

LOG OF TEST BORINGS

SPROUT ENGINEERS, INC.  
1715 'B' STREET  
SPARKS, NEVADA

APPENDIX I

## APPENDIX I

### Explorations:

The field investigation consisted of drilling five (5) test holes with a Test Borer Soil Sampling Drill Rig on April 13 to 16, 1964. The location of these borings is shown on the Log of Borings in the body of this report. The maximum depth of borings was thirty-seven (37) feet below the surface.

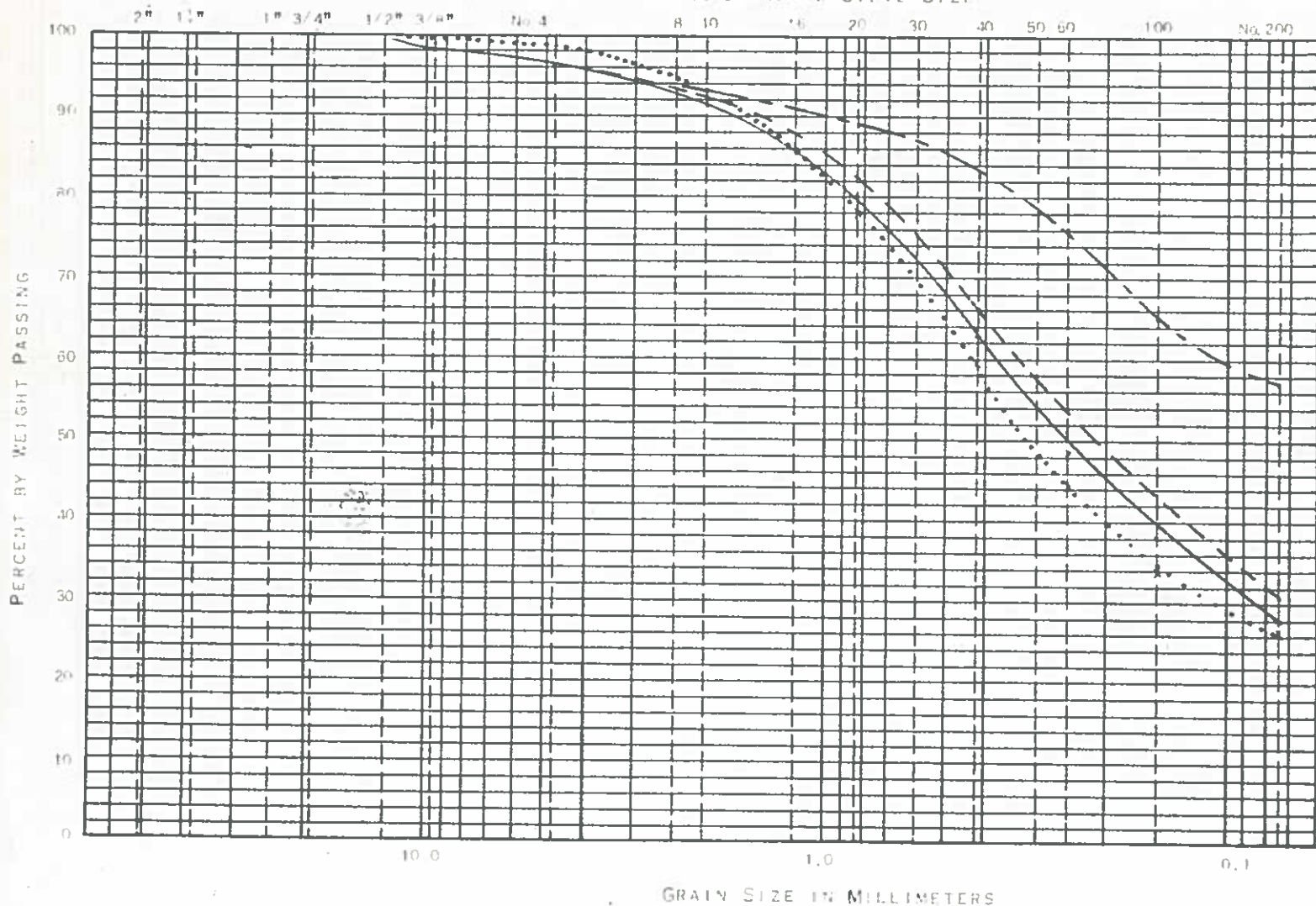
Samples of various soils encountered were obtained with a Split Spoon Sampler (2" O.D. - 1 3/8" I.D.). The sampler was driven eighteen (18) inches into undisturbed soil using a 140 pound weight dropping thirty (30) inches. The number of blows required to drive the sampler twelve (12) inches was recorded and is shown on the Log of Borings. Samples representing the various soils were taken for examination and testing in our laboratory.

### Laboratory Tests:

Samples of the different soils encountered were tested in the laboratory as to grain-size distribution and plasticity characteristics.

The standard penetration test, together with empirical data, was used to establish related densities and their allowable bearing values of the soil.

U. S. STANDARD SIEVE SIZE



SAMPLE NO.	L.L.	P. I.	NAT. W.C.
5-A	54	22	16.8
3-A	34	4	14.9
1-A	29	2	13.9
5-B	34	12	11.0

GRAIN SIZE IN MILLIMETERS

GRAVEL

SAND

COARSE

FINE

COARSE

MEDIUM

FINE

SILT OR CLAY

GRADATION CURVES

8065-T-64