Table I. Summary of material tests

(Blank spaces indicate data not available)

54175

Classification of the material	Number on plate	Location: 1/4 fraction	1/4 section	Section	Township (S)	Range (E)	Estimated quantity of material (cubic yards)	Average thickness: Material (feet)	Overburden (feet)	Accessibility	Geologic formation or member[1]	Authority for test data[2]	Date of test	Sieve analysis: Percent on 3/4 inch	Percent on 3/8 inch	Percent on No. 4	Percent on No. 16	Percent on No. 100	Percent passed No. 200 (wash)	Description of the material[3]: Fraction	Limestone	Shale	Chert and/or chalcedony	Silt	Laboratory test data: Weight per cubic foot (dry)	Specific gravity (dry)	Gradation factor	Compressive strength ratio: 1 day	3 days	Los Angeles percent loss	Soundness (25 cycles)	Toughness	Cementation	Absorption	Color	Laboratory No.	Remarks
Coarse aggregate	ca 1	NE	SE	10	12	13	50,000	20	4	Good	Glacial outwash	SHCK	1-40	17	33	46	74	92	68	A mixture of silt and cemented particles of chert, granitic sand-gravel, and limestone pebbles.							5.04							100+			38816	Slaking 30+. P.I.=19. 10.2% oversize. Accepted for surface material under Sec. 75, Kans. Hwy Std. Spec. (ed 1937).
	ca 2	NE	NW	7	11	12	7,000	6	0-1	Good	Kame-like glacial deposits	USGS	9-48	3	11	19	38	65	32.68							2.63								60566	
Mixed aggregate	ma 1	NW	NW	9	10	10	150,000			Good	Alluvium	SHCK	1-40	3	6	15	80	100	0.4	Granitic sand-gravel.					108.0	2.60	4.35								38819	0.09% mudballs.
		NW	NW	9	10	10	3,500			Good	Alluvium	SHCK	12-46	0	2	10	76	99	0.67	Siliceous sand-gravel, contains flint and calcareous particles.						2.62	4.12	1.62	1.29	36.2	0.89				clear	49411	Mudballs=0%; shale=0%; sticks=0.07%. Sampled from stockpile. Acceptable under Secs. 108, 110, and 112, Kans. Hwy. Std. Spec (ed 1945).
	ma 2	NW	SW	20	10	10	150,000			Fair	Alluvium	SHCK	3-42	0	2	10	78	99	0.5	Sand gravel consisting of siliceous and calcareous particles.							4.18										44662	Acceptable under Sec. 75, Kans. Hwy. Std. Spec. (ed. 1937).
Fine aggregate	fa 1	SE	SW	17	10	12	5,000			Good	Alluvium	SHCK	2-37	0	0	0	17	99	0.5	A clean, fine, granitic sand.							2.54	1.07	1.05						straw	30959	Acceptable under Sec. 55, Kans. Hwy. Std. Spec. (ed. 1934).
	fa 2	NW	NW	9	10	10	150,000			Good	Alluvium	SHCK	1-40	0	1	4	38	100		Granitic sand.					112.0	2.62	3.18	1.19	1.14		3.17					38817	Acceptable for use as a fine aggregate under Sec 65, Kans. Hwy. Std. Spec. (ed. 1947).
Chert gravel	cg 1	NW	SW	26	10	9	3,000	3	0-3	Poor	Sanborn	USGS	9-48	40	58	70	82	84	15.3	Brown and white flint granules and pebbles in brown clay.						2.39	5.86			2.03	0.97					60565	
	cg 2	NE	NE	6	11	12	10,000	7	0-4	Good	Older gravel	SHCK	5-40	27	53	71	90	100	25.0	Rounded to angular particles of flint in brown clay; some limestone fragments.							6.20							100+			39807	Deval=11.2. 38.70% insoluble in HCL. 18(av.) slaking. Accepted under Sec. 74, Kans. Hwy. Std. Spec. (ed. 1937).
	cg 3	SW	SW	1	11	11	10,000	4	0	Fair	Older gravel	SHCK	5-40	26	55	79	97	100	15.4	Brown and white flint granules and pebbles in brown clay.							6.51							100+			39806	Deval=8.3. 96.54% Insoluble in HCL. 18(av.) slaking. Accepted under Sec. 74, Kans. Hwy. Std. Spec. (ed 1937).
	cg 4	SE	SE	25	11	10	12,000	8	0-1	Good	Older gravel	USGS	9-48	24	37	50	64	70	29.8	C				100		2.21	4.45			20.4	0.97					60564	
																				F	Tr		40	60													
	cg 5	SE	NE	26	11	10	3,000	6	0-2	Good	Older gravel	USGS	9-48	34	51	65	80	85	14.71	C						2.18	5.66			38.3	0.99					60563	
																				F	85			5	10											
	cg 6	SE	NW	10	12	10	15,000	6	0-3	Good	Older gravel	USGS	9-48	33	58	70	83	87	11.32	White, blue, and brown flint and brown clay.						2.18	5.89			2.04	5.94					60569	
	cg 7	NW	SE	18	12	9	3,000	6	0	Good	Alluvium	USGS	9-48	50	68	82	93	97	3.17	C	Tr			100		2.10	7.15			24.8	0.94					60570	
																				F	5		Tr	95													
	cg 8	SE	SE	27	14	10	18,000	5	0-2	Good	Sanborn	USGS	9-48	45	60	74	85	90	9.48	White, and brown flint and brown clay.						2.24	6.32			20.2	0.94					60573	
Limestone gravel	lg 1	SW	NE	25	11	12	2,000	1-4	0	Fair	Alluvium	SHCK	12-47	25	56	73	91	98	1.6	Siliceous and calcareous.					100.6	24.6				22.7	0.96					57918	Trace mudballs, no shale, no sticks. Accepted under Secs. 107 to 110, and 112, Kans. Hwy. Std. Spec. (ed. 1945).
	lg 2	SE	NE	26	11	12	15,000	5	0-5	Good	Sanborn	USGS	10-48	46	59	67	80	89	6.53	Conglomerate composed mostly of limestone pebbles which are flat and irregular.							6.10			36.6						60837	
	lg 3	NW	NW	12	12	11	15,000	6	0-3	Good	Sanborn	USGS	9-48	36	46	55	74	88	11.9	C	5			95			5.55			32.8						60567	
																				F	5		5	90													
	lg 4	NE	NW	5	13	13	10,000	7	0-1	Good	Sanborn	USGS	9-48	29	43	55	72	82	16.33	C	100						5.16								60568	
																				F	85				15											
	lg 5	SW	SW	6	13	9	8,000	1-6	0	Good	Terrace deposit	USGS	9-48	58	76	83	90	93	6.24	C																
																				F	10			90		2.17	6.99			29.6	0.88					60571	
	lg 6	NW	SE	24	13	9	5,000	1-5	0	Good	Terrace deposit	SHCK	8-48	0	34	60	86	93	7.0	Limestone and white and brown chert with some gray silt and clay.							5.33			24.8	0.93					60208	Sieve analysis was made of material after material retained on 3/4" sieve was crushed to pass 3/4" sieve.
	lg 7	NW	NE	35	13	9	5,000	1-5	0	Good	Sanborn	SHCK	8-48	0	47	74	91	96	3.6	Limestone and white chert with some gray silt and clay.							5.84			22.8	0.91					60209	Sieve analysis was made of material after material retained on 3/4" sieve was crushed to pass 3/4" sieve.
Mineral filler	mf 1	SE	NW	23	12	10	100,000	30	0-7	Good	Terrace deposit	USGS	6-49				0	5	93.4	Yellow-clay hardpan.					84.2	2.62							100+			63397	
Limestone	ls 1	NE	NE	36	10	9	20,000	4	0-3	Good	Tarkio limestone	SHCK	7-48							Hard, massive, dark-brown limestone; weathers in large blocks. Fossiliferous.						2.58				31.9	0.94			1.62		59772	Acceptable under supplemental Spec 45-255 and under Secs. 108 to 112, and 114, Kans. Hwy. Std. Spec. (ed. 1945).
	ls 2	NE	NE	27	11	13	20,000	4-7	0-4	Good	Tarkio limestone	USGS	10-48							Hard, massive, brown limestone. Fossiliferous.						2.39				35.0	0.90			5.08		60899	
	ls 3	SW	SE	27	11	13	2,000	1-2	0-4	Good	Maple Hill limestone	USGS	10-48							Hard, massive, brown to gray limestone. Fossiliferous.						2.55				25.0	0.91			2.29		60900	
	ls 4	SE	SE	28	11	13	10,000	5-7	0-4	Good	Dover limestone	USGS	10-48							Massive, brown to gray limestone. Fossiliferous.						2.46				31.8	0.84			2.95		60901	
	ls 5	SE	SW	30	11	13	3,000	2	0-5	Good	Grandhaven limestone	USGS	10-48							Massive, brown to tan limestone; weathers platy in lower part.						2.94				27.2	0.77			3.89		60898	
	ls 6	SW	SE	3	11	10	10,000	6	0-3	Good	Cottonwood limestone member	SHCK	4-46							Hard, massive, gray limestone; some chert nodules. Fossiliferous.						2.07				61.0	0.66			6.76		50859	Not acceptable under Secs. 107 to 112, and 114, Kans. Hwy. Std. Spec. (ed. 1945).
	ls 7	NE	SE	27	11	10	30,000	4	0-4	Good	Cottonwood limestone member	SHCK	11-45							Hard, massive, light gray limestone; scattered chert nodules. Fossiliferous.						2.32				23.0	0.93			41.4		49071	Accepted under Secs. 108 to 112, Kans. Hwy. Std. Spec. (ed 1945). Accepted as wash check under Sec. 91 (ed. 1937).
	ls 8	SE	NE	32	12	13	2,000	1	0-5	Good	Grayhorse limestone member	USGS	10-48							Hard, massive, gray-brown limestone; iron nodules. Fossiliferous.						2.46				28.8	0.92			3.02		60903	
	ls 9	NE	NE	13	12	12	8,000	5	0-6	Good	Houchen Creek limestone member	USGS	10-48							Hard, massive, wavy limestones separated by shale partings.						2.28				37.0	0.79			4.71		60897	
	ls 10	NE	NE	13	12	12	8,000	3	0-3	Good	Americus limestone member	USGS	10-48							Beds of hard, massive, dense, blue-gray limestone, separated by a shale parting.						2.46				32.3	0.80			3.23		60835	
	ls 11	NE	NE	31	12	12	12,000	5	0-2	Good	Neva limestone member	USGS	10-48							Hard, light gray limestone; weathers platy.						2.43				31.9	0.95			3.18		60836	
	ls 12	NE	SE	36	12	12	5,000	3	0-5	Good	Brownville limestone	USGS	10-48							Medium hard, massive limestone; brown to tan-brown; weathers to irregular blocks.						2.52				24.6	0.85			2.91		60902	
	ls 13	SE	NW	10	12	10	5,000	5	0-4	Good	Cottonwood limestone member	SHCK	11-45							Hard, massive, gray limestone; chert nodules present.						2.26				48.9	0.79			5.21		49036	Not acceptable under Secs. 107 to 112, Kans. Hwy. Std. Spec. (ed. 1945).
	ls 14	SW	SE	13	12	10	5,000	2	0-5	Good	Middleburg limestone	USGS	10-48							Hard, massive, gray limestone; weathers blocky to platy.						2.49				29.2	0.78			3.19		60907	
	ls 15	SW	SE	13	12	10	10,000	2-3	0-4	Good	Eiss limestone member	USGS	10-48							Hard, massive, gray limestone; weathers in foot-square blocks; porous.						2.50				32.8	0.88			2.31		60906	
	ls 16	SE	NE	36	12	10	64,500	5	0-3	Good	Cottonwood limestone member	SHCK	5-46							Hard, massive, light gray limestone; flint nodules; weathers in large blocks.						2.26				39.0	0.82			5.76		49588	Accepted under Secs. 110 to 112, Kans. Hwy. Std. Spec. (ed 1945).
	ls 17	SW	NE	13	12	9	25,000	6	0-5	Good	Funston limestone	SHCK	4-46							Medium-hard, massive, gray limestone; weathers in large blocks; porous.						2.23				39.7	0.94			4.76		49584	Accepted under Secs. 107 to 112, and 114, Kans. Hwy. Std Spec. (ed. 1945).
	ls 18	SW	SW	6	13	12	14,500	7	0-2	Good	Threemile limestone member	SHCK	12-39							Medium-hard, massive, gray, cherty limestone; thick limestones at top.					138.5	2.22						5		5.50		38655	Deval=6.8. Sound. Accepted under Secs. 68, 73, and 76, Kans. Hwy. Std. Spec. (ed. 1937).
	ls 19	NW	NW	14	13	12	8,000	5	0-5	Good	Five Point limestone	USGS	10-48							Massive limestone at top, oatmeal texture, alternating soft limestone and shale at base.						2.05				46.0	0.92			7.66		60838	
	ls 20	NW	NW	28	13	12	4,000	7	0-8	Fair	Neva limestone member	SHCK	9-38							Massive limestone with shale parting; gray, hard. Sparsely fossiliferous.					140.9	2.29						9		5.20		35436	Deval=6.7. French coeff.=6.0. Sound. Accepted as an aggregate under Secs. 68 to 71, 73, and 76, Kans. Hwy. Std. Spec. (ed. 1937).
																				Massive, soft, gray limestone.					140.4	2.25						10		5.90		35435	Deval=6.8. French coeff.=5.9. Unsound. Not accepted as an aggregate under Secs. 68 to 71, 73, and 76, Kans. Hwy. Std. Spec. (ed. 1937).
	ls 21	SW	SE	28	13	12	10,000	5-6	0-6	Good	Cottonwood limestone member	SHCK	Unknown							Hard, massive, gray limestone; some chert nodules; weathers in large blocks.					146.6	2.27						6		5.50		38654	Deval=5.4. French coeff.=7.4. Sound. Accepted under Secs. 68 to 71, 73, and 76, Kans. Hwy. Std. Spec. (ed. 1937).
	ls 22	SE	SE	29	13	12	4,000	5	0-5	Poor	Cottonwood limestone member	SHCK	9-38							Hard, massive, light gray limestone; weathers blocky; some chert nodules. Fossiliferous.					146.6	2.35						7		4.10		35439	Deval=6.9. French coeff.=5.8. Sound. Accepted under Secs. 68 to 71, 73, and 76, Kans. Hwy. Std. Spec. (ed. 1937).
	ls 23	SW	NW	23	13	10	25,000	5	0-3	Good	Cottonwood limestone member	SHCK	12-46							Hard, massive limestone; weathers in large blocks; porous; some chert nodules.						2.18				45.2	0.77			6.12		49590	Not acceptable under Secs. 107 to 112, and 114, Kans Hwy. Std. Spec. (ed. 1945).
																										2.15				44.8	0.85			6.57		49589	Acceptable under Secs. 108, 109, 111, 112, and 114, Kans. Hwy. Std. Spec. (ed. 1945).
	ls 24	NW	SE	4	13	9	5,000	3	0-4	Good	Threemile limestone member	SHCK	1-38							Medium-hard, massive limestone; light-gray; weathers blocky.					129.8	2.08						4		4.30		33270	Deval=10.63. French coeff.=3.76. Sound. Accepted as aggregate under Secs. 68, 69, 71, and 72, Kans. Hwy. Std. Spec. (ed. 1937).
	ls 25	SE	NW	6	13	9	29,800	2-8	0-4	Good	Fort Riley limestone member	SHCK	12-39							Hard, massive, gray limestone; weathers in large blocks; porous.					119.6	1.92						6		6.80		38641	Deval=19.4. French coeff.=2.1. Not acceptable under Secs. 68 to 71, 73, and 76, Kans. Hwy. Std. Spec. (ed. 1937).
	ls 26	NE	NE	16	13	9	10,000	6	0-6	Poor	Threemile limestone member	SHCK	12-39							Medium-hard, light gray limestone; many chert nodules and lenses; massive bed at top.					136.7	2.19						5		7.60		38643	Deval=13.0. French coeff.=3.1. Sound. Acceptable under Spec. 37-299, dated 5-19-39, Kans. Hwy. Std. Spec..
	ls 27	SE	NE	18	13	9	20,000	8	0-4	Poor	Florence limestone member	SHCK	12-40							Medium-hard, massive, gray limestone; abundant chert nodules and lenses.					137.3	2.20						4		6.00		38642	Deval=15.2. French coeff.=2.6. Sound. Not acceptable under Secs. 68 to 73, and 76, Kans. Hwy. Std. Spec. (ed. 1937).
	ls 28	NW	NE	24	13	9	8,000	22	0-4	Good	Funston limestone	USGS	11-48							Massive, soft, light gray limestone. Fossiliferous.						1.88				63.2	0.93			6.24		61300	
	ls 29	NW	NE	35	13	9	50,000	33	0-4	Good	Threemile limestone member	USGS	11-48							Massive, soft, light gray limestone; some chert lenses near base. Some fossils.						1.94				55.2	0.92			13.00		61301	
	ls 30	SE	SE	36	13	8	15,000	5	0-6	Good	Fort Riley limestone member	SHCK	1-46							Hard, massive, gray limestone; weathers in large blocks; porous.						2.22				39.4	0.87			6.29		49580	Accepted under Secs. 108 to 112, and 114, Kans. Hwy. Std. Spec. (ed. 1945).
	ls 31	SW	SE	21	14	13	8,000	4	0-2	Good	Grandhaven limestone	USGS	10-48							Hard, massive, brown limestone; weathers in irregular blocks. Fossiliferous.						2.52				27.4	0.83			3.04		60905	
	ls 32	NE	NE	21	14	12	5,000	8	0-6	Good	Howe limestone member	SHCK	4-37							Hard, massive, gray and brown limestone; weathers in large blocks.					148.4	2.33						8		4.30		31320	Deval=6.7. French coeff.=6.0. Sound. Accepted as aggregate under Secs. 58 to 61, Kans. Hwy. Std. Spec. (ed. 1934).
	ls 33	NW	NW	24	14	12	8,000	4	0-6	Good	Five Point limestone	SHCK	9-47							Massive, soft, gray limestone.						2.27				41.9	0.65			6.20		56851	Not accepted under Secs. 107 to 112, and 114, Kans. Hwy. Std. Spec. (ed. 1945).
	ls 34	SE	NE	28	14	12	6,500	10	0-4	Good	Howe limestone member	SHCK	1-39							Hard, massive, tan-brown limestone; porous.					145.4	2.33						11		4.30		38653	Deval=4.7. French coeff.=8.5. Sound. Accepted under Secs. 68 to 71, 73, and 76, Kans. Hwy. Std. Spec. (ed. 1937).
	ls 35	SE	SW	30	14	12	20,000	12	0-3	Good	Howe limestone member	SHCK	12-39							Hard, massive, tan-brown limestone; porous; contains some chert nodules.					149.1	2.39						7		3.00		38648	Deval=7.5. French coeff.=5.3. Sound. Accepted under Secs. 68 to 71, 73, and 76, Kans. Hwy. Std. Spec. (ed. 1937).
	ls 36	NW	NW	31	14	12	50,000	12	0-6	Good	Howe limestone member	SHCK	1-49							Hard, massive, tan-brown limestone; porous; contains some chert nodules.						2.53				28.5	0.96			2.01		61765	Accepted under Seos. 108 to 112, and 114, Kans. Hwy. Std Spec. (ed. 1945), and supplement 45-255.
	ls 37	SW	SW	33	14	12	5,000	6-8	0-8	Good	Howe limestone member	SHCK	10-44							Large, massive, tan-gray limestone; porous; weathers in large blocks.						2.33				39.6	0.96			5.40		48037	Accepted under Secs. 68, 69, 71, 73, and 76, and supplements 37-671 and 37-701, Kans. Hwy. Std. Spec. (ed 1937).
	ls 38	NE	SW	4	14	11	2,000	6	0-4	Good	Neva limestone member	SHCK	6-35							Beds of hard, light gray limestone separated by shale partings.					152.0	2.43						6		1.84		25958	Deval=7.34. French coeff.=5.45. Sound. Accepted as aggregate and riprap under Secs. 58, 59, 61, 63, and 78, Kans. Hwy. Std. Spec. (ed. 1937).
	ls 39	SW	NW	3	15	13	10,000	5	0-5	Good	Dover limestone	USGS	10-48							Medium-hard, massive, gray to brown limestone.						2.51				26.2	0.82			3.46		60904	
	ls 40	SW	SW	8	15	13	2,080	5	0-4	Good	Aspinwall limestone	SHCK	12-41							Hard, dense, massive, brown limestone.					166.0	2.66				29.4				0.90		44050	Sound at 25 cycles. Accepted under Secs. 68, 69, 71, 73, and 76, Kans. Hwy. Std. Spec. (ed. 1937).
	ls 41	SE	NE	11	15	11	3,000	7	0-3	Good	Neva limestone member	SHCK	12-41							Beds of hard, massive, gray limestone separated by shale partings.					154.1	2.48				31.1		5		2.50		44047	Sound at 25 cycles. Accepted under Secs. 68 to 71, 73, and 76, Kans. Hwy. Std. Spec. (ed. 1937).

1. All correlations with geologic formations or members by USGS.
2. SHCK, State Highway Commission of Kansas: sample collection and test data. USGS, U.S. Geological Survey: sample collection and description of material; test data by SHCK.
3. C, coarse fraction, retained on No. 4 sieve; F, fine fraction, passed through No. 4 sieve; Tr, trace; in terms of percent composition.

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This report is preliminary and has not been edited or reviewed for conformity with Geological Survey standards or nomenclature.