OFFICE MEMORANDUM

DATE: July 6, 1978

TO: L. T. Oehler
Engineer of Research

FROM: R. W. Muethel

SUBJECT: Petrographic Analysis of Coarse Aggregate: Paquin Gravel Co. #2, Pit No. 21-19 (Testing Laboratory Sample No. 78 A-758). Research Report No. R-1093.

On May 22, 1978, a sample of crushed gravel was received by the Department's Testing Laboratory Section. Information accompanying the sample stated the material was obtained from a stockpile at the Paquin Gravel Co. #2, Pit No. 21-19, location southwest of southeast, Section 21, T40N, R23W, Delta County. The material was produced for use in bituminous mixtures (25A, 1976 Standard Specifications). The material was submitted to the Laboratory to be tested for information. Petrographic analysis of a portion of the sample was requested by G. H. Gallup.

Summary

Rock Class	Condition of Particles	Percent of Sample
Igneous	Hard, fresh, and non-porous	1
Sedimentary	Hard to soft, fresh to moderately weathered, and non-porous to porous	99

Approximately 41 percent of the sample was found to be contained in rock type categories having absorption values from 2.2 to 2.4 percent.

Detailed tabulations of petrographic composition, specific gravity, and absorption are included in Tables 1 and 2.

Detailed Petrography

Petrographic examination was conducted in general conformance with ASTM C295, "Petrographic Examination of Aggregates for Concrete." Representative portions—300 particles—of the noted sieve fractions of the sample were identified megascopically along with acid testing and a scratch test for hardness, and microscopically with

a stereomicroscope. Specific gravity and absorption determinations were performed in general accordance with ASTM C127, "Specific Gravity and Absorption of Coarse Aggregate." Determinations included all material of the rock types analyzed. The following sheets contained the rock type descriptions.

TESTING AND RESEARCH DIVISION

R. W. Muethel

Geologist - Materials Research Unit

TABLE 1
PETROGRAPHIC COMPOSITION
Testing Laboratory Sample No. 78 A-758

Rock Type	Sieve Fraction Analyzed				Computed Sample Composition
	1 to 3/4-in.	3/4 to 1/2-in.	1/2 to 3/8-in.	3/8 to No. 4	
Granite	---	---	0.3	0.3	0.3
Gabbro	---	---	---	0.7	0.4
Limestone, dense	---	---	46.4	49.3	47.8
Limestone, porous	---	---	21.0	18.3	19.6
Shaly and Argillaceous Limestone	---	---	3.0	0.7	1.8
Dolomitic Limestone	---	---	---	1.0	0.5
Dolomite, dense	---	---	9.0	8.0	8.5
Dolomite, porous	---	---	19.3	20.7	20.0
Sandstone	---	---	0.7	0.7	0.7
Siltstone	---	---	0.3	---	0.2
Siderite	---	---	---	0.3	0.2
Totals, percent	---	---	100.0	100.0	100.0

Note: Computed sample composition is based upon counts of 300 particles contained in each of the sieve fractions noted.

TABLE 2
SPECIFIC GRAVITY AND ABSORPTION DATA
Testing Laboratory Sample No. 78 A-758

Rock Type	Specific Gravity			Absorption, percent	Composition, Percent by Weight
	Bulk, dry	Bulk, ssd	Apparent		
Granite	*	*	*	*	0.4
Gabbro	*	*	*	*	0.2
Limestone, dense	2.64	2.67	2.72	1.08	48.6
Limestone, porous	2.58	2.63	2.73	2.22	19.2
Shaly and Argillaceous Limestone	2.53	2.59	2.70	2.44	2.8
Dolomitic Limestone	*	*	*	*	0.1
Dolomite, dense	2.76	2.78	2.83	0.85	8.8
Dolomite, porous	2.63	2.69	2.79	2.23	19.3
Sandstone	*	*	*	*	0.6
Siltstone	*	*	*	*	TR
Siderite	*	*	*	*	TR
Total Sample	--	--	--	--	100.0

NOTE: Values are computed from determinations made on all sample material contained in the categories noted. Asterisks indicate no determination due to insufficient material in sample.

IGNEOUS ROCKS		
Rock Type	Granite	Gabbro
Color	mottled buff to white and gray to black	mottled gray and dark green to black
Texture	medium to fine grained	medium to fine grained
Luster	dull	dull
Hardness	Mohs 6 to 7	Mohs 5-1/2 to 6
Porosity	non-porous	non-porous
Particle Shape	angular	angular
Particle Surface	fresh, rough, dented to ridged	fresh, rough, dented to ridged

SEDIMENTARY ROCKS			
Rock Type	Limestone, dense	Limestone, porous	Shaly to Argillaceous Limestone
Color	buff to gray; and mottled buff and gray to brown	buff; gray; and mottled buff and gray	mottled buff; gray; and yellowish brown
Texture	very fine grained to micro-crystalline	fine to very fine grained	very fine grained to microcrystalline
Luster	dull	dull to earthy	dull to earthy
Hardness	Mohs 3	Mohs 2-1/2 to 3	Mohs 2-1/2 to 3
Porosity	non-porous to slightly porous	finely porous	finely porous
Particle Shape	angular	angular	angular
Particle Surface	fresh, rough to moderately smooth, dented to ridged	fresh, rough to moderately smooth, dented to ridged	fresh to slightly weathered, rough to moderately smooth, dented to ridged
Remarks		Many particles contain traces of argillaceous material.	

SEDIMENTARY ROCKS (Cont.)			
Rock Type	Dolomitic Limestone, dense	Dolomite, dense	Dolomite, porous
Color	buff	gray; and mottled gray and buff	buff; gray; and mottled buff and gray
Texture	very fine grained to micro-crystalline	very fine grained to micro-crystalline	fine grained to micro-crystalline
Luster	dull	dull	dull to earthy
Hardness	Mohs 3 to 3-1/2	Mohs 3-1/2 to 4	Mohs 3-1/2 to 4
Porosity	non-porous	non-porous to slightly porous	finely porous
Particle Shape	angular	angular	angular
Particle Surface	fresh, rough to moderately smooth, dented to ridged	fresh, rough, dented to ridged	fresh, rough, dented to ridged
Remarks			A number of particles contain small argillaceous exposures.

SEDIMENTARY ROCKS (Cont.)			
Rock Type	Sandstone	Siltstone	Siderite
Color	mottled buff to white, and pink to reddish brown	buff	mottled reddish and yellowish brown
Texture	coarse to medium grained	very fine grained	fine grained to microcrystalline
Luster	dull to vitreous	dull to earthy	dull
Hardness	Mohs 7	Mohs 2-1/2 to 3	Mohs 4-1/2
Porosity	Porous	finely porous	finely porous
Particle Shape	angular to subrounded	angular to subrounded	angular to subangular
Particle Surface	fresh, rough, dented to ridged	fresh to slightly weathered, moderately smooth, dented to ridged	fresh to moderately weathered, rough, dented to ridged