BUREAU of MATERIALS and RESEARCH

GEOTECHNICAL UNIT
GEOLOGY SECTION

BRIDGE FOUNDATION GEOLOGY REPORT

Pottawatomie County State Fishing Lake Bridge
75 K-8212-01
Bridge No. 900-75-1.40 (053)

Pottawatomie County

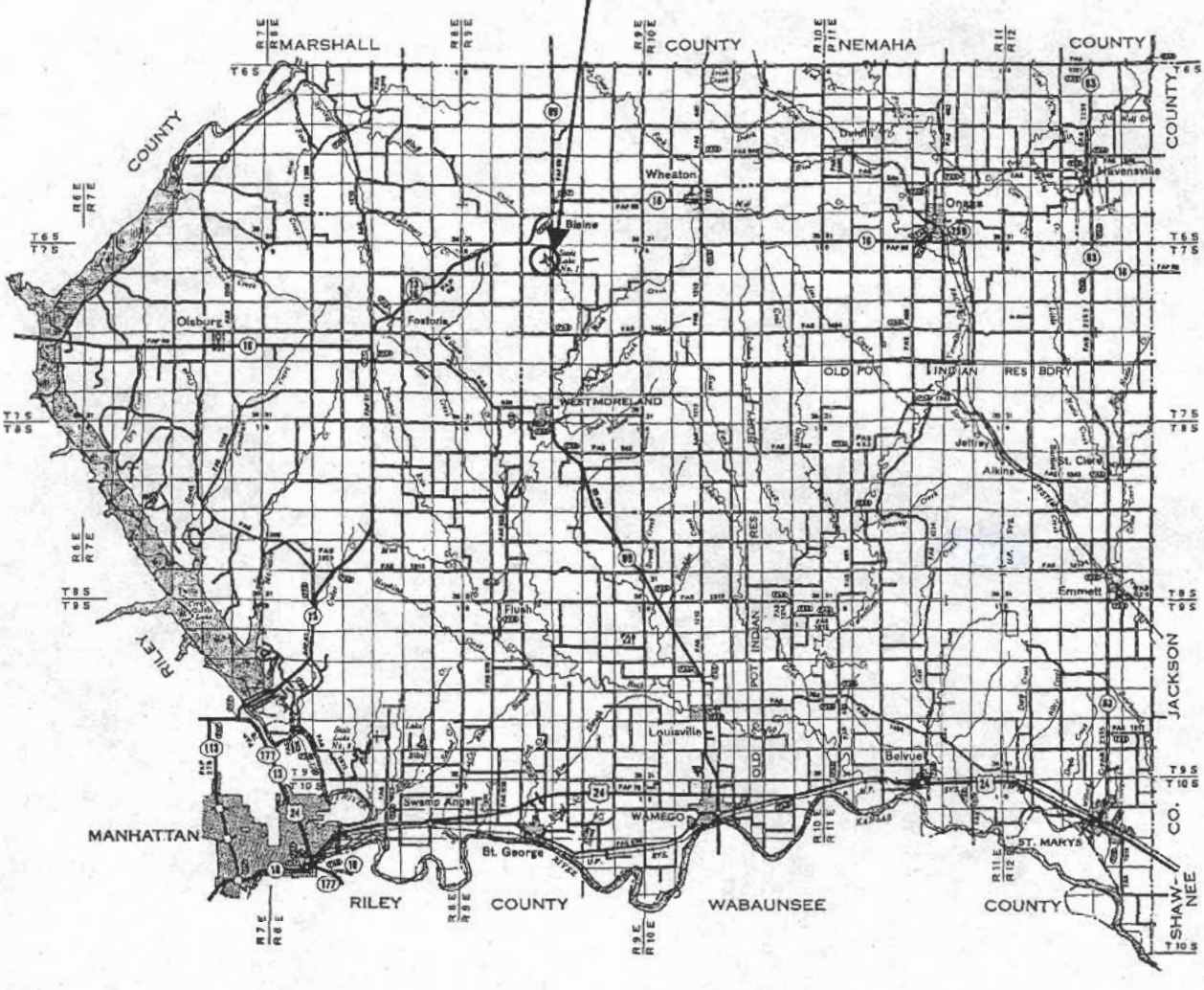
GARY R. KOONTZ, P.E.
CHIEF GEOLOGIST

BY

Delmar Thompson, P.G., Regional Geologist

December 2000

75-K-8212-01
Pottawatomie County State Fishing Lake Bridge
Bridge No. 900-75-1.40 (053)



INTRODUCTION

This report details the geology and footing recommendations associated with the proposed bridge replacement at the Pottawatomie County State Fishing Lake located just west of K-99 approximately 7.24 to 8.0 km (4.5 to 5 miles) north of Westmoreland. The existing bridge is a small wooden structure bearing on concrete block footings at the north end of the lake. The proposed structure will be a single span bridge approximately 9.5 m in length at the same location.

GEOLOGY AT THE BRIDGE SITE

Soil Mantle

At the ends of the existing structure the upper 0.24 m (0.8 foot) of soil mantle consists of gravel and silty clay of firm roadway material. Below this zone, the mantle at the bridge site consists of approximately 5.0 m (16.5 feet) of saturated, very soft dark brown to black silt and silty clay, which is high in organic content. Several thin, heavy gravel zones were noted within the soil mantle as well as some cobbles. It should be noted that the soil below the roadway is quite soft and will likely not support the weight of heavy equipment once the roadway is removed.

Council Grove Group
Blue Rapids Shale Formation

Below the soil mantle, the remnant of the Blue Rapids Shale Formation consists of approximately .6 m (2 feet) of weathered, olive-green shale. The Blue Rapids is not expected to stop pile at this location.

Crouse Limestone Formation

The Crouse Limestone Formation will be the footing foundation material for both abutments. The upper Crouse Limestone Formation consists of 0.6 to 1.0 m (2 to 3 ft.) of shaly, platy limestone above 0.4 to 0.7 of firm, gray shale. The lower limestone of the "Crouse" is approximately 1.6 m (5.2 ft.) thick and is composed of hard to shaly limestone with an occasion thin shale break. As drilled, the Crouse Limestone Formation is just under 3 m (9.8 ft.) thick.

FOUNDATION RECOMMENDATIONS

Abutment Foundations
H-Pile Foundations

Due to the potential of encountering cobbles and the heavy gravel noted within the soil mantle, steel H-piling are is recommended at both abutments. Loads on individual Steel H-piles should not exceed 55 tons, 490 kN, or 9 ksi for a 10 X 42 H-pile.

Abutment 1, Approximate Station 10+074.568
Abutment 2, Approximate Station 10+084.068

A pile tip elevation of 416.8 is recommended with the pile reaching bearing on or in the upper limestone of the Crouse Formation. Driving of the pile should cease once bearing is achieved and the pile is on or in the limestone of the Crouse Formation.

Hydrology

The level of the lake was measured in November of 2000 to be 422.0. Any excavation below this level should be considered saturated and will require sheeting and dewatering equipment.

Investigative Procedure

Information from two power auger soundings at the proposed bridge location as well as information from the 1964 Project 16-75-S-1305 (3), were used to develop the foundation geology at this bridge location.

Acknowledgments

Rob Vervynck, Engineering Technician Senior, and Willard Trout, Engineering Technician, of the Lawrence Regional Geology Office, assisted in the field investigation for this bridge foundation study.

K900-75 K-8212-01 Pottawotamie Co. State Fishing Lake #1 Bridge

11-28-00 upper 30's windy			
Rob Vervynck			
Willand Trout			
D. L. Thompson			
PA # 1	422.93	0°-0.244	Gravel, Road
Sta. 10+074.318	422.68	0.244	Clay, silty, to silt, dark brown, very soft Push .91 to 1.372
	421.49	1.433	Cobble, hard
	421.40	1.524	Clay silty to silt, dark brown, push 1.524 to 1.798
	421.13	1.798	Gravel, heavy
	420.85	2.073	Silt, very soft push 2.134 to 3.048
	419.73	3.200	Gravel, heavy
	419.21	3.719	clay, silty to silt, dark brown pump from water at 3.81, push 3.81 to 4.511
	418.41	4.511	Gravel, heavy
	418.26	4.663	Firm, shale, brown, weathered
	417.90	5.029	Shale, Firmer, olive, weathered
	417.32	5.608	Limestone, shaly
	416.89	6.035	Limestone, hard to shaly
	416.71	6.218	Shale, Firm, smooth
	415.92	7.010	Limestone, shaly
	415.82	7.102	Limestone, hard 7.285 to 7.254 - Shale, break
	415.15	7.772	Limestone, shaly
	414.85	8.077	Shale, very Firm, smooth
	414.79	8.138	Limestone, shaly
	414.48	8.443	Limestone, hard
	414.33	8.595	Shale, Firm
	414.24	8.687	TD

K900-75 K-8212-01 Pottawatomie Co. State Fishing Lake #1 Bridge

PA # 2				
Sta. 10+	084.318	422.95	0°	Gravel, road bed
		422.70	0.244	Clay, silty to silt, very soft, light gravel zones Push 0.98 to 2.80
		420.14	2.804	Clay, silty, dark brown, Firmer
		418.98	3.962	Very Soft, silt - Push to 4.420
		418.53	4.420	Slightly firmer - Push 4.57 to 5.12
		417.82	5.121	Shale, Firm
		417.55	5.395	Limestone, shaly
		417.22	5.730	Limestone, hard to shaly - Shale breaks - 6.14, 6.22
		416.54	6.401	Shale, Firm
		416.15	6.797	Limestone, hard
		415.84	7.102	TD

BM # 11 Rivet & Washer in Concrete Sta. 10+083.418, 2.697 m Lt.

BM # 11	+	−	422.905
TP 1	1.58		424.485
PA 1		1.555	422.930
PA 2		1.535	422.950
BM # 11		1.580	422.905
BM # 11			422.905
TP 1	1.53		424.435
Water Level		2.41	422.025
BM # 11		1.53	422.905

.39 c
.792 1.3
2.6