

## 23. CHARACTERISTICS OF PEBBLES FROM CENOZOIC MARINE GLACIAL SEDIMENTS IN THE ROSS SEA (DSDP SITES 270-274) AND THE SOUTH INDIAN OCEAN (SITE 268)

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### INTRODUCTION

The 984 pebbles on which this study is based are from late Cenozoic sediments in the Ross Sea (DSDP Sites 270-274), and from Site 268, 200 km off the coast of Antarctica in the South Indian Ocean (Figure 1). No pebbles were found in cores at Site 269, midway between Sites 268 and 274 and a similar distance from the continent. Nor were any found unequivocally in place at Site 267, which was more densely populated with icebergs at the time of drilling than any of the other sites on Leg 28. The pebbles occur scattered through poorly sorted fine-grained sediment, largely silty clay, of which they normally form less than 2%. The context indicates that they were deposited from melting ice and that they were probably derived by glacial erosion.

The study was undertaken to document the characteristics of the pebbles and to see if changes in characteristics areally or with time could be used to provide evidence for changes in Antarctic climate or for tectonic events in the late Cenozoic. It seemed likely that pebbles from some intervals might record the effects of non-glacial processes. In addition, pebble lithologies were determined both to place limits on the location of the source regions and to ascertain the geological character of the source.

The pebbles were collected onboard for later measurement and description, except for those from Site 268, which were measured and described onboard. Sampling was necessarily somewhat erratic. The pebbles were picked out by hand, and the small but variable numbers collected over most of the core length reflect to some degree the time available for sampling and labeling, as well as their sparse distribution (Figure 2). The stratigraphic distribution of sampled pebbles is considerably different from the abundance of pebbles in the core, which has been plotted for Site 270 by Barrett (this volume). The more lithified cores are less well represented because of the difficulty in extracting pebbles, and smaller pebbles (less than 10 mm in length) have also been discriminated against for practical reasons. However, the uniqueness of the collection persuaded the writer that description was desirable despite the considerable bias in sampling. The attributes measured and described for each pebble are given in Table 1. A listing of the observed and derived properties for each pebble is filed with the Deep Sea Drilling Project.

### SHAPE AND ROUNDNESS

The range in sphericity of Ross Sea pebbles is not large, and the mean values are close both to pebbles in deposits of continental glaciers and to river pebbles

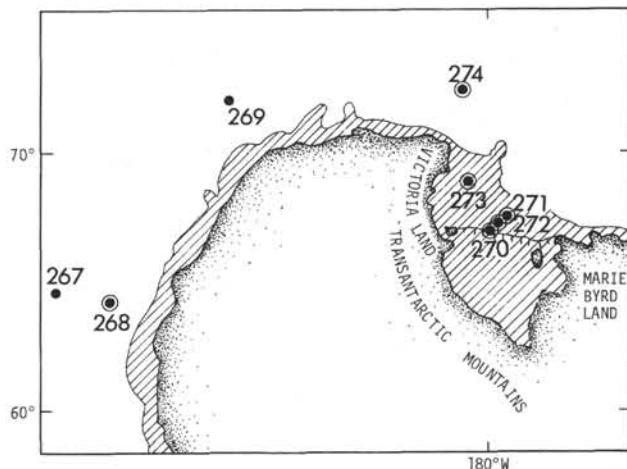


Figure 1. Locality map for Leg 28 sites near Antarctica. Only circled sites yielded ice-rafted pebbles. The stippled area lies between the 0 and 100 meter isobaths.

(Table 2), though Sneed and Folk (1958) found that rivers had very little effect on pebbles for transport distances up to 200 miles. Other shape indices indicate that the Ross Sea pebbles have little preference for being either prolate (elongate) or oblate (disk-shaped).

Roundness appears significantly lower than for river pebbles, and is much lower than for beach pebbles, though the difference between the Ross Sea pebbles and those in the upstream reaches studied by Sneed and Folk is not large. Roundness of the former is similar to that for pebbles in Pleistocene till in New Hampshire (Krumbein roundness of 0.48 from over 4000 pebbles, Drake, 1971), and for pebbles from Permian tillite in Antarctica (Table 2).

The proportion of striated pebbles from the Ross Sea (Table 2) is much larger than those described by Drake (10% versus 2.9%), or those described by Lindsay (1970) (0.8%). However, Holmes (1960) found 28% of a sample of glacially transported fine-grained sedimentary pebbles to be striated. The differences may be partly due to different proportions of susceptible lithologies, though less than 10% of the Ross Sea pebbles are of fine-grained sedimentary lithologies.

### PEBBLE LITHOLOGY

#### Procedure

Pebbles were identified largely from hand specimen examination, though for about one in five a fragment

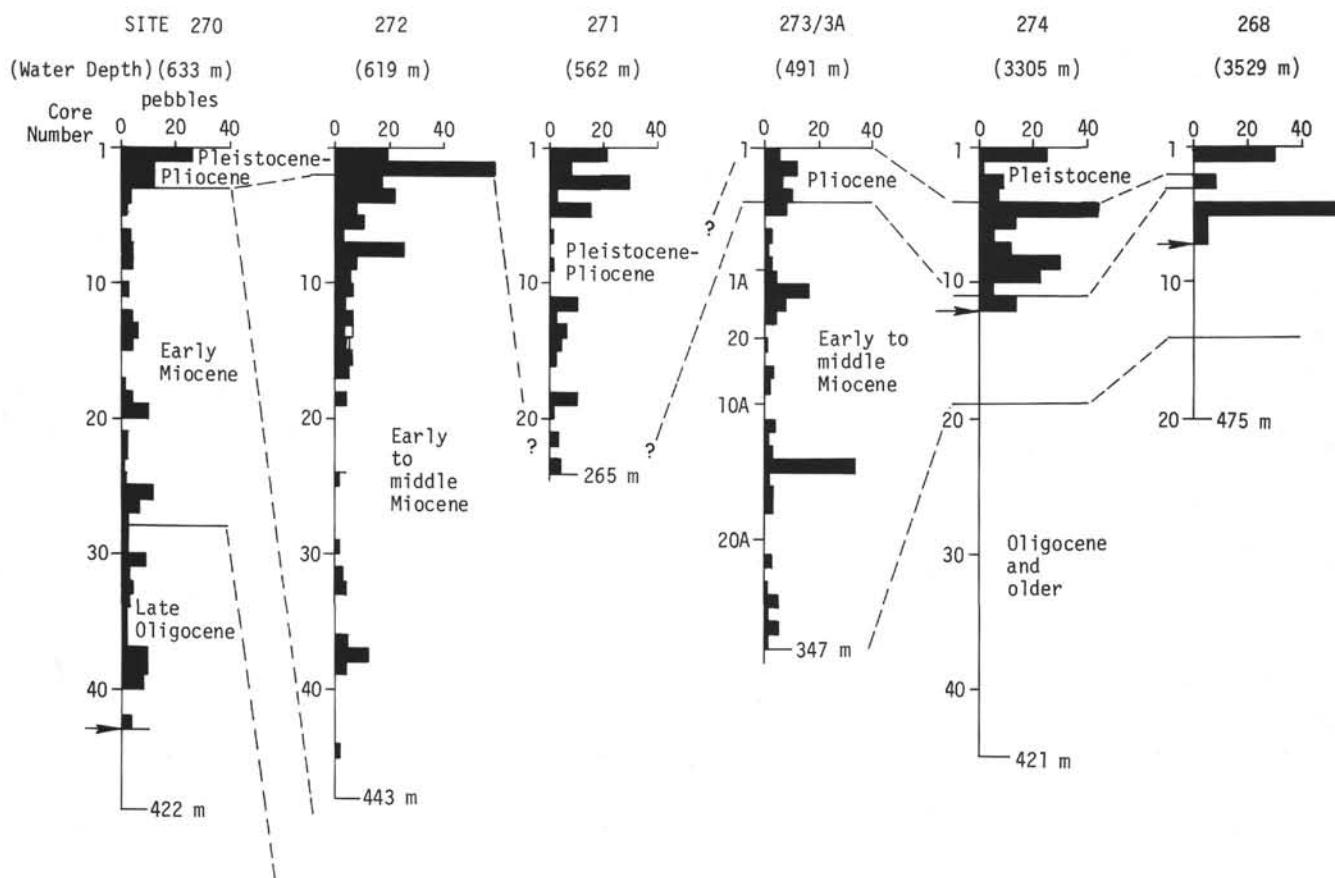


Figure 2. Distribution of pebbles used in this study. Abundances are not closely related to abundances in the core. The lowest limit for pebbles in place at Sites 268, 279, and 274 is indicated by arrows.

TABLE 1  
Properties Observed and Derived for Pebbles Collected on Leg 28

Observed Property	Derived Property	Acceptable Condition of Pebble
a, b, c axes (to 0.1 mm)	Maximum projection sphericity <sup>a</sup> Aschenbrenner sphericity <sup>c</sup> Oblate-prolate index <sup>a</sup> Williams shape factor <sup>d</sup>	Whole <sup>b</sup> Whole Whole Whole
Krumbein roundness <sup>e</sup>		Whole and broken <sup>f</sup>
Diameters of smallest circle fitted to margin and largest inscribed circle	Folk roundness <sup>a</sup>	Whole and broken
Presence of striae		Whole and broken
Lithology		All (Includes pebbles that were drilled, sawn or that appear to have little of the original surface left)

<sup>a</sup> Dobkins and Folk (1970).

<sup>b</sup> Indicates that only whole pebbles were used in averaging derived property.

<sup>c</sup> Aschenbrenner (1956).

<sup>d</sup> Williams (1965).

<sup>e</sup> Krumbein (1941).

<sup>f</sup> Pebbles in this category have at least half of their original surface preserved.

**TABLE 2**  
Shape and Roundness for Pebbles of All Lithologies From DSDP Sites 268 and 270-274

	270-272	273	274	268	Lindsay (1970) Tillite	Sneed and Folk (1958) River	Dobkins and Folk (1970) River	Dobkins and Folk (1970) Beach
Number of whole pebbles	265	77	149	86	1091	111	86	157
Mean size and range (mm)	14 (4-60)	17 (6-45)	12 (4-50)	13 (6-52)	(4-64)	(30-70)	(16-32)	(16-32)
Maximum projection sphericity	0.69 ± 0.11	0.71 ± 0.25	0.67 ± 0.12	0.70 ± 0.09		0.69	0.69 ± 0.10	0.62 ± 0.12
Aschenbrenner sphericity	0.87 ± 0.06	0.87 ± 0.07	0.85 ± 0.07	0.88 ± 0.04	0.87			
Oblate-prolate index	0.55 ± 5.36	-0.28 ± 5.52	0.22 ± 5.82	0.72 ± 4.16			-1.69 ± 5.50	-0.73 ± 5.30
Williams shape factor	0.07 ± 0.29	0.08 ± 0.29	0.09 ± 0.30	0.05 ± 0.23				
Krumbein roundness	0.47 ± 0.09	0.48 ± 0.12	0.40 ± 0.14	0.36 ± 0.12	0.49	0.54 (upstream)		
Folk roundness	0.25 ± 0.17	-	-	-		0.63 (downstream)	0.38 ± 0.19	0.49 ± 0.21
Striated clasts	10%	8%	13%	2%	0.8			

Note: Comparative data are for all lithologies in the Pagoda Tillite (Permian), Antarctica, for quartz pebbles in the Colorado River, and for basalt pebbles from rivers and beaches on Tahiti-nui. The error indicated is one standard deviation.

was crushed on a glass slide for microscopic examination to determine gross mineralogy and the character of the matrix or groundmass. Further control was provided by 30 thin sections from Site 270, 20 from Sites 271-273, and 20 from Site 268. It is estimated from a comparison of hand specimen and thin section determinations that about 90% of the pebbles are correctly categorized. The major problem is the distinction of metamorphic rocks that appear unfoliated in hand specimen but are clearly foliated in thin section. Pebbles of indurated graywacke and argillite have been included with the nonfoliated metamorphic rocks because in hand specimen they cannot be readily distinguished though the former can be easily separated from the quartzose, argillaceous, and calcareous sediments. The results are summarized in Table 3. Inferences concerning source are based largely on the summary of Antarctic bedrock geology compiled by Craddock (1972).

#### South Central Ross Sea (Sites 270-272)

The source region appears to be dominantly a metasedimentary geosynclinal sequence. Pebbles from this sequence (two-thirds of the sample) range from graywacke and argillite (15%), through phyllite and schist (9%) to gneiss (7%). A considerable proportion are hornfels and granofels (16%) and vein quartz and metavolcanic rocks are quite common. The plutonic rocks are largely granitic and somewhat altered. No such terrane is exposed in Marie Byrd Land, which near the coast is extensively intruded by granite in the west and is largely covered by Cenozoic volcanic rocks in the east. Nor is it to be found in the Transantarctic Mountains, where the cover rocks comprise 2000 meters of continental sediments (Beacon Supergroup) overlain by at least 500 meters of Jurassic basalt and intruded by up to 1000 meters of coeval diabase. The exposed basement is largely granitic and can also be excluded as a dominant source.

The source region is inferred to lie in the area between coastal Marie Byrd Land and the central Transantarctic Mountains, a region now covered by ice. Comparison of Miocene and Plio-Pleistocene lithologic proportions indicates very little change in the character of the source

region with time. The only difference that is likely to be significant in the data presented here is the substantially larger proportion of diabase in the Miocene. Most of the pebbles (9 of the 14) come from the interval 34-52 meters subbottom (middle Miocene) at Site 272, and thus represent a relatively short period when ice from the Transantarctic Mountains reached as far west as the south central Ross Sea.

#### Western Ross Sea (Site 273)

The difference in provenance between the Miocene and Plio-Pleistocene pebbles at Site 273 is substantial and appears significant, despite the limited data. The Plio-Pleistocene sample is dominated by metamorphic lithologies, of which the most common is schist. The source region may be significantly, but not greatly, different from that for the south central Ross Sea. The significant number of diabase pebbles indicates that at least some of the ice was passing through the Transantarctic Mountains.

In contrast, diabase is the single most common lithology in the Miocene pebbles. The potential source region is quite limited in extent, the only large volumes of diabase being in the Transantarctic Mountains between the Ohio Range (85°S; 110°W) and the Mawson Glacier (76°10'S). The abundance of diabase in the Miocene pebbles of 273 is comparable with that of pebbles in moraines in the lower Victoria Valley adjacent to McMurdo Sound. Five pebble counts from moraines about 25 km down valley from the main escarpment of Beacon sediments and Jurassic diabase show that the sediments constitute from 0% to 10% and diabase from 20% to 50% of the samples. The other pebbles are largely granitic, even though the underlying basement rocks contain almost as large an area of metasedimentary rocks (data from Calkin, 1971, fig. 6 and 12). The source of the Miocene pebbles at Site 273 is therefore inferred to be a similar area of Beacon sediments intruded by diabase, with a basement largely of geosynclinal metasedimentary rocks. The most likely region is the Beardmore Glacier area, between 82° and 86°S.

TABLE 3  
Lithologies (in percent) of Pebbles from DSDP Sites 268 and 270-274

Site Age Number of Pebbles	270-272 Plio- Pleist 246	270-272 Mio- cenea 298	273 Plio- Pleist 33	273,273A Mio- cene 115	274 Plio-b Pleist 188	268 Plio- Pleist 104
Volcanic	2	3	3	8	13	2
Silicic	x <sup>c</sup>	x	-	2	6	-
Basaltic	2	2	3	6	7	2
Plutonic	13	20	28	52	22	55
Granitic	10	12	13	17	15	48
Gabbroic (Diabase)	3 (x)	8 (5)	15 (6)	35 (28)	8 (6)	7 (-)
Metamorphic	70	65	63	29	53	27
Foliated	18	14	34	12	12	18
Nonfoliated	51	51	28	17	40	9
Sedimentary (Diamictite)	15 (3)	13 (1)	6 (6)	11 (3)	12 (2)	16 (-)
	100%	100%	100%	100%	100%	100%
Other	7%	10%	3%	10%	14%	10%
Striated	8%	11%	3%	10%	13%	2%

<sup>a</sup>Includes 60 pebbles from the late Oligocene at Site 270.

<sup>b</sup>Includes 14 pebbles from the Miocene.

<sup>c</sup>Less than 0.5%.

#### Northern Ross Sea (Site 274)

The pebbles at Site 274, a deep water site 300 km north of the continental margin, are in similar lithologic proportions to those from the south central Ross Sea, again pointing to dominantly a geosynclinal meta-sedimentary source terrane inferred to be the interior of Marie Byrd Land. The most obvious difference is in the larger proportion of volcanic pebbles. The silicic pebbles are likely to have come from the Gallipoli Porphyries (Devonian) of northern Victoria Land; the basalt pebbles being from the late Cenozoic McMurdo Volcanics, an association of highly differentiated alkaline basaltic rocks on the Victoria Land coast. In addition there is a significant, though small, proportion of diabase pebbles from the Transantarctic Mountains. It is believed that most of the ice dropping pebbles at Site 274 came from Marie Byrd Land, but that some came from the western side of the Ross Sea through the Transantarctic Mountains.

All of the Ross Sea sites yielded a few pebbles of semilithified-lithified diamictite, a poorly sorted silty claystone, like most of the sediments from which the pebbles were taken. Sediments with a similar degree of lithification are at present at least 300 and probably about 600 meters below the sea floor at Site 271. The pebbles indicate extensive erosion probably during glacial advances near the margin of the Ross embayment. The oldest diamictite pebble recovered is from the middle Miocene of Site 272.

#### South Indian Ocean (Site 268)

The pebbles at Site 268 are clearly from a different source than those from the Ross Sea sites. Almost half are granitic, and the metamorphic pebbles, the next

largest group, are largely schist and gneiss. No graywacke, argillite, or metavolcanic pebbles were recognized. Several of the rock types are distinctive, although they form a small proportion of the sample. Two of the gabbros are very coarse grained, and in thin section show close alignment of apparent long axes of plagioclase, suggesting derivation from a layered-cumulate mafic intrusion. The sedimentary rocks include both well-sorted fine to medium grained ortho quartzites, like the Devonian of the Transantarctic Mountains, and hematitic orthoquartzite, presumably from a "red-bed" sequence.

The exposed rocks on the adjacent coast from 90° to 150°E are granulite facies schist and gneiss intruded by charnockitic granite, apart from a small area of Precambrian sediment at Mount Sandow. No charnockite was found among the granite pebbles, and the lithologies suggest a more varied terrane that included more varied and younger rocks than those presently exposed along the adjacent coast. However, no other Antarctic region is known where similar lithologies in similar proportions crop out.

#### CONCLUSIONS

The study has shown that the Ross Sea pebbles are similar in roundness to those in glacial deposits and are different from beach and river pebbles. There appears to be no long-term stratigraphic variation in the shape or roundness of the pebbles studied. Ten percent of the pebbles are striated, a large number for a deposit with a small proportion of fine-grained sedimentary lithologies.

Lithologic proportions of pebbles in the Ross Sea indicate that the major source is largely a geosynclinal

metasedimentary sequence intruded by granitic rocks, and located in inland Marie Byrd Land, now covered by ice. Lithologies typical of the Transantarctic Mountains are rare, except for the Miocene at Site 273, where the abundance of diabase and the still considerable proportion of metasediments suggests a source in the central Transantarctic Mountains for that place and time. The source for the pebbles at Site 274 is also clearly the Ross embayment to the south, arguing against the importance of circumpolar transport of coarse glacial debris. Piper and Brisco (this volume) reach a similar conclusion from the large differences in the proportion of ice rafted sediment at Sites 268, 269, and 274, which are equally spaced and about the same distance from the Antarctic coast. No source that can satisfactorily account for the lithologic proportions and types at Site 268 is presently known, though the adjacent coast is largely ice covered. Inferred source rocks of interest include a layered-cumulate mafic intrusion and a "red-bed" sequence.

#### ACKNOWLEDGMENTS

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#### APPENDIX A

Key for pebble data from DSDP Site 268 (104 pebbles), South Indian Ocean, and Sites 270-274 (879 pebbles), Ross Sea, Antarctica:

C/A, B/A	Axial ratios. A, B, C are long, intermediate, and short axes.
SPH	Maximum projection sphericity (Dobkins and Folk, 1970).
OPI	Oblate-prolate index (Dobkins and Folk, 1970).
KRNSS	Roundness (Krumbein, 1941).
FRNSS	Roundness (Dobkins and Folk, 1970).
SIZE	Mean size in mm [(A+B+C)/3] for whole pebbles. A axis for others.
LITHOLOGY STR	S denotes presence of striae on surface.
ASPH	Working sphericity of Aschenbrenner (1956).
WSHAPE	Shape factor of Williams (1965).

Last column on right has a letter indicating the state of the pebble. W = whole; B = broken after deposition; S = sawn; D = drilled; N = no original surface left for other reasons.

Where data are not available or sufficient to calculate the above parameters 0.00 or \*\*\*\*\* have been substituted in the printout.

A copy of the program, which is in FORTRAN IV for a Burroughs 6700, is available on request.

	C/A	B/A	SPH	OPI	KRNSS	FRNSS	SIZE	LITHOLOGY	STR	ASPH	WSHAPE	
268	1	5	1	0.75	0.86	0.87	0.95	0.30	0.00	24.3	GRANODIORITE	
268	1	CC	2	0.57	0.77	0.75	0.58	0.30	0.00	27.3	GRANODIORITE	
268	1	CC	3	0.64	0.88	0.78	-2.60	0.40	0.00	21.0	SANDSTONE	
268	1	CC	4	0.33	0.48	0.61	8.18	0.30	0.00	20.0	GRANITE	
268	1	CC	5	0.59	0.68	0.80	4.70	0.50	0.00	16.7	HORNBLENDITE	
268	1	CC	6	0.45	0.59	0.70	5.50	0.50	0.00	15.0	GRANITE	
268	1	CC	7	0.60	0.75	0.78	2.08	0.30	0.00	15.7	GRANITE	
268	1	CC	8	0.40	0.80	0.58	-4.17	0.30	0.00	14.7	GRANOFELS	
268	1	CC	9	0.42	0.63	0.65	3.24	0.40	0.00	13.0	GRANITE	
268	1	CC	10	0.63	0.79	0.80	1.13	0.40	0.00	15.3	SCHIST	
268	1	CC	11	0.50	0.72	0.70	1.11	0.30	0.00	13.3	SANDSTONE	
268	1	CC	12	0.39	0.61	0.63	3.51	0.30	0.00	12.0	VEIN QUARTZ	
268	1	CC	13	0.56	0.69	0.77	3.81	0.30	0.00	12.0	GRANITE	
268	1	CC	14	0.47	0.67	0.69	2.68	0.50	0.00	10.7	GRANODIORITE?	
268	1	CC	15	0.70	0.80	0.85	2.38	0.30	0.00	8.3	SCHIST	
268	1	CC	16	0.45	0.82	0.63	-3.67	0.50	0.00	8.3	SCHIST	
268	1	CC	17	0.43	0.71	0.64	0.00	0.30	0.00	10.0	GRANITE	
268	1	CC	18	0.46	0.77	0.65	-1.55	0.50	0.00	9.7	VEIN QUARTZ	
268	1	CC	19	0.31	0.44	0.61	10.18	0.30	0.00	9.3	GRANITE	
268	1	CC	20	0.50	0.90	0.65	-6.00	0.30	0.00	8.0	GRANITE	
268	1	CC	21	0.50	0.92	0.65	-6.67	0.30	0.00	9.7	METAQUARTZITE	
268	1	CC	22	0.50	0.75	0.69	0.00	0.40	0.00	9.0	FELDSPAR	
268	1	CC	23	0.45	0.91	0.61	-7.33	0.40	0.00	8.7	GRANODIORITE	
268	1	CC	24	0.45	0.73	0.66	0.00	0.40	0.00	8.0	GRANODIORITE	
268	1	CC	25	0.45	0.82	0.63	-3.67	0.40	0.00	8.3	GRANODIORITE	
268	1	CC	26	0.42	0.83	0.59	-5.14	0.10	0.00	9.0	GRANODIORITE	
268	1	CC	27	0.45	0.73	0.66	0.00	0.30	0.00	8.0	GRANODIORITE	
268	1	CC	28	0.50	0.80	0.68	-2.00	0.30	0.00	7.7	FELDSPAR	
268	1	CC	29	0.64	0.73	0.82	3.93	0.30	0.00	8.7	GRANITE	
268	1	CC	30	0.56	0.67	0.77	4.50	0.30	0.00	6.7	FELDSPAR	
268	1	CC	31	0.33	0.56	0.58	5.00	0.30	0.00	5.7	HORNFELS	
268	1	CC	32	0.33	0.56	0.58	5.00	0.30	0.00	5.7	MUDSTONE	
268	3	CC	1	0.52	0.72	0.72	1.38	0.40	0.00	21.7	GRANITE	
268	3	CC	2	0.37	0.74	0.57	-2.26	0.30	0.00	13.3	SANDSTONE	
268	3	CC	3	0.56	0.75	0.75	1.27	0.30	0.00	12.3	GRANITE	
268	3	CC	4	0.44	0.67	0.67	2.25	0.30	0.00	12.7	GRANODIORITE	
268	3	CC	5	0.62	0.69	0.82	4.88	0.30	0.00	10.0	SCHIST	
268	3	CC	6	0.54	0.69	0.75	3.10	0.40	0.00	9.7	SCHIST	
268	3	CC	7	0.50	0.80	0.68	-2.00	0.30	0.00	7.7	HORNFELS	
268	3	CC	8	0.46	0.72	0.66	0.33	0.50	0.00	44.3	GABBRO	
268	5	1	1	0.52	0.97	0.65	-4.49	0.50	0.00	27.3	GRANITE	
268	5	1	2	0.60	0.83	0.76	-1.39	0.40	0.00	24.3	GRANITE	
268	5	1	3	0.00	0.83	0.00****	0.20	0.00	37.0	GRANITE		
268	5	1	4	0.00	0.83	0.00****	0.20	0.00	27.0	GRANODIORITE		
268	5	1	5	0.33	0.75	0.53	-3.75	0.20	0.00	16.7	GRANODIORITE	
268	5	1	6	0.44	0.56	0.71	6.75	0.20	0.00	12.0	GRANITE	
268	5	1	7	0.47	0.76	0.66	-1.18	0.30	0.00	12.7	GRANITE	
268	5	1	8	0.42	0.67	0.64	1.71	0.40	0.00	8.3	ORTHOQUARTZIT	
268	5	1	9	0.60	0.80	0.77	0.00	0.60	0.00	8.0	?	
268	5	1	10	0.60	0.70	0.80	4.17	0.50	0.00	7.7	MUDSTONE	
268	5	2	11	0.52	0.81	0.70	-1.79	0.60	0.00	52.0	GABBRO	
268	5	2	12	0.42	0.58	0.68	5.52	0.20	0.00	17.3	GNEISS	
268	5	2	13	0.38	0.54	0.65	6.50	0.60	0.00	16.7	MUDSTONE	
268	5	2	14	0.00	0.54	0.00****	0.60	0.00	20.0	MUDSTONE		
268	5	2	15	0.50	0.55	0.77	8.00	0.60	0.00	13.7	SANDSTONE	
268	5	2	16	0.56	0.67	0.77	4.50	0.50	0.00	13.3	OIDRITE?	
268	5	2	17	0.44	0.72	0.65	0.00	0.40	0.00	13.0	FELDSPAR	
268	5	2	18	0.73	0.73	0.90	6.82	0.40	0.00	12.3	HORNBLENDITE	
268	5	2	19	0.59	0.59	0.84	8.50	0.30	0.00	12.3	GRANITE	
268	5	2	20	0.67	0.83	0.81	0.00	0.30	0.00	10.0	BASALT (IRACH)	
268	5	2	21	0.54	0.77	0.72	0.00	0.30	0.00	10.0	GRANODIORITE?	
268	5	2	22	0.35	0.59	0.60	3.46	0.30	0.00	11.0	SCHIST	
268	5	2	23	0.54	0.77	0.72	0.00	0.40	0.00	10.0	FELDSPAR	
268	5	2	24	0.42	0.67	0.64	1.71	0.50	0.00	8.3	VEIN QUARTZ	
268	5	2	25	0.63	0.75	0.50	2.67	0.60	0.00	6.3	GRANITE	
268	5	CC	26	0.00	0.75	0.00****	0.10	0.00	32.0	GRANODIORITE		
268	5	CC	27	0.00	0.75	0.00****	0.40	0.00	35.0	SANDSTONE		
268	5	CC	28	0.47	0.89	0.63	-6.13	0.30	0.00	28.3	GNEISS	
268	5	CC	29	0.00	0.89	0.00****	0.50	0.00	36.0	GNEISS		
268	5	CC	30	0.00	0.89	0.00****	0.30	0.00	28.0	GNEISS		
268	5	CC	31	0.67	0.71	0.04	5.63	0.40	0.00	19.0	GRANODIORITE	
268	5	CC	32	0.57	0.87	0.72	-3.54	0.20	0.00	18.7	GRANITE	
268	5	CC	33	0.63	0.74	0.82	3.39	0.50	0.00	15.0	CORDIERITE	
268	5	CC	35	0.32	0.73	0.52	-3.14	0.50	0.00	15.0	PHYLLOLITE	
268	5	CC	36	0.61	0.94	0.73	-5.54	0.50	0.00	15.3	SANDSTONE	
268	5	CC	37	0.00	0.94	0.00****	0.40	0.00	16.0	GRANITE		
268	5	CC	38	0.56	0.88	0.71	-3.81	0.20	0.00	13.0	GNEISS	
268	5	CC	39	0.50	0.80	0.68	-2.00	0.30	0.00	15.3	BASALT	
268	5	CC	40	0.71	0.88	0.83	-1.42	0.60	0.00	14.7	SCHIST	
268	5	CC	41	0.50	0.75	0.69	0.00	0.30	0.00	12.0	GRANITE	
268	5	CC	42	0.53	0.65	0.76	4.72	0.60	0.00	12.3	ORTHOQUARTZIT	
268	5	CC	43	0.47	0.80	0.65	-2.6d	0.40	0.00	11.3	GRANITE	
268	5	CC	44	0.58	0.75	0.77	1.71	0.40	0.00	9.3	SCHIST	
268	5	CC	45	0.47	0.71	1.00	0.80	-7.00	0.30	0.00	12.7	GRANITE
268	5	CC	46	0.47	0.71	0.68	1.18	0.30	0.00	12.3	SCHIST	
268	5	CC	47	0.35	0.76	0.55	-3.86	0.30	0.00	12.0	ORTHOQUARTZIT	
268	5	CC	48	0.43	0.86	0.60	-5.83	0.20	0.00	10.7	METAQUARTZITE	
268	5	CC	49	0.67	0.80	0.82	1.50	0.40	0.00	12.3	GRANITE	

## CHARACTERISTICS OF PEBBLES FROM CENOZOIC MARINE GLACIAL SEDIMENTS

	C/A	B/A	SPH	OPI	KRNSS	FRNSS	SIZE	LITHOLOGY	STR	ASPH	WSHAPE
268	5 CC 50	0.40	0.80	0.58	-4.17	0.40	0.00	11.0	SCHIST	0.83	0.38 N
268	5 CC 51	0.54	0.69	0.75	3.10	0.20	0.00	9.7	GRANITE	0.91	-0.11 N
268	5 CC 52	0.55	0.64	0.78	5.50	0.30	0.00	8.0	ORTHOQUARTZIT	0.91	-0.26 N
268	5 CC 53	0.44	0.78	0.63	-2.25	0.30	0.00	6.7	GRANITE	0.86	0.27 N
268	5 CC 54	0.56	0.78	0.73	0.00	0.20	0.00	7.0	GRANITE	0.91	0.08 N
268	5 CC 55	0.63	0.63	0.86	8.00	0.30	0.00	6.0	MUDSTONE	0.92	-0.38 N
268	6 1 1	0.00	0.63	0.00*****	0.00	0.00	0.00110.0	GABBRO	*****	*****	D
268	6 1 2	0.00	0.63	0.00*****	0.00	0.00	60.0	GRANODIORITE	*****	*****	D
268	6 1 3	0.00	0.63	0.00*****	0.00	0.00	90.0	GNEISS	*****	*****	D
268	6 1 4	0.00	0.63	0.00*****	0.00	0.00	280.0	GRANITE	*****	*****	D
268	6 1 5	0.00	0.63	0.00*****	0.00	0.00	60.0	GABBRO	*****	*****	D
268	7 1 1	0.00	0.63	0.00*****	0.00	0.00	60.0	GRANODIORITE	*****	*****	D
268	7 1 2	0.00	0.63	0.00*****	0.00	0.00	80.0	GRANODIORITE	*****	*****	D
268	7 1 3	0.00	0.63	0.00*****	0.00	0.00	60.0	GABBRO	*****	*****	D
268	7 1 4	0.00	0.63	0.00*****	0.00	0.00	60.0	=268 7*1 3	*****	*****	D
268	7 2 5	0.00	0.63	0.00*****	0.00	0.00	58.0	GABBRO	*****	*****	D
270	01 01 01	0.38	0.89	0.55	-8.30	0.30	0.43	7.3	VEIN QUARTZ	0.80	0.51 N
270	01 01 02	0.00	0.89	0.00*****	0.50	0.20	29.5	HORNFELS	*****	*****	N
270	01 02 03	0.48	0.53	0.75	8.32	0.50	0.27	9.8	VEIN QUARTZ	0.88	-0.41 N
270	01 02 04	0.59	0.69	0.79	4.12	0.60	0.63	11.4	MUDSTONE	0.92	-0.18 N
270	01 02 05	0.63	0.76	0.81	2.40	0.50	0.00	10.1	HORNFELS	0.93	-0.09 N
270	01 02 06	0.38	0.76	0.57	-2.90	0.60	0.44	4.7	MUDSTONE	0.82	0.34 N
270	01 02 07	0.37	0.82	0.55	-5.76	0.30	0.00	5.7	GRANOFELS	0.81	0.45 N
270	01 02 08	0.00	0.82	0.00*****	0.40	0.00	7.9	CHERT	*****	*****	N
270	01 02 09	0.00	0.82	0.00*****	0.40	0.00	12.6	METAQUARTZITE	*****	*****	N
270	01 02 10	0.55	0.85	0.71	-3.20	0.80	0.40	13.1	MUDSTONE	0.90	0.25 N
270	01 02 11	0.51	0.77	0.69	-0.52	0.50	0.25	11.7	GRANOFELS	0.89	0.14 N
270	01 02 12	0.25	0.75	0.43	-7.00	0.40	0.27	11.9	METAQUARTZITE	0.69	0.57 N
270	01 02 13	0.32	0.58	0.56	3.63	0.40	0.17	14.4	VEIN QUARTZ	0.80	0.05 N
270	01 02 14	0.49	0.88	0.65	-5.38	0.50	0.67	13.5	SCHIST	0.87	0.37 N
270	01 02 15	0.47	0.68	0.69	2.04	0.40	0.24	12.7	METAQUARTZITE	0.88	-0.00 N
270	01 02 16	0.53	0.82	0.70	-2.23	0.40	0.11	19.0	SCHIST	0.89	0.21 N
270	01 02 17	0.51	0.66	0.74	4.02	0.40	0.32	17.3	SCHIST	0.90	-0.16 N
270	01 02 18	0.47	0.92	0.62	-7.37	0.60	0.57	3.9	VEIN QUARTZ	0.86	0.44 N
270	01 02 19	0.71	0.77	0.87	4.22	0.50	0.44	8.6	SCHIST	0.94	-0.17 N
270	01 02 20	0.00	0.77	0.00*****	0.50	0.25	18.3	METAQUARTZITE	*****	*****	N
270	01 02 21	0.50	0.57	0.76	7.02	0.40	0.15	15.8	METAQUARTZITE	0.89	-0.34 N
270	01 02 22	0.00	0.57	0.00*****	0.40	0.05	31.0	GRAYWACKE	*****	*****	N
270	01 CC 23	0.48	0.84	0.63	-4.26	0.40	0.12	6.5	ARGILLITE	0.86	0.34 N
270	01 CC 24	0.43	0.70	0.64	-0.73	0.30	0.25	7.9	GRANOFELS	0.86	0.12 N
270	01 CC 25	0.55	0.79	0.73	-0.53	0.30	0.24	8.9	SHELL	0.91	0.11 N
270	01 CC 26	0.75	0.84	0.88	1.90	0.50	0.42	9.8	METAQUARTZITE	0.94	-0.06 N
270	02 CC 01	0.45	0.84	0.63	-4.57	0.60	0.30	5.7	MUDSTONE	0.86	0.36 N
270	02 CC 02	0.49	0.66	0.71	3.54	0.50	0.50	6.9	MUDSTONE	0.89	-0.12 N
270	02 CC 03	0.73	0.89	0.44	-1.24	0.50	0.40	7.2	MUDSTONE	0.94	0.08 N
270	02 CC 04	0.00	0.89	0.00*****	0.60	0.43	9.4	MUDSTONE	*****	*****	N
270	02 CC 05	0.35	0.52	0.62	5.94	0.30	0.42	7.7	SCHIST	0.83	-0.23 N
270	02 CC 06	0.00	0.57	0.00*****	0.40	0.00	11.0	MUDSTONE	*****	*****	N
270	02 CC 07	0.65	0.85	0.80	-0.98	0.40	0.11	9.4	METAQUARTZITE	0.93	0.09 N
270	02 CC 08	0.00	0.85	0.00*****	0.50	0.00	17.9	SCHIST	*****	*****	N
270	02 CC 09	0.31	0.35	0.65	14.09	0.40	0.09	9.1	GRAYWACKE	0.80	-0.60 N
270	02 CC 10	0.00	0.35	0.00*****	0.50	0.00	20.7	SCHIST	*****	*****	N
270	02 CC 11	0.69	0.81	0.84	1.63	0.50	0.15	13.1	MUDSTONE	0.94	-0.05 N
270	02 CC 12	0.00	0.81	0.00*****	0.50	0.31	24.5	ARGILLITE	*****	*****	N
270	03 01 01	0.53	0.56	0.79	8.12	0.50	0.20	6.6	GRAYWACKE	0.90	-0.40 N
270	03 01 02	0.00	0.56	0.00*****	0.40	0.00	15.4	ARGILLITE	S*****	*****	N
270	03 01 03	0.00	0.56	0.00*****	0.50	0.59	13.0	METAQUARTZITE	*****	*****	N
270	03 01 04	0.00	0.56	0.00*****	0.30	0.00	17.6	SCHIST	*****	*****	N
270	03 01 05	0.58	0.82	0.75	-1.30	0.40	0.19	12.8	GRANITE	0.91	0.14 N
270	03 01 06	0.00	0.82	0.00*****	0.30	0.00	16.4	GRANITE	*****	*****	N
270	03 01 07	0.42	0.57	0.68	5.59	0.40	0.09	13.4	SCHIST	0.86	-0.22 N
270	03 01 08	0.31	0.54	0.56	5.11	0.40	0.18	14.5	SCHIST	0.79	-0.03 N
270	03 01 09	0.00	0.54	0.00*****	0.40	0.13	34.0	GNEISS	*****	*****	S
270	03 01 10	0.00	0.54	0.00*****	0.30	0.12	51.0	GRANODIORITE	*****	*****	S
270	03 01 11	0.00	0.54	0.00*****	0.50	0.00	39.0	GNEISS	*****	*****	S
270	03 CC 12	0.00	0.54	0.00*****	0.60	0.00	45.0	GNEISS	*****	*****	D
271	01 01 01	0.58	0.84	0.74	-1.85	0.40	0.04	15.2	ARGILLITE	0.91	0.17 N
270	04 CC 01	0.37	0.76	0.57	-3.02	0.40	0.10	5.5	METABASALT	0.82	0.35 N
270	04 CC 02	0.35	0.65	0.57	1.10	0.40	0.44	6.7	METABASALT	0.81	0.17 N
270	04 CC 03	0.64	0.81	0.79	0.24	0.50	0.50	7.4	GNEISS	0.93	0.04 N
270	05 02 01	0.43	0.83	0.81	-4.58	0.50	0.25	7.4	GRAYWACKE	0.84	0.37 N
270	05 02 02	0.39	0.68	0.60	0.52	0.40	0.21	16.7	GRAYWACKE	0.84	0.16 N
270	07 02 01	0.63	0.90	0.76	-3.46	0.20	0.04	16.2	VEIN QUARTZ	0.92	0.21 N
270	07 02 02	0.41	0.82	0.59	-4.75	0.30	0.03	14.2	GRANOFELS	0.84	0.39 N
270	07 02 03	0.40	0.84	0.57	-5.95	0.40	0.16	5.2	CHERT	0.82	0.44 N
270	08 02 01	0.00	0.84	0.00*****	0.50	0.00	10.9	ORTHOQUARTZIT	*****	*****	C
270	08 02 02	0.00	0.84	0.00*****	0.40	0.00	10.5	VEIN QUARTZ	*****	*****	C
270	08 02 03	0.00	0.84	0.00*****	0.50	0.00	13.2	GRANOFELS	*****	*****	C
270	08 03 04	0.00	0.84	0.00*****	0.50	0.00	18.8	GRANOFELS	*****	*****	S
270	09 02 01	0.00	0.84	0.00*****	0.40	0.00	27.0	HORNFELS	*****	*****	S
270	09 03 02	0.43	0.53	0.70	7.57	0.50	0.15	16.0	MICROCLINE	0.87	-0.35 N
270	09 03 03	0.00	0.53	0.00*****	0.40	0.00	15.4	GABBRO	*****	*****	N
270	09 04 04	0.00	0.53	0.00*****	0.60	0.69	26.4	LIMESTONE	*****	*****	C
270	10 02 01	0.00	0.53	0.00*****	0.40	0.33	18.9	ORTHOQUARTZIT	*****	*****	S
270	10 02 02	0.00	0.53	0.00*****	0.50	0.50	23.7	GRAYWACKE	*****	*****	S
270	10 02 03	0.00	0.53	0.00*****	0.40	0.00	11.9	METABASALT	*****	*****	C
270	11 01 01	0.00	0.53	0.00*****	0.50	0.00	38.0	LIMESTONE	*****	*****	C
270	11 01 02	0.00	0.53	0.00*****	0.50	0.00	7.6	GRANODIORITE	*****	*****	C
270	11 01 03	0.00	0.53	0.00*****	0.50	0.00	13.6	CHERT	*****	*****	C
270	13 01 01	0.00	0.53	0.00*****	0.50	0.00	13.3	GRANODIORITE	*****	*****	C
270	13 02 02	0.00	0.53	0.00*****	0.50	0.22	14.8	HORNFELS	*****	*****	S
270	13 02 03	0.00	0.53	0.00*****	0.50	0.14	23.3	HORNFELS	*****	*****	S
270	13 03 04	0.45	0.55	0.72	7.20	0.20	0.08	7.7	PLAGIOCLASE	0.88	-0.34 N
270	14 01 01	0.00	0.55	0.00*****	0.40	0.30	10.8	HORNFELS	*****	*****	S
270	14 01 02	0.00	0.55	0.00*****	0.70	0.00	8.5	LIMESTONE	*****	*****	C
270	14 02 03	0.00	0.55	0.00*****	0.80	0.00	14.5	METABASALT	*****	*****	N

C/A	B/A	SPH	OPI	KRNSS	FRNSS	SIZE	LITHOLOGY	STR	ASPH	WSHAPE
270 14 02 04	0.00	0.55	0.00*****	0.60	0.00	8.0	GRANODIORITE	*****		N
270 14 01 05	0.00	0.55	0.00*****	0.50	0.33	58.0	LIMESTONE	*****		S
270 14 01 06	0.00	0.55	0.00*****	0.50	0.11	30.0	CHERT	*****		S
270 15 01 01	0.51	0.55	0.77 8.04	0.40	0.11	31.6	GABBRO	0.89 -0.40		H
270 15 03 02	0.56	0.75	0.74 1.12	0.60	0.19	18.1	GNEISS	0.91 0.01		H
270 15 03 03	0.57	0.93	0.70 -5.98	0.60	0.29	14.5	ARGILLITE	0.90 0.34		H
270 15 01 04	0.62	0.69	0.82 5.06	0.50	0.14	25.3	DIABASE	0.92 -0.23		H
270 18 05 01	0.38	0.90	0.55 -8.80	0.50	0.17	6.8	GRAYWACKE	0.80 0.53		H
270 19 -24 01	0.70	0.76	0.85 4.05	0.50	0.10	21.1	METASILVOLC	0.94 -0.16		H
270 19 02 01	0.65	0.88	0.79 -2.33	0.50	0.43	16.8	METASILVOLC	0.94 0.16		H
270 19 02 02	0.00	0.88	0.00*****	0.40	0.00	55.0	METABASALT	*****		S
270 19 03 03	0.00	0.88	0.00*****	0.50	0.00	23.1	METABASALT	*****		B
270 20 01 01	0.00	0.88	0.00*****	0.60	0.21	10.2	GRAYWACKE	*****		B
270 20 01 02	0.57	0.97	0.70 -7.33	0.50	0.18	10.2	ARGILLITE	0.90 0.38		H
270 20 02 03	0.60	0.83	0.76 -1.08	0.50	0.47	21.8	GNEISS	0.92 0.12		H
270 20 02 04	0.42	0.91	0.58 -8.12	0.50	0.42	13.3	ARGILLITE	0.83 0.49		H
270 20 04 05	0.00	0.91	0.00*****	0.50	0.60	6.1	ARGILLITE	*****		B
270 20 04 06	0.60	0.92	0.73 -4.86	0.60	0.50	6.1	ARGILLITE	0.91 0.28		H
270 20 04 07	0.62	0.98	0.73 -7.32	0.50	0.33	5.0	ARGILLITE	0.91 0.36		H
270 20 05 08	0.00	0.98	0.00*****	0.40	0.00	29.7	GRANITE	*****		B
270 20 06 09	0.49	0.67	0.71 2.98	0.50	0.27	8.7	ARGILLITE	0.89 -0.06		H
270 20 02 10	0.34	0.61	0.58 2.57	0.50	0.25	16.9	GNEISS	0.81 0.09		H
270 22 02 01	0.00	0.61	0.00*****	0.40	0.00	50.0	GNEISS	*****		N
270 22 06 02	0.00	0.61	0.00*****	0.50	0.13	18.7	GNEISS	*****		B
270 23 01 01	0.00	0.61	0.00*****	0.50	0.64	14.5	METASILVOLC	*****		S
270 23 02 02	0.00	0.61	0.00*****	0.40	0.14	35.0	ORTHOCLASE	*****		B
270 24 02 01	0.52	0.78	0.71 -0.69	0.50	0.29	20.1	BASALT	0.90 0.14		H
270 25 04 01	0.50	0.59	0.75 6.35	0.50	0.44	10.1	ARGILLITE	S 0.89 -0.30		H
270 25 04 02	0.00	0.59	0.00*****	0.50	0.36	25.9	SCHIST	*****		B
270 26 03 01	0.58	0.74	0.77 2.16	0.60	0.63	4.4	VEIN QUARTZ	0.92 0.06		H
270 26 03 02	0.57	0.80	0.74 -0.75	0.50	0.77	6.5	GRANITE	0.91 0.12		H
270 26 03 03	0.58	0.63	0.81 -6.50	0.60	0.27	13.1	GRANOFELS	0.91 -0.31		H
270 26 05 04	0.66	0.79	0.82 2.01	0.50	0.23	7.3	GRAYWACKE	0.93 -0.07		H
270 26 05 05	0.00	0.79	0.00*****	0.40	0.00	14.1	GRAYWACKE	*****		N
270 26 05 06	0.00	0.79	0.00*****	0.50	0.04	14.1	GRAYWACKE	*****		N
270 26 06 07	0.00	0.79	0.00*****	0.40	0.21	9.7	ARGILLITE	*****		B
270 26 06 08	0.53	0.92	0.67 -6.15	0.50	0.36	8.0	GRAYWACKE	0.89 0.37		H
270 26 06 09	0.00	0.92	0.00*****	0.40	0.30	11.7	ARGILLITE	*****		B
270 26 06 10	0.79	0.95	0.87 -3.31	0.60	0.78	9.2	ARGILLITE	0.95 0.12		H
270 26 06 11	0.58	0.88	0.72 -3.85	0.40	0.08	15.2	GRANOFELS	0.91 0.26		H
270 26 CC 12	0.58	0.98	0.70 -7.74	0.50	0.04	23.0	METASILVOLC	0.90 0.40		H
270 27 01 01	0.00	0.98	0.00*****	0.40	0.53	48.0	METAQUARTZITE	*****		S
270 27 03 02	0.00	0.98	0.00*****	0.60	0.41	41.0	GRANODIOMITE	*****		S
270 27 03 03	0.00	0.98	0.00*****	0.40	0.67	27.0	ARGILLITE	*****		B
270 27 03 04	0.39	0.53	0.66 6.74	0.60	0.50	18.6	GRANOFELS	0.85 -0.27		H
270 27 04 05	0.00	0.53	0.00*****	0.30	0.00	40.0	LIMESTONE	S*****		N
270 27 04 06	0.79	0.89	0.89 0.46	0.50	0.38	17.5	GRAYWACKE	0.95 -0.00		H
270 28 02 01	0.00	0.89	0.00*****	0.40	0.00	38.0	ARGILLITE	*****		N
270 28 03 02	0.52	0.84	0.69 -3.21	0.60	0.61	39.3	GRAYWACKE	0.89 0.26		H
270 29 01 01	0.00	0.64	0.00*****	0.50	0.35	36.0	METASILVOLC	*****		S
270 29 05 02	0.00	0.84	0.00*****	0.70	0.67	21.2	METAQUARTZITE	*****		S
270 30 01 01	0.43	0.64	0.66 3.27	0.40	0.21	20.6	GABBRO	0.87 -0.06		H
270 30 02 02	0.00	0.64	0.00*****	0.20	0.16	41.0	DIABASE	*****		B
270 31 02 01	0.00	0.64	0.00*****	0.40	0.00	5.6	VEIN QUARTZ	*****		N
270 31 02 02	0.57	0.67	0.79 4.74	0.50	0.16	12.3	GRAYWACKE	S 0.91 -0.22		B
270 31 02 03	0.00	0.67	0.00*****	0.40	0.31	45.0	GRAYWACKE	*****		N
270 31 03 /4	0.00	0.67	0.00*****	0.40	0.00	12.5	=270 31 3 7	*****		N
270 31 03 05	0.00	0.67	0.00*****	0.50	0.00	14.8	METAQUARTZITE	*****		N
270 31 03 06	0.00	0.67	0.00*****	0.10	0.00	16.9	=270 31 3 7	*****		N
270 31 03 07	0.00	0.67	0.00*****	0.20	0.00	18.3	BASALTIC TUFF	*****		N
270 31 05 08	0.00	0.67	0.00*****	0.50	0.00	6.5	ARGILLITE	*****		C
270 31 02 09	0.54	0.57	0.80 8.29	0.60	0.30	12.3	GRANODIORITE	0.90 -0.41		H
270 32 03 01	0.00	0.57	0.00*****	0.60	0.04	58.0	GABBRO	*****		H
270 32 03 02	0.00	0.57	0.00*****	0.70	0.00	0.0	GRAYWACKE	*****		B
270 32 05 03	0.00	0.57	0.00*****	0.50	1.00	26.5	METABASALT	*****		B
270 33 01 01	0.00	0.57	0.00*****	0.50	0.39	50.0	ARGILLITE	*****		S
270 33 05 02	0.00	0.57	0.00*****	0.60	0.00	40.0	CARBONATITE	S*****		S
270 33 06 03	0.00	0.57	0.00*****	0.50	0.19	21.0	GRANITE	*****		S
270 33 06 04	0.00	0.57	0.00*****	0.40	0.00	44.0	ARGILLITE	*****		B
270 34 01 01	0.00	0.57	0.00*****	0.40	0.00	14.4	LIMESTONE	*****		C
270 34 02 02	0.00	0.57	0.00*****	0.40	0.00	15.3	CHERT	*****		C
270 34 03 03	0.00	0.57	0.00*****	0.00	0.00	18.3	SCHIST	*****		S
270 35 02 01	0.00	0.57	0.00*****	0.00	0.00	50.0	MUDSTONE	*****		D
270 35 06 02	0.67	0.70	0.86 6.1d	0.30	0.07	21.5	GRANITE	0.93 -0.27		H
270 36 02 01	0.00	0.70	0.00*****	0.50	0.50	11.1	MUDSTONE	*****		B
270 36 05 02	0.00	0.70	0.00*****	0.60	0.20	30.0	SCHIST	*****		B
270 37 01 01	0.00	0.70	0.00*****	0.60	0.22	60.0	LIMESTONE	*****		C
270 37 03 02	0.00	0.70	0.00*****	0.60	0.25	11.6	LIMESTONE	*****		S
270 38 01 01	0.00	0.70	0.00*****	0.80	0.64	12.0	GRAYWACKE	*****		C
270 38 01 02	0.00	0.70	0.00*****	0.50	0.00	12.0	ARGILLITE	*****		C
270 38 03 03	0.00	0.70	0.00*****	0.50	0.00	0.0	METAQUARTZITE	*****		N
270 38 04 04	0.00	0.70	0.00*****	0.40	0.43	37.0	GRANITE	*****		C
270 38 04 05	0.00	0.70	0.00*****	0.40	0.14	18.1	MUDSTONE	*****		S
270 38 04 06	0.00	0.70	0.00*****	0.40	0.23	18.0	GRAYWACKE	*****		S
270 38 05 07	0.00	0.70	0.00*****	0.40	0.13	13.0	MUDSTONE	*****		S
270 38 06 08	0.00	0.70	0.00*****	0.30	0.29	18.2	GRANITE	*****		B
270 38 06 09	0.24	0.44	0.51 9.90	0.50	0.43	18.5	MUDSTONE	0.74 -0.19		H
270 39 01 01	0.00	0.44	0.00*****	0.50	0.00	40.0	GRANOFELS	*****		B
270 39 01 02	0.00	0.44	0.00*****	0.60	0.00	7.0	ARGILLITE	*****		S
270 39 01 03	0.00	0.44	0.00*****	0.50	0.18	8.6	GRANITE	*****		S
270 39 01 04	0.00	0.44	0.00*****	0.30	0.00	11.2	=270 39 1 8	*****		N
270 39 01 05	0.00	0.44	0.00*****	0.30	0.00	12.7	=270 39 1 8	*****		N
270 39 01 06	0.00	0.44	0.00*****	0.50	0.13	16.4	GRANITE	*****		S
270 39 01 07	0.00	0.44	0.00*****	0.50	0.20	23.0	SCHIST	*****		S
270 39 01 08	0.00	0.44	0.00*****	0.40	0.00	20.5	GRAYWACKE	*****		N
270 39 02 09	0.00	0.44	0.00*****	0.00	0.00	55.0	LIMESTONE	*****		N

## CHARACTERISTICS OF PEBBLES FROM CENOZOIC MARINE GLACIAL SEDIMENTS

C/A	B/A	SPH	OPI	KRNSS	FRNSS	SIZE	LITHOLOGY	STR	ASPH	WSHAPE
270 40 01 01	0.00	0.44	0.00*****	0.40	0.32	13.8	GRANITE	*****	8	
270 40 01 02	0.44	0.74	0.64 -0.52	0.50	0.50	14.4	ARGILLITE	0.86	0.19	M
270 40 02 03	0.00	0.74	0.00*****	0.40	0.00	44.9	MUDSTONE	*****	S	
270 40 02 04	0.51	0.58	0.76 6.82	0.60	0.50	9.2	VEIN QTZ	0.89	-0.33	M
270 40 03 05	0.00	0.58	0.00*****	0.60	0.00	21.0	METASILVOLC	*****	B	
270 40 03 06	0.00	0.58	0.00*****	0.60	0.00	20.0	=270 40 3 5	*****	N	
270 40 04 07	0.70	0.90	0.82 -2.38	0.70	0.70	17.3	ANDESITE	0.94	0.14	M
270 40 05 08	0.63	0.87	0.77 -2.34	0.50	0.09	24.6	GRAYWACKE	S 0.92	0.16	M
270 43 05 01	0.00	0.87	0.00*****	0.40	0.25	15.0	GRAYWACKE	*****	B	
270 43 05 02	0.00	0.87	0.00*****	0.50	0.31	20.0	SILICIC VOLC	*****	S	
270 43 05 03	0.00	0.87	0.00*****	0.30	0.19	19.8	GRAYWACKE	*****	B	
271 01 01 02	0.00	0.87	0.00*****	0.30	0.00	18.6	GRANITE?	*****	N	
271 01 01 03	0.00	0.87	0.00*****	0.50	0.27	16.5	GRANOFELS	*****	B	
271 01 01 04	0.70	0.86	0.83 -0.24	0.60	0.47	8.4	SANDSTONE	0.94	0.04	M
271 01 01 05	0.00	0.86	0.00*****	0.30	0.23	37.0	METAM GABBRO	*****	B	
271 01 01 06	0.39	0.76	0.58 -2.86	0.50	0.13	30.1	GRANOFELS	S 0.83	0.33	M
271 01 01 07	0.55	0.90	0.69 -5.01	0.50	0.22	20.7	GNEISS	0.90	0.32	M
271 01 01 08	0.37	0.87	0.54 -7.88	0.50	0.03	14.4	HORNFELS	0.80	0.51	M
271 01 01 09	0.21	0.88	0.37-15.98	0.40	0.14	14.0	SCHIST	0.62	0.72	M
271 01 01 10	0.61	0.82	0.76 -0.16	0.50	0.13	13.8	METASILVOLC?	0.92	0.11	M
271 01 01 11	0.63	0.87	0.77 -2.26	0.40	0.06	9.5	GRANITE	0.92	0.16	M
271 01 01 12	0.50	0.58	0.75 6.79	0.60	0.05	7.5	SCHIST	0.89	-0.33	M
271 01 01 13	0.54	0.85	0.70 -3.11	0.50	0.10	8.7	METAQUARTZITE	0.90	0.25	M
271 01 CC 14	0.55	0.70	0.76 3.20	0.50	0.25	61.3	SCHIST	0.91	-0.12	M
271 01 CC 15	0.55	0.87	0.71 -3.64	0.50	0.22	36.3	SCHIST	0.90	0.26	M
271 01 CC 17	0.00	0.87	0.00*****	0.40	0.08	33.0	GNEISS	*****	B	
271 01 CC 18	0.41	0.66	0.63 1.83	0.40	0.23	30.4	METABASALT	S 0.85	0.06	M
271 01 CC 19	0.00	0.93	0.00*****	0.30	0.07	23.0	GRANITE	0.86	0.44	M
271 01 CC 20	0.46	0.95	0.61 -9.00	0.30	0.04	12.2	GRANOFELS	*****	B	
271 01 CC 21	0.00	0.95	0.00*****	0.30	0.00	14.7	METASILVOLC	*****	B	
271 02 01 01	0.00	0.95	0.00*****	0.00	0.00	96.0	DIORITE	*****	D	
271 02 01 02	0.00	0.95	0.00*****	0.00	0.00	79.0	SCHIST	*****	D	
271 02 CC 03	0.00	0.95	0.00*****	0.40	0.00	70.0	METASILVOLC	S*****	B	
271 02 CC 04	0.00	0.95	0.00*****	0.30	0.00	55.0	CHERT	*****	B	
271 02 CC 05	0.40	0.81	0.58 -4.64	0.30	0.08	50.0	SCHIST	0.83	0.40	M
271 02 CC 06	0.40	0.62	0.64 3.26	0.50	0.02	13.8	GRANITE	0.85	-0.04	M
271 02 CC 07	0.00	0.62	0.00*****	0.30	0.00	9.4	GRANITE	*****	N	
271 03 01 01	0.42	0.87	0.58 -6.77	0.50	0.22	6.0	GRANOFELS	0.83	0.45	M
271 03 01 02	0.55	0.92	0.69 -5.73	0.40	0.10	11.0	GRANITE	0.90	0.34	M
271 03 01 03	0.00	0.92	0.00*****	0.30	0.00	22.1	GRANODIORITE	*****	B	
271 03 01 04	0.45	0.74	0.65 -0.46	0.50	0.13	6.4	MARBLE	0.87	0.17	M
271 03 01 05	0.00	0.74	0.00*****	0.40	0.00	10.4	GRANITE	*****	N	
271 03 01 06	0.36	0.88	0.53 -8.46	0.40	0.31	5.5	HORNFELS	0.79	0.53	M
271 03 01 07	0.43	0.69	0.65 1.12	0.40	0.29	7.7	VEIN QUARTZ	0.86	0.09	M
271 03 01 08	0.00	0.69	0.00*****	0.30	0.00	14.0	VEIN QUARTZ	*****	N	
271 03 01 09	0.00	0.69	0.00*****	0.40	0.00	13.6	SCHIST	*****	N	
271 03 01 10	0.26	0.85	0.43-11.73	0.40	0.15	9.6	SCHIST	0.68	0.65	M
271 03 01 11	0.37	0.74	0.57 -2.22	0.50	0.11	11.5	SCHIST	0.82	0.32	M
271 03 02 12	0.39	0.66	0.61 1.2/	0.60	0.30	5.7	DIAMICTITE	0.84	0.12	M
271 03 02 13	0.23	0.49	0.47 6.98	0.50	0.24	6.5	ARGILLITE	0.72	0.05	M
271 03 02 14	0.26	0.39	0.56 12.64	0.30	0.16	6.8	FELDSPAR	0.77	-0.42	M
271 03 02 15	0.00	0.39	0.00*****	0.30	0.00	15.1	METABASALT	*****	B	
271 03 02 16	0.62	0.63	0.85 7.60	0.60	0.50	7.1	ARGILLITE	0.92	-0.36	M
271 03 02 17	0.00	0.63	0.00*****	0.50	0.00	11.1	SCHIST	*****	B	
271 03 02 18	0.00	0.63	0.00*****	0.50	0.00	12.9	SCHIST	*****	B	
271 03 02 19	0.00	0.63	0.00*****	0.40	0.00	10.9	VEIN QUARTZ	*****	B	
271 03 02 20	0.00	0.63	0.00*****	0.30	0.05	13.8	METASILVOLC	*****	B	
271 03 02 21	0.38	0.80	0.56 -4.79	0.60	0.50	11.0	GRAYWACKE	0.81	0.41	M
271 03 02 22	0.00	0.80	0.00*****	0.40	0.00	21.8	ARGILLITE	S*****	B	
271 03 02 23	0.00	0.80	0.00*****	0.40	0.00	16.9	HORNFELS	*****	B	
271 03 02 24	0.00	0.80	0.00*****	0.20	0.00	19.9	GRANOFELS	*****	B	
271 03 CC 25	0.59	0.85	0.74 -2.21	0.60	0.50	9.1	GRAYWACKE	0.91	0.18	M
271 03 CC 26	0.43	0.88	0.59 -6.66	0.50	0.50	9.9	GRANOFELS?	0.84	0.44	M
271 03 CC 27	0.00	0.88	0.00*****	0.50	0.00	19.5	GRANITE	*****	B	
271 03 CC 28	0.00	0.88	0.00*****	0.50	0.00	8.0	GRANOFELS	*****	D	
271 03 CC 29	0.00	0.88	0.00*****	0.40	0.00	56.0	GRANITE	*****	B	
271 04 01 01	0.39	0.88	0.56 -7.83	0.40	0.18	25.0	ORTHQUARTZIT	0.81	0.50	M
271 04 01 02	0.00	0.88	0.00*****	0.50	0.00	46.0	MUDSTONE CALC	*****	N	
271 05 01 01	0.00	0.88	-0.00*****	0.30	0.00	10.7	GRANITE	*****	N	
271 05 01 02	0.36	0.40	0.69 12.18	0.40	0.13	18.2	METABASALT	0.83	-0.56	M
271 05 02 03	0.00	0.40	0.00*****	0.50	0.22	9.1	ARGILLITE	*****	S	
271 05 02 04	0.00	0.40	0.00*****	0.60	0.45	10.4	GRAYWACKE	*****	S	
271 05 02 05	0.00	0.40	0.00*****	0.30	0.00	8.1	ARGILLITE	*****	B	
271 05 02 06	0.54	0.77	0.72 -0.23	0.40	0.21	13.3	DIORITE	0.90	0.10	M
271 05 02 07	0.00	0.77	0.00*****	0.50	0.00	32.0	DIORITE	*****	D	
271 05 04 08	0.39	0.73	0.59 -1.54	0.30	0.06	6.8	GRAYWACKE	S 0.83	0.28	M
271 05 04 09	0.00	0.73	0.00*****	0.30	0.00	11.4	GRANITE	*****	B	
271 05 04 10	0.27	0.54	0.52 4.87	0.40	0.13	9.1	PHYLLITE	0.76	0.06	M
271 05 04 11	0.00	0.54	0.00*****	0.40	0.00	13.7	GRANODIORITE	*****	B	
271 05 04 12	0.51	0.79	0.69 -1.47	0.50	0.15	13.6	SANDSTONE	0.89	0.19	M
271 05 04 13	0.42	0.98	0.56-11.26	0.40	0.11	14.2	VEIN QUARTZ	0.82	0.57	M
271 05 04 14	0.27	0.62	0.49 0.95	0.50	0.24	18.5	PHYLLITE	S 0.75	0.28	M
271 05 04 15	0.35	0.69	0.56 -0.71	0.50	0.16	27.3	GRAYWACKE	0.81	0.28	M
271 07 CC 01	0.00	0.69	0.00*****	0.50	0.00	65.0	METAQUARTZITE	*****	B	
271 09 CC 01	0.00	0.69	0.00*****	0.40	0.26	18.5	GRAYWACKE	*****	B	
271 12 01 01	0.00	0.69	0.00*****	0.50	0.30	79.0	HORNFELS?	S*****	B	
271 12 01 02	0.00	0.69	0.00*****	0.20	0.00	8.5	GRANITE	*****	N	
271 12 01 03	0.33	0.67	0.55 0.00	0.50	0.44	5.2	GRAYWACKE	0.80	0.25	M
271 12 01 04	0.00	0.67	0.00*****	0.40	0.00	7.9	LIMESTONE	*****	N	
271 12 01 05	0.00	0.67	0.00*****	0.30	0.00	10.0	HORNFELS	*****	N	
271 12 01 06	0.00	0.67	0.00*****	0.50	0.00	13.5	HORNFELS	*****	N	
271 12 01 07	0.61	0.64	0.84 6.91	0.50	0.50	10.1	VEIN QUARTZ	0.92	0.33	M
271 12 01 08	0.00	0.64	0.00*****	0.40	0.00	14.0	GNEISS	*****	B	
271 12 01 09	0.46	0.61	0.70 4.94	0.50	0.16	14.9	GRAYWACKE	0.88	0.20	M
271 12 01 10	0.64	0.65	0.86 7.39	0.40	0.23	17.6	GNEISS	0.92	0.34	M

C/A	B/A	SPH	OPI	KRNSS	FRNSS	SIZE	LITHOLOGY	STR	ASPH	WSHAPE
271 13 01 01	0.00	0.65	0.00*****	0.00	0.00	60+0	GRANO FELS	*****	0	
271 13 01 02	0.00	0.65	0.00*****	0.40	0.00	56+0	GRANO FELS	*****	0	
271 14 CC 01	0.00	0.65	0.00*****	0.30	0.00	14+7	GRANO FELS	*****	0	
271 14 CC 02	0.00	0.65	0.00*****	0.30	0.00	15+2	SAME AS 14CC	*****	0	
271 14 CC 03	0.00	0.65	0.00*****	0.40	0.00	25+4	GRANO FELS	*****	0	
271 14 CC 04	0.46	0.82	0.64 -3.67	0.50	0.13	23+8	ARGILLITE	S 0.87 0.32	M	
271 14 CC 05	0.00	0.82	0.00*****	0.30	0.00	34+6	GRANITE	*****	0	
271 14 CC 06	0.00	0.82	0.00*****	0.40	0.00	38+0	SAME AS 14CC	*****	0	
271 15 CC 01	0.00	0.82	0.00*****	0.00	0.00	60+0	LIMESTONE	*****	0	
271 15 CC 02	0.00	0.82	0.00*****	0.00	0.00	68+0	METASILVOLC	*****	0	
271 15 CC 03	0.00	0.82	0.00*****	0.50	0.00	61+0	DIABASE	*****	0	
271 15 CC 04	0.00	0.82	0.00*****	0.50	0.00	60+0	SANDSTONE	*****	0	
271 16 CC 01	0.00	0.82	0.00*****	0.00	0.00	66+0	GNEISS	*****	0	
271 16 CC 02	0.00	0.82	0.00*****	0.00	0.00	47+0	METASILVOLC	*****	0	
271 19 01 01	0.00	0.82	0.00*****	0.50	0.59	42+0	GRANO FELS	*****	0	
271 19 01 02	0.52	0.82	0.69 -2+38	0.60	0.19	20+9	GRANO FELS	0.89 0.23	M	
271 19 01 03	0.29	0.65	0.51 0.00	0.50	0.25	4+2	VEIN QUARTZ	0.76 0.30	M	
271 19 01 04	0.45	0.67	0.67 2+36	0.50	0.00	4+2	FELDSPAR	0.87 -0.01	M	
271 19 01 05	0.62	0.83	0.78 -6+62	0.50	0.21	8+5	HORN FELS	0.92 0.09	M	
271 19 01 06	0.00	0.83	0.00*****	0.50	0.00	9+4	GRANO FELS	*****	0	
271 19 01 07	0.59	0.70	0.79 3+75	0.50	0.15	12+6	VEIN QUARTZ	0.92 -0.16	M	
271 19 01 08	0.63	0.80	0.79 0.51	0.50	0.14	13+7	GNEISS	0.93 0.02	M	
271 19 01 09	0.00	0.80	0.00*****	0.40	0.00	22+7	HORN FELS	S*****	N	
271 19 01 10	0.00	0.80	0.00*****	0.40	0.00	24+1	METASILVOLC	*****	0	
271 20 01 01	0.00	0.80	0.00*****	0.40	0.00	75+0	BASALT	*****	0	
271 22 01 01	0.00	0.80	0.00*****	0.20	0.00	58+0	GRANO FELS	*****	N	
271 22 01 02	0.00	0.80	0.00*****	0.00	0.00	88+0	GRANODIORITE	*****	D	
271 22 01 03	0.00	0.80	0.00*****	0.40	0.00	49+0	SAME AS 22*1	*****	N	
271 24 02 01	0.71	0.96	0.81 -5+00	0.30	0.30	8+7	METAM GABBRO	0.94 0.22	M	
271 24 02 02	0.45	0.95	0.60 -9+05	0.50	0.08	9+1	HORN FELS	0.84 0.50	M	
271 24 02 03	0.00	0.95	0.00*****	0.50	0.17	14+2	GNEISS	*****	0	
271 24 02 04	0.47	0.60	0.72 5+50	0.40	0.12	13+6	ARGILLITE	0.80 -0.24	M	
272 01 02 01	0.44	0.58	0.64 5+50	0.40	0.13	6+5	GRAYWACKE	0.87 -0.22	M	
272 01 02 02	0.52	0.54	0.79 8+60	0.60	0.24	10+2	LIMESTONE	0.89 -0.43	M	
272 01 02 03	0.35	0.41	0.66 11+51	0.50	0.24	11+4	SCHIST	0.82 -0.51	M	
272 01 02 04	0.63	0.52	0.92 12+84	0.40	0.12	15+6	DIAMICITITE	0.90 -0.58	M	
272 01 02 05	0.59	0.66	0.81 5+85	0.50	0.23	17+0	GRANO FELS	0.92 -0.28	M	
272 01 03 06	0.00	0.66	0.00*****	0.50	0.00	13+2	GRANO FELS	*****	0	
272 01 03 07	0.37	0.58	0.62 4+50	0.50	0.04	11+0	GRANITE	0.84 -0.10	M	
272 01 03 08	0.40	0.61	0.64 3+93	0.60	0.22	13+5	GRAYWACKE	0.85 -0.09	M	
272 01 03 09	0.00	0.61	0.00*****	0.40	0.00	24+3	METASILVOLC	*****	N	
272 01 04 10	0.00	0.61	0.00*****	0.50	0.00	20+7	GRANO FELS	*****	N	
272 01 04 11	0.00	0.61	0.00*****	0.30	0.00	21+5	SANDSTONE	*****	N	
272 01 05 12	0.67	0.83	0.81 0.00	0.60	0.64	6+5	DIAMICITITE	0.93 0.04	M	
272 01 05 13	0.35	0.68	0.56 -0+30	0.40	0.19	8+3	HORN FELS	0.81 0.25	M	
272 01 05 14	0.57	0.67	0.58 -0+00	0.40	0.21	10+9	HORN FELS	0.81 0.24	M	
272 01 05 15	0.56	0.84	0.72 -2+51	0.50	0.08	15+5	PHYLLITE	0.90 0.21	M	
272 01 05 16	0.76	0.78	0.90 5+56	0.50	0.20	13+3	GRAYWACKE	0.94 -0.20	M	
272 01 05 17	0.43	0.63	0.67 3+65	0.40	0.06	17+6	HORN FELS	0.87 -0.09	M	
272 01 05 18	0.35	0.66	0.52 -8+28	0.40	0.11	37+6	HORN FELS	0.78 0.53	M	
272 01 05 19	0.00	0.86	0.00*****	0.40	0.00	75+0	HORN FELS	*****	0	
272 02 01 01	0.00	0.86	0.00*****	0.40	0.00	9+9	HORN FELS	*****	N	
272 02 01 02	0.00	0.86	0.00*****	0.40	0.00	13+3	HORN FELS	*****	B	
272 02 01 03	0.00	0.86	0.00*****	0.50	0.00	11+9	SANDSTONE	*****	N	
272 02 01 04	0.38	0.72	0.58 1+56	0.40	0.17	13+4	SANDSTONE	0.82 0.28	M	
272 02 01 05	0.56	0.76	0.75 0+81	0.50	0.15	9+8	DIORITE	0.91 0.03	M	
272 02 01 06	0.26	0.63	0.47 -0+25	0.40	0.23	13+4	PHYLLITE	S 0.73 0.36	M	
272 02 01 07	0.32	0.69	0.53 1+44	0.50	0.20	14+9	GRAYWACKE	S 0.78 0.33	M	
272 02 02 08	0.52	0.68	0.74 3+18	0.50	0.06	6+0	DIORITE	0.90 -0.11	M	
272 02 02 09	0.33	0.59	0.57 3+39	0.40	0.19	6+0	SCHIST	0.81 0.05	M	
272 02 02 10	0.00	0.59	0.00*****	0.50	0.00	7+4	DOLOMITE	*****	N	
272 02 02 11	0.00	0.59	0.00*****	0.30	0.00	10+0	# 270 2-2 10	*****	N	
272 02 02 12	0.66	0.88	0.79 -2+24	0.50	0.14	8+4	DIORITE?	0.93 0.15	M	
272 02 02 13	0.39	0.70	0.60 -0+22	0.60	0.21	6+8	DOLOMITE?	0.84 0.20	M	
272 02 02 14	0.49	0.65	0.72 3+86	0.50	0.06	10+3	BASALT GLASS	0.89 -0.14	M	
272 02 02 15	0.47	0.73	0.67 0+16	0.60	0.11	9+0	HORN FELS	0.88 0.12	M	
272 02 02 16	0.55	0.80	0.80 0+73	0.50	0.19	10+0	ORTHOQUARTZIT	0.91 0.13	M	
272 02 02 17	0.00	0.80	0.00*****	0.30	0.00	17+1	GNEISS	*****	N	
272 02 02 18	0.51	0.66	0.74 3+90	0.60	0.40	11+9	GRANO FELS	0.90 -0.15	M	
272 02 02 19	0.62	0.65	0.64 6+70	0.50	0.26	13+1	HORN FELS	0.92 -0.32	M	
272 02 02 20	0.64	0.65	0.86 7+23	0.50	0.03	11+5	HORN FELS	0.92 -0.33	M	
272 02 02 21	0.40	0.91	0.56 -8+50	0.50	0.43	14+9	SANDSTONE	0.82 0.51	M	
272 02 02 22	0.65	0.68	0.85 6+38	0.50	0.07	12+5	GRAYWACKE	0.93 -0.29	M	
272 02 02 23	0.42	0.73	0.62 -0+75	0.60	0.28	19+7	MUDSTONE	0.85 0.21	M	
272 02 03 24	0.51	0.83	0.68 -3+10	0.40	0.15	6+6	FELDSPAR	0.89 0.26	M	
272 02 03 25	0.60	0.68	0.81 5+00	0.50	0.54	7+6	METASILVOLC	0.92 -0.23	M	
272 02 03 26	0.43	0.63	0.67 3+62	0.40	0.04	7+3	VEIN QUARTZ	0.87 -0.09	M	
272 02 03 27	0.54	0.87	0.66 -3+90	0.50	0.27	10+7	GRANITE	0.89 0.28	M	
272 02 03 28	0.37	0.75	0.56 -2+90	0.50	0.15	11+0	GRAYWACKE	0.81 0.35	M	
272 02 03 29	0.00	0.75	0.00*****	0.30	0.00	17+4	DIAMICITITE	*****	0	
272 02 03 30	0.00	0.75	0.00*****	0.60	0.40	21+7	DIAMICITITE	S*****	0	
272 02 03 31	0.57	0.71	0.77 3+24	0.50	0.27	12+5	METABASALT	0.91 -0.13	M	
272 02 03 32	0.00	0.71	0.00*****	0.50	0.50	21+7	GNEISS	*****	0	
272 02 03 33	0.37	0.84	0.54 -6+86	0.50	0.12	13+6	PHYLLITE	0.80 0.48	M	
272 02 03 34	0.32	0.70	0.52 -2+02	0.50	0.06	26+9	ARGILLITE	S 0.78 0.43	M	
272 02 03 35	0.20	0.33	0.49 16+85	0.40	0.06	23+5	ARGILLITE	0.71 -0.45	M	
272 02 03 36	0.38	0.69	0.59 -0+16	0.50	0.19	44+8	SCHIST	S 0.83 0.21	M	
272 02 04 37	0.37	0.81	0.55 -5+50	0.40	0.04	7+9	VEIN QUARTZ	0.80 0.44	M	
272 02 04 38	0.38	0.48	0.67 8+81	0.60	0.25	7+5	ARGILLITE	0.85 -0.39	M	
272 02 04 39	0.44	0.71	0.65 0+51	0.50	0.06	8+6	ARGILLITE	0.87 0.12	M	
272 02 04 40	0.45	0.61	0.69 4+45	0.50	0.28	10+3	METABASALT	0.87 -0.16	M	
272 02 04 41	0.62	0.66	0.84 6+42	0.50	0.17	9+8	FELDSPAR	0.92 -0.30	M	
272 02 04 42	0.63	0.82	0.79 -0+34	0.60	0.56	10+2	SANDSTONE	0.93 0.07	M	
272 02 04 43	0.29	0.58	0.53 3+29	0.50	0.08	11+9	MUDSTONE	0.78 0.12	M	
272 02 04 44	0.00	0.58	0.00*****	0.50	0.00	20+9	LIMESTONE	*****	0	
272 02 04 45	0.54	0.66	0.76 4+55	0.50	0.06	11+4	ORTHOQUARTZIT	0.91 -0.20	M	

## CHARACTERISTICS OF PEBBLES FROM CENOZOIC MARINE GLACIAL SEDIMENTS

C/A	B/A	SPH	OPI	KRNSS	FRNSS	SIZE	LITHOLOGY	STR	ASPH	WSHAPE
272 02 04 46	0.19	0.76	0.36	10.71	0.50	0.1/ 11.6	PHYLLITE		0.60	0.67 N
272 02 04 47	0.55	0.63	0.78	5.94	0.60	0.25 15.5	ULORITE		0.91	0.28 N
272 02 04 48	0.45	0.79	0.64	2.53	0.50	0.03 19.0	METAQUARTZITE		0.86	0.27 N
272 02 04 49	0.56	0.74	0.75	1.57	0.50	0.27 23.8	ORTHOQUARTZIT		0.91	0.02 N
272 02 04 50	0.48	0.84	0.65	4.19	0.50	0.22 21.5	BASALTIC TUFF	S	0.87	0.33 N
272 02 04 51	0.00	0.84	0.00*****		0.40	0.32 28.9	GRANITE		*****	B
272 02 04 52	0.30	0.41	0.61	11.53	0.50	0.07 43.3	HORNFELS	S	0.80	0.45 N
272 02 05 53	0.65	0.77	0.82	2.57	0.50	0.10 6.2	CHERT		0.93	0.10 N
272 02 05 54	0.68	0.69	0.88	6.93	0.40	0.14 9.5	BASALT		0.93	0.30 N
272 02 05 55	0.50	0.97	0.63	8.93	0.50	0.38 8.5	HORNFELS		0.86	0.47 N
272 02 05 56	0.00	0.97	0.00*****		0.60	0.33 16.4	SILICIC VOLC		*****	B
272 02 05 57	0.00	0.97	0.00*****		0.50	0.18 18.4	ARGILLITE		*****	B
272 02 05 58	0.00	0.97	0.00*****		0.50	0.25 18.2	DIAMICTITE		*****	B
272 02 05 59	0.00	0.97	0.00*****		0.40	0.00 26.7	APLITE		*****	N
272 03 01 01	0.54	0.72	0.74	2.19	0.60	0.30 34.7	ORTHOQUARTZIT		0.91	0.05 N
272 03 01 02	0.00	0.72	0.00*****		0.40	0.00 25.1	GRANODIORITE		*****	d
272 03 01 03	0.00	0.72	0.00*****		0.40	0.00 21.1	= 270 3 1 2		*****	B
272 03 01 04	0.72	0.77	0.88	4.53	0.50	0.25 6.8	HORNFELS		0.94	0.18 N
272 03 01 05	0.00	0.77	0.00*****		0.40	0.00 11.0	CORDIERITE		*****	B
272 03 01 06	0.00	0.77	0.00*****		0.50	0.00 14.3	BRECCIA		*****	B
272 03 01 07	0.60	0.66	0.81	5.55	0.50	0.55 12.1	FELDSPAR		0.92	0.26 N
272 03 01 08	0.40	0.95	0.55	10.31	0.50	0.18 13.0	ORTHOQUARTZIT		0.81	0.56 N
272 03 01 09	0.00	0.95	0.00*****		0.40	0.00 15.0	DIORITE		*****	N
272 03 01 10	0.47	0.60	0.72	5.48	0.60	0.33 14.2			0.88	0.24 N
272 03 01 11	0.00	0.60	0.00*****		0.40	0.00 23.5	BASALT		*****	B
272 03 01 12	0.00	0.60	0.00*****		0.40	0.00 35.0	LIMESTONE		*****	B
272 03 01 13	0.00	0.60	0.00*****		0.50	0.00 43.0	GRANITE		*****	N
272 03 03 14	0.32	0.74	0.52	3.59	0.50	0.11 7.4	GRANOFELS		0.78	0.41 N
272 03 03 15	0.51	0.75	0.71	0.29	0.50	0.20 10.3	VEIN QUARTZ		0.90	0.08 N
272 03 03 16	0.44	0.64	0.67	3.10	0.50	0.30 17.7	GRANITE		0.87	0.06 N
272 03 03 17	0.56	0.60	0.81	7.37	0.60	0.24 21.3	GRANOFELS		0.91	0.36 N
272 04 01 01	0.54	0.63	0.77	5.57	0.50	0.08 9.4	GRANITE		0.90	0.26 N
272 04 02 02	0.41	0.66	0.64	2.02	0.50	0.08 7.0	ARGILLITE		0.85	0.05 N
272 04 02 03	0.41	0.78	0.60	3.1d	0.50	0.15 16.2	GRANOFELS	S	0.84	0.33 N
272 04 02 04	0.00	0.78	0.00*****		0.50	0.00 65.0	GNEISS		*****	S
272 04 02 05	0.00	0.78	0.00*****		0.50	0.00 52.0	DIABASE		*****	B
272 04 02 06	0.00	0.78	0.00*****		0.60	0.00 60.0	DIABASE		*****	N
272 04 03 07	0.27	0.67	0.47	1.91	0.60	0.05 6.1	ARGILLITE		0.73	0.41 N
272 04 03 08	0.00	0.67	0.00*****		0.50	0.25 10.5	ARGILLITE		*****	B
272 04 03 09	0.41	0.86	0.58	6.52	0.50	0.17 21.6	MARBLE		0.83	0.45 N
272 04 03 10	0.76	0.83	0.89	2.6d	0.60	0.22 26.0	DIABASE		0.95	0.09 N
272 04 03 11	0.00	0.83	0.00*****		0.40	0.00 54.0	METABASALT	S	*****	N
272 04 04 12	0.43	0.82	0.61	4.17	0.50	0.05 7.3	PHYLLOLITE		0.85	0.36 N
272 04 04 13	0.00	0.82	0.00*****		0.40	0.00 25.7	LIMESTONE		*****	B
272 04 04 14	0.54	0.60	0.79	6.97	0.50	0.30 20.4	METASILVOLC		0.90	0.34 N
272 04 04 15	0.34	0.65	0.57	1.14	0.50	0.40 15.5	GRANITE		0.81	0.18 N
272 04 04 16	0.50	0.70	0.71	2.06	0.30	0.30 25.6	DIABASE		0.89	0.02 N
272 04 04 17	0.00	0.70	0.00*****		0.50	0.00 55.0	PHYLLOLITE	S	*****	B
272 04 04 18	0.00	0.70	0.00*****		0.50	0.00 28.2	METAM GABBRO		*****	B
272 04 05 19	0.00	0.70	0.00*****		0.60	0.67 12.2	SANDSTONE		*****	B
272 04 05 20	0.42	0.80	0.60	3.61	0.50	0.19 15.6	DIABASE		0.84	0.34 N
272 04 05 21	0.50	0.59	0.75	6.43	0.50	0.19 19.3	ARGILLITE		0.89	0.30 N
272 04 05 22	0.00	0.59	0.00*****		0.40	0.00 37.0	DIABASE		*****	N
272 05 02 01	0.32	0.73	0.52	3.14	0.60	0.11 7.5	METAM RHMIC		0.77	0.40 N
272 05 02 02	0.40	0.53	0.68	7.33	0.50	0.08 16.4	DIABASE		0.86	0.32 N
272 05 02 03	0.29	0.70	0.50	2.49	0.50	0.09 22.5	GRANOFELS		0.75	0.40 N
272 05 02 04	0.00	0.70	0.00*****		0.50	0.00 30.0	SANDSTONE		*****	N
272 05 02 05	0.00	0.70	0.00*****		0.50	0.00 44.0	SANDSTONE		*****	N
272 05 02 06	0.00	0.70	0.00*****		0.50	0.56 80.0	GNEISS		*****	S
272 05 03 07	0.00	0.70	0.00*****		0.50	0.33 45.0	GRANOFELS		*****	B
272 06 01 01	0.00	0.70	0.00*****		0.30	0.00 14.5	DIABASE		*****	B
272 06 01 02	0.56	0.70	0.77	3.12	0.40	0.14 20.2	ARGILLITE	S	0.91	0.12 N
272 06 01 03	0.00	0.70	0.00*****		0.50	0.34 53.0	DIABASE		*****	S
272 06 02 04	0.54	0.61	0.78	6.32	0.50	0.40 8.7	METAM RHMIC		0.90	0.30 N
272 06 02 05	0.37	0.50	0.65	7.7d	0.50	0.10 9.3	GNEISS		0.84	0.31 N
272 06 02 06	0.00	0.50	0.00*****		0.40	0.00 35.0	GRANITE		*****	N
272 06 03 07	0.00	0.50	0.00*****		0.40	0.00 8.0	GRANITE		*****	B
272 06 03 08	0.00	0.50	0.00*****		0.50	0.00 8.5	SCHIST		*****	B
272 06 03 09	0.71	0.83	0.85	1.17	0.60	0.14 7.1	GRANITE		0.94	0.03 N
272 06 03 10	0.00	0.83	0.00*****		0.50	0.00 28.6	GRANOFELS		*****	D
272 07 01 01	0.00	0.83	0.00*****		0.50	0.00 54.0	SCHIST	S	*****	B
272 07 02 02	0.00	0.83	0.00*****		0.60	0.00 70.0	GNEISS		*****	D
272 08 01 01	0.00	0.83	0.00*****		0.50	0.22 11.8	GNEISS		*****	B
272 08 01 02	0.51	0.52	0.80	9.52	0.50	0.14 9.8	GRANOFELS		0.89	0.48 N
272 08 01 03	0.00	0.52	0.00*****		0.40	0.14 20.0	GRANITE		*****	B
272 08 01 04	0.50	0.57	0.76	7.08	0.60	0.30 13.5	GRANOFELS		0.89	0.34 N
272 08 01 05	0.00	0.57	0.00*****		0.50	0.00 28.2	GNEISS		*****	B
272 08 02 06	0.00	0.57	0.00*****		0.40	0.00 9.2	FELDSPAR		*****	N
272 08 02 07	0.00	0.57	0.00*****		0.50	0.00 16.1	MUDSTONE		*****	B
272 08 02 08	0.00	0.57	0.00*****		0.50	0.14 20.1	HORNFELS		*****	B
272 08 03 09	0.45	0.79	0.64	2.77	0.50	0.15 10.9	GNEISS		0.86	0.28 N
272 08 03 10	0.60	0.97	0.72	7.15	0.60	0.06 9.3	GNEISS		0.91	0.36 N
272 08 03 11	0.45	0.67	0.67	2.23	0.50	0.17 10.2	GRANOFELS		0.87	0.00 N
272 08 04 12	0.00	0.67	0.00*****		0.40	0.17 10.1	GRANOFELS		*****	B
272 08 04 13	0.00	0.67	0.00*****		0.40	0.00 9.7	FELDSPAR		*****	B
272 08 04 14	0.59	0.66	0.81	5.45	0.60	0.13 8.3	GRANITE		0.92	0.25 N
272 08 04 15	0.54	0.80	0.71	1.08	0.50	0.10 7.2	GRANITE		0.90	0.15 N
272 08 04 16	0.53	0.72	0.73	1.69	0.50	0.03 8.9	METASILVOLC		0.90	0.01 N
272 08 04 17	0.47	0.52	0.75	8.45	0.60	0.43 8.4	GRANOFELS		0.88	0.41 N
272 08 04 18	0.00	0.52	0.00*****		0.50	0.00 15.8	HORNFELS		*****	B
272 08 04 19	0.00	0.52	0.00*****		0.50	0.00 11.8	HORNFELS		*****	B
272 08 04 20	0.48	0.73	0.68	0.56	0.50	0.19 10.5	METAQUARTZITE		0.88	0.09 N
272 08 04 21	0.00	0.73	0.00*****		0.50	0.00 22.7	METAM GABBRO	S	*****	B
272 08 04 22	0.53	0.76	0.72	0.36	0.50	0.13 16.8	GRANOFELS		0.90	0.07 N
272 08 04 23	0.00	0.76	0.00*****		0.50	0.00 19.7	GRANOFELS		*****	B
272 08 04 24	0.33	0.82	0.51	7.09	0.50	0.05 11.9	DIABASE		0.77	0.51 N

C/A	B/A	SPH	OPI	KRNS	FRNS	SIZE	LITHOLOGY	STR	ASPH	WSHAPE
272 08 04 25	0.47	0.91	0.62	-6.89	0.60	0.18	13+4	GRANITE	0.86	0.43 N
272 09 02 01	0.00	0.91	0.00*****		0.50	0.00	60+0	GRANITE	*****	***** D
272 09 02 02	0.51	0.64	0.74	4.60	0.40	0.11	18+0	GRANOFELS	0.90	-0.20 N
272 09 02 03	0.00	0.64	0.00*****		0.50	0.00	53+0	= 270 9-2 1	*****	***** D
272 09 03 04	0.46	0.71	0.67	0.91	0.60	0.35	19+2	GNEISS	0.87	0.08 N
272 09 04 05	0.35	0.60	0.59	3.59	0.50	0.25	6+1	GRANOFELS	0.82	0.01 N
272 09 04 06	0.52	0.81	0.70	-1.85	0.50	0.18	11+0	METAQUARTZITE	0.89	0.20 N
272 09 04 07	0.46	0.72	0.67	0.30	0.50	0.02	19+3	GABBRO	0.88	0.12 N
272 10 01 01	0.00	0.72	0.00*****		0.00	0.00	62+0	GRANOFELS	S*****	***** S
272 10 02 02	0.39	0.71	0.59	-0.80	0.60	0.40	12+9	SCHIST	0.83	0.24 N
272 10 02 03	0.55	0.87	0.71	-3.69	0.50	0.17	12+8	LIMESTONE	0.90	0.27 N
272 10 02 04	0.00	0.87	0.00*****		0.40	0.00	22+2	VEIN QUARTZ	*****	***** N
272 10 02 05	0.00	0.87	0.00*****		0.40	0.00	22+5	= 270 10-2 4	*****	***** N
272 11 01 01	0.63	0.99	0.74	-7.71	0.50	0.13	16+8	GRANOFELS	0.91	0.36 N
272 11 01 02	0.00	0.99	0.00*****		0.50	0.05	25+2	GRANOFELS	S*****	***** B
272 11 01 03	0.00	0.99	0.00*****		0.50	0.00	55+0	GNEISS	*****	***** B
272 11 03 04	0.59	0.77	0.77	0.90	0.60	0.39	18+6	GRANOFELS	S 0.92	0.01 N
272 11 05 05	0.00	0.77	0.00*****		0.50	0.33	10+4	HORNFELS	*****	***** S
272 11 05 06	0.00	0.77	0.00*****		0.30	0.00	50+0	GRANOFELS	*****	***** S
272 12 01 01	0.00	0.77	0.00*****		0.50	0.00	63+0	GRANOFELS	*****	***** B
272 12 01 02	0.00	0.77	0.00*****		0.60	0.29	46+0	BASALTIC TUFF	*****	***** B
272 12 02 03	0.60	0.73	0.79	2.86	0.60	0.63	21+7	METAM RPHIC	0.92	-0.11 N
272 13 01 01	0.00	0.73	0.00*****		0.40	0.00	8+9	GRANOFELS	*****	***** B
272 13 01 02	0.00	0.73	0.00*****		0.40	0.00	7+1	FELDSPAR	*****	***** B
272 13 01 03	0.54	0.75	0.73	1.02	0.40	0.14	9+0	DIAMICTITE	0.91	0.02 N
272 13 03 04	0.70	0.92	0.81	-3.31	0.40	0.05	7+5	URTHQUARTZIT	0.94	0.17 N
272 13 03 05	0.63	0.76	0.81	2.49	0.50	0.25	8+3	MUDSTONE	0.93	-0.09 N
272 13 03 06	0.65	0.72	0.84	4.81	0.50	0.05	12+3	HORNFELS	0.93	-0.21 N
272 14 02 01	0.65	0.74	0.63	3.67	0.50	0.32	10+5	GRANITE	0.93	-0.15 N
272 14 02 02	0.51	0.56	0.77	7.76	0.30	0.11	18+1	HORNFELS	S 0.89	-0.38 N
272 14 04 03	0.60	0.81	0.77	-0.30	0.50	0.24	23+4	GNEISS	0.92	0.08 N
272 15 02 01	0.00	0.81	0.00*****		0.40	0.13	10+7	SCHIST	*****	***** B
272 15 02 02	0.42	0.87	0.59	-6.58	0.50	0.13	10+0	VEIN QUARTZ	0.83	0.45 N
272 15 02 03	0.00	0.87	0.00*****		0.50	0.00	17+5	SCHIST	*****	***** B
272 15 02 04	0.00	0.87	0.00*****		0.40	0.27	27+3	GRANITE	*****	***** B
272 16 02 01	0.00	0.87	0.00*****		0.20	0.00	41+0	BASALT	*****	***** B
272 16 03 02	0.00	0.87	0.00*****		0.50	0.00	10+0	GRANOFELS	*****	***** N
272 16 03 03	0.34	0.69	0.59	-1.11	0.50	0.10	8+2	SCHIST	0.80	0.30 N
272 16 03 04	0.52	0.81	0.69	-1.99	0.50	0.20	10+2	SCHIST	0.89	0.21 N
272 16 03 05	0.56	0.81	0.73	-1.35	0.50	0.22	26+1	GNEISS	0.91	0.15 N
272 17 02 01	0.00	0.81	0.00*****		0.40	0.00	16+5	METABASALT	*****	***** B
272 17 03 02	0.00	0.81	0.00*****		0.40	0.00	10+0	PHYLLITE	S*****	***** B
272 17 03 03	0.41	0.59	0.66	4.79	0.60	0.17	13+2	METABASALT	S 0.86	-0.15 N
272 17 03 04	0.00	0.59	0.00*****		0.50	0.00	24+9	METASILVOL	*****	***** B
272 17 03 05	0.46	0.69	0.67	1.45	0.50	0.10	21+9	LIMESTONE	S 0.86	0.05 N
272 19 03 01	0.00	0.69	0.69	0.00*****	0.50	0.11	19+7	HORNFELS	*****	***** B
272 19 03 02	0.00	0.69	0.00*****		0.50	0.19	51+0	METAN DATABASE	*****	***** B
272 19 06 03	0.00	0.69	0.69	0.00*****	0.40	0.00	8+5	GRANITE	*****	***** B
272 19 06 04	0.60	0.77	0.78	1.41	0.60	0.36	15+1	METAQUARTZITE	0.92	-0.02 N
272 25 02 01	0.00	0.77	0.00*****		0.30	0.00	27+4	LIMESTONE	*****	***** B
272 30 02 01	0.00	0.77	0.00*****		0.30	0.00	78+0	DIABASE	*****	***** S
272 32 02 01	0.00	0.77	0.00*****		0.50	0.32	52+0	GRANOFELS	*****	***** S
272 32 02 02	0.00	0.77	0.00*****		0.30	0.00	40+0	HORNFELS	*****	***** S
272 32 02 03	0.00	0.77	0.00*****		0.30	0.00	44+0	= 270 32-2 2	*****	***** B
272 33 02 01	0.00	0.77	0.00*****		0.30	0.00	14+2	HORNFELS	S*****	***** B
272 33 02 02	0.00	0.77	0.00*****		0.30	0.00	19+3	GRANITE	*****	***** B
272 33 02 03	0.00	0.77	0.00*****		0.20	0.00	31+0	= 270 33-2 1	*****	***** B
272 33 02 04	0.00	0.77	0.00*****		0.30	0.00	41+0	= 270 33-2 1	*****	***** B
272 37 01 01	0.00	0.77	0.00*****		0.30	0.00	29+0	PHYLLITE	*****	***** B
272 37 01 02	0.00	0.77	0.00*****		0.40	0.00	67+0	HORNFELS	*****	***** D
272 37 01 03	0.00	0.77	0.00*****		0.50	0.15	52+0	GNEISS	*****	***** B
272 37 02 04	0.00	0.77	0.00*****		0.50	0.21	20+5	GRANITE	*****	***** B
272 37 02 05	0.51	0.87	0.67	-4.73	0.50	0.21	16+1	GRANOFELS	0.88	0.33 N
272 38 01 01	0.63	0.65	0.84	6.81	0.60	0.00	13+8	DIAMICTITE	0.92	-0.32 N
272 38 01 02	0.38	0.53	0.65	6.87	0.50	0.00	15+3	= 270 38-1 1	0.85	-0.27 N
272 38 01 03	0.39	0.62	0.62	3.03	0.50	0.00	20+0	= 270 38-1 1	0.84	-0.00 N
272 38 01 04	0.00	0.62	0.00*****		0.50	0.00	19+5	= 270 38-1 1	*****	***** B
272 38 01 05	0.42	0.72	0.62	-0.32	0.50	0.15	27+7	= 270 38-1 1	0.85	0.19 N
272 38 01 06	0.41	0.68	0.57	-7.35	0.50	0.14	32+0	ARGILLITE	S 0.82	0.48 N
272 38 01 07	0.55	0.73	0.74	1.69	0.60	0.32	23+6	DRTHQQUARTZIT	0.91	-0.02 N
272 38 01 08	0.38	0.68	0.67	8.91	0.50	0.04	26+1	DIABASE	0.85	-0.40 N
272 38 01 09	0.00	0.48	0.00*****		0.50	0.00	41+0	DRTHQQUARTZIT	*****	***** B
272 38 01 10	0.34	0.84	0.52	-7.48	0.60	0.19	25+5	GNEISS	0.78	0.51 N
272 38 01 11	0.00	0.84	0.00*****		0.50	0.00	43+0	SCHIST	*****	***** B
272 38 01 12	0.45	0.73	0.65	-0.41	0.50	0.22	35+7	GRANOFELS	S 0.87	0.17 N
272 39 01 01	0.00	0.73	0.00*****		0.00	0.00	61+0	DIAMICTITE	*****	***** N
272 39 01 02	0.00	0.73	0.00*****		0.00	0.00	60+0	= 270 39-1 1	*****	***** N
272 39 01 03	0.00	0.73	0.00*****		0.00	0.00	67+0	GNEISS	*****	***** N
272 39 01 04	0.00	0.73	0.00*****		0.60	0.00	62+0	= 270 39-1 1	*****	***** B
272 45 CC 01	0.00	0.73	0.00*****		0.30	0.00	45+0	GRANOFELS	*****	***** S
273 01 01 01	0.00	0.73	0.00*****		0.50	0.00	30+0	GRANITE	*****	***** B
273 01 01 02	0.00	0.73	0.00*****		0.50	0.00	31+0	DIAMICTITE	*****	***** B
273 01 CC 02	0.00	0.73	0.00*****		0.40	0.00	8+5	SCHIST	*****	***** B
273 01 CC 04	0.69	0.89	0.81	-2.28	0.60	0.00	8+8	DIABASE	0.93	0.14 N
273 01 CC 05	0.24	0.97	0.39	-19+30	0.60	0.00	14+0	SCHIST	0.63	0.75 N
273 02 01 01	0.68	0.80	0.84	1.87	0.50	0.00	13+3	PHYLLITE	0.94	-0.06 N
273 02 01 02	0.39	0.79	0.58	-4.04	0.50	0.00	10+2	SCHIST	0.83	0.38 N
273 02 02 03	0.43	0.76	0.62	-1.73	0.50	0.00	18+9	SCHIST	0.85	0.25 N
273 02 03 04	0.41	0.79	0.60	-3.71	0.50	0.00	28+7	GRANITE	0.84	0.35 N
273 02 03 05	0.66	0.73	0.84	4.67	0.50	0.00	20+9	GNEISS	0.93	-0.20 N
273 02 03 06	0.00	0.73	0.00*****		0.30	0.00	12+2	VEIN QUARTZ	*****	***** N
273 02 03 07	0.42	0.74	0.62	-1.21	0.50	0.00	20+7	BASALT	0.85	0.24 N
273 02 04 08	0.40	0.83	0.58	-5.21	0.60	0.00	29+7	GNEISS	0.83	0.41 N
273 02 CC 09	0.00	0.83	0.00*****		0.40	0.00	12+0	METAM RPHIC	*****	***** B
273 02 CC 10	0.55	0.67	0.76	4.07	0.50	0.00	10+7	GRAYWACKE	0.91	-0.17 N
273 02 CC 11	0.27	0.50	0.53	7.03	0.40	0.00	9+7	HORNFELS	0.77	-0.09 N

## CHARACTERISTICS OF PEBBLES FROM CENOZOIC MARINE GLACIAL SEDIMENTS

C/A	B/A	SPH	OPI	KRNSS	FRNSS	OPI	LITHOLOGY	STR	ASPH	WSHAPE
273 02 CC 12	0.00	0.50	0.00*****	0.30	0.00	18.6	DIAMICTITE	*****	H	
273 03 CC 01	0.00	0.50	0.00*****	0.50	0.00	35.0	GABBRO	*****	S	
273 03 CC 02	0.00	0.50	0.00*****	0.50	0.00	32.0	#273 3CC 1	*****	S	
273 03 CC 03	0.52	0.68	0.73 3.08	0.40	0.00	7.6	ARGILLITE	0.90	-0.10	H
273 03 CC 04	0.00	0.68	0.00*****	0.50	0.00	8.4	VEIN QUARTZ	*****	H	
273 03 CC 05	0.58	0.90	0.72 4.55	0.60	0.00	7.4	GRANOFELS	0.91	0.29	H
273 03 CC 06	0.57	0.78	0.75 0.14	0.50	0.00	11.5	GABBRO	0.91	0.07	H
273 04 02 01	0.43	0.76	0.63 1.65	0.50	0.00	15.3	GRANITE	0.86	0.24	H
273 04 02 02	0.39	0.53	0.66 7.05	0.50	0.00	13.7	SCHIST	0.85	-0.29	H
273 04 02 03	0.00	0.53	0.00*****	0.40	0.00	21.4	ARGILLITE	S*****	H	
273 04 02 04	0.00	0.53	0.00*****	0.40	0.00	20.9	SCHIST	*****	H	
273 04 02 05	0.66	0.86	0.80 1.08	0.60	0.00	12.2	DIABASE	0.93	0.09	H
273 04 02 06	0.50	0.56	0.76 7.40	0.60	0.00	14.3	GABBRO	0.89	-0.36	H
273 04 CC 07	0.41	0.67	0.63 1.37	0.30	0.00	6.3	VEIN QUARTZ	0.85	0.10	H
273 04 CC 08	0.59	0.98	0.71 -7.52	0.50	0.00	7.5	GRANITE	0.90	0.38	H
273 04 CC 09	0.48	0.78	0.67 1.45	0.50	0.00	10.4	SCHIST	0.88	0.20	H
273 04 CC 10	0.34	0.69	0.55 0.94	0.50	0.00	11.3	SCHIST	0.80	0.29	H
273 05 01 01	0.00	0.69	0.00*****	0.30	0.00	6.50	GRANITE	*****	H	
273 05 01 02	0.00	0.69	0.00*****	0.00	0.00	6.90	WEISS	*****	D	
273 05 01 03	0.00	0.69	0.00*****	0.00	0.00	9.40	DIABASE	*****	D	
273 05 01 04	0.00	0.69	0.00*****	0.00	0.00	55.0	#273 5-1 3	*****	D	
273 05 CC 05	0.00	0.69	0.00*****	0.40	0.00	8.5	PHYLLITE	*****	H	
273 05 CC 06	0.00	0.69	0.00*****	0.30	0.00	7.0	GABBRO	*****	H	
273 05 CC 07	0.00	0.69	0.00*****	0.30	0.00	9.0	#273 5CC 6	*****	H	
273 05 CC 08	0.00	0.69	0.00*****	0.30	0.00	10.5	#273 5CC 6	*****	H	
273 07 02 01	0.69	0.78	0.45 2.91	0.60	0.00	26.3	DIABASE	0.94	-0.11	H
273 07 02 02	0.28	0.85	0.45 10.60	0.40	0.00	43.3	MISSING	0.71	0.62	H
273 08 03 01	0.45	0.71	0.66 0.65	0.90	0.00	44.7	DIABASE	0.87	0.10	H
273 09 02 01	0.00	0.71	0.00*****	0.30	0.00	22.1	PHYLLITE	S*****	H	
273A01 CC 01	0.00	0.71	0.00*****	0.40	0.00	57.0	WEISS	*****	D	
273A01 CC 02	0.00	0.71	0.00*****	0.50	0.00	50.0	DIABASE	*****	H	
273A01 CC 03	0.00	0.71	0.00*****	0.00	0.00	9.50	DIABASE	*****	D	
273A01 CC 04	0.00	0.71	0.00*****	0.00	0.00	46.0	DIAMICTITE	*****	H	
273A02 CC 01	0.55	0.67	0.77 4.15	0.50	0.00	6.2	GRANOFELS	0.91	-0.18	H
273A02 CC 02	0.45	0.72	0.65 -0.04	0.60	0.00	7.6	ARGILLITE	0.87	0.15	H
273A02 CC 03	0.59	0.71	0.79 3.41	0.40	0.00	9.3	DIABASE	0.92	-0.14	H
273A02 CC 04	0.00	0.71	0.00*****	0.50	0.00	14.4	MUDSTONE	*****	H	
273A02 CC 05	0.35	0.69	0.56 -0.88	0.50	0.00	10.2	LIMESTONE	S 0.80	0.28	H
273A02 CC 06	0.59	0.85	0.74 2.16	0.60	0.00	11.6	DIABASE	0.91	0.18	H
273A02 CC 07	0.00	0.85	0.00*****	0.50	0.00	14.2	SCHIST	*****	H	
273A02 CC 08	0.00	0.85	0.00*****	0.40	0.00	16.6	DIABASE	*****	H	
273A02 CC 09	0.48	0.61	0.73 5.43	0.40	0.00	13.1	MURNFELS	0.89	-0.24	H
273A02 CC 10	0.49	0.89	0.64 -5.92	0.60	0.00	14.8	PHYLLITE	0.87	0.39	H
273A02 CC 11	0.59	0.72	0.79 3.22	0.50	0.00	18.8	DIABASE	0.92	-0.13	H
273A02 CC 12	0.17	0.80	0.33 14.90	0.50	0.00	16.4	DIABASE	S 0.56	0.73	H
273A02 CC 13	0.46	0.82	0.64 3.65	0.40	0.00	21.4	DIABASE	0.87	0.32	H
273A02 CC 14	0.00	0.82	0.00*****	0.40	0.00	27.7	DIABASE	*****	H	
273A02 CC 15	0.00	0.82	0.00*****	0.40	0.00	37.0	SANDSTONE	*****	H	
273A02 CC 16	0.35	0.84	0.53 7.30	0.80	0.00	37.3	MURNFELS	0.79	0.50	H
273A03 CC 01	0.00	0.84	0.00*****	0.50	0.00	58.0	GRANODIORITE	*****	H	
273A03 CC 02	0.52	0.77	0.70 -0.65	0.50	0.00	23.7	DIABASE	S 0.89	0.14	H
273A03 CC 03	0.00	0.77	0.00*****	0.40	0.00	41.0	DIABASE	*****	S	
273A03 CC 04	0.63	0.82	0.79 -0.34	0.50	0.00	20.9	DIABASE	0.93	0.07	H
273A03 CC 05	0.00	0.82	0.00*****	0.60	0.00	41.0	BASALT	*****	H	
273A03 CC 06	0.58	0.75	0.77 1.60	0.50	0.00	11.0	FELDSPAR	0.92	-0.03	H
273A03 CC 07	0.00	0.75	0.00*****	0.00	0.00	31.0	DIABASE	*****	D	
273A04 CC 01	0.55	0.92	0.69 -5.85	0.50	0.00	31.3	LIMESTONE	S 0.90	0.35	H
273A04 CC 02	0.00	0.92	0.00*****	0.50	0.00	45.0	ORTHOQUARTZIT	*****	H	
273A04 CC 03	0.64	0.68	0.85 6.02	0.50	0.00	9.5	GRANITE	0.93	-0.27	H
273A04 CC 04	0.47	0.60	0.72 5.31	0.50	0.00	13.1	DIABASE	0.88	-0.23	H
273A06 01 01	0.00	0.60	0.00*****	0.00	0.00	77.0	DIABASE	*****	D	
273A08 01 01	0.00	0.60	0.00*****	0.00	0.00	54.0	GRANITE	*****	D	
273A08 02 02	0.00	0.60	0.00*****	0.50	0.00	65.0	GRANITE	*****	H	
273A08 05 03	0.00	0.60	0.00*****	0.50	0.00	54.0	GRANOFELS	*****	H	
273A09 CC 01	0.00	0.60	0.00*****	0.40	0.00	10.8	DIABASE	*****	H	
273A09 CC 02	0.00	0.60	0.00*****	0.50	0.00	20.8	# 273A 9CC 1	*****	H	
273A12 CC 01	0.46	0.57	0.73 6.68	0.50	0.00	7.2	GRANITE	0.89	-0.31	H
273A12 CC 02	0.50	0.76	0.74 0.57	0.60	0.00	8.2	DIABASE	0.91	0.05	H
273A12 CC 03	0.56	0.77	0.74 0.31	0.50	0.00	15.2	GRANITE	0.91	0.06	H
273A12 CC 04	0.00	0.77	0.00*****	0.00	0.00	46.0	DIABASE	*****	D	
273A13 CC 01	0.00	0.77	0.00*****	0.50	0.00	64.0	LIMESTONE	*****	H	
273A13 CC 02	0.00	0.77	0.00*****	0.00	0.00	55.0	BASALT	*****	N	
273A14 CC 01	0.62	0.72	0.81 3.73	0.60	0.00	20.3	DIABASE	0.92	-0.16	H
273A14 CC 02	0.52	0.81	0.69 -1.87	0.50	0.00	9.1	GRANOFELS	0.89	0.20	H
273A14 CC 03	0.60	0.89	0.74 -3.86	0.50	0.00	20.5	DIABASE	0.91	0.25	H
273A15 CC 01	0.00	0.89	0.00*****	0.40	0.00	15.4	SILICIC VOLC	*****	H	
273A15 CC 02	0.59	0.93	0.72 -5.75	0.50	0.00	12.7	SILICIC VOLC	0.91	0.32	H
273A15 CC 03	0.37	0.72	0.57 -1.56	0.50	0.00	11.5	GRAYWACKE	0.82	0.29	H
273A15 CC 09	0.40	0.97	0.55 11.11	0.60	0.00	11.8	DIABASE	0.80	0.57	H
273A15 CC 05	0.41	0.67	0.63 1.52	0.50	0.00	12.2	LIMESTONE	0.85	0.08	H
273A15 CC 06	0.37	0.46	0.67 9.65	0.60	0.00	11.4	ARGILLITE	S 0.84	-0.43	H
273A15 CC 07	0.46	0.56	0.72 6.91	0.60	0.00	11.9	DIABASE	0.88	-0.32	H
273A15 CC 08	0.39	0.53	0.67 7.18	0.50	0.00	11.2	GRAYWACKE	0.85	-0.30	H
273A15 CC 09	0.70	0.73	0.88 5.94	0.50	0.00	13.0	DIABASE	0.94	-0.25	H
273A15 CC 10	0.30	0.88	0.47 10.91	0.50	0.00	11.9	BASALT	0.73	0.61	H
273A15 CC 11	0.64	0.73	0.82 3.76	0.50	0.00	11.9	MURNFELS	S 0.93	-0.16	H
273A15 CC 12	0.42	0.82	0.60 -4.44	0.50	0.00	12.8	GRAYWACKE	0.84	0.37	H
273A15 CC 13	0.00	0.82	0.00*****	0.40	0.00	16.9	GRANITE	*****	N	
273A15 CC 14	0.00	0.82	0.00*****	0.50	0.00	16.1	GRANOFELS	*****	H	
273A15 CC 15	0.00	0.82	0.00*****	0.40	0.00	20.5	METASILVOLC	*****	H	
273A15 CC 16	0.00	0.82	0.00*****	0.50	0.00	18.0	GRANITE	*****	H	
273A15 CC 17	0.51	0.79	0.69 -1.67	0.50	0.00	13.8	DIABASE	0.89	0.20	H
273A15 CC 18	0.36	0.71	0.56 1.48	0.40	0.00	13.2	ARGILLITE	S 0.81	0.30	H
273A15 CC 19	0.50	0.65	0.73 3.98	0.60	0.00	13.7	WEISS	0.89	-0.15	H
273A15 CC 20	0.43	0.97	0.57 10.32	0.50	0.00	14.5	SCHIST	0.82	0.54	H

	C/A	B/A	SPH	OPI	KRNSS	FRNSS	SIZE	LITHOLOGY	STR	ASPH	WSHAPE
273A15 CC 21	0.52	0.55	0.77	7.10	0.40	0.00	15.6	CHERT		0.90	-0.35 M
273A15 CC 22	0.34	0.55	0.60	5.36	0.60	0.00	13.9	PHYLLITE		0.82	-0.11 M
273A15 CC 23	0.57	0.70	0.77	3.61	0.50	0.00	16.6	DIAMICTITE		0.91	-0.15 M
273A15 CC 24	0.51	0.86	0.67	-4.37	0.50	0.00	16.3	GRANITE		0.88	0.32 M
273A15 CC 25	0.64	0.92	0.77	-4.41	0.60	0.00	15.7	GNEISS		0.92	0.24 M
273A15 CC 26	0.45	0.73	0.65	-0.36	0.50	0.00	16.2	GNEISS		0.87	0.16 M
273A15 CC 27	0.64	0.98	0.75	-7.00	0.50	0.00	19.6	METAQUARTZITE		0.92	0.33 M
273A15 CC 28	0.35	0.60	0.59	3.18	0.60	0.00	14.8	SCHIST		0.82	0.03 M
273A15 CC 29	0.00	0.60	0.00*****		0.40	0.00	22.7	DIABASE		0.90	-0.12 M
273A15 CC 30	0.53	0.68	0.74	3.24	0.50	0.00	19.2	BASALT			
273A15 CC 31	0.00	0.64	0.00*****		0.40	0.00	24.8	DIAMICTITE	S*****		
273A15 CC 32	0.00	0.68	0.00*****		0.40	0.00	32.0	HORNFELS	S*****		
273A15 CC 33	0.00	0.65	0.00*****		0.40	0.00	37.0	LIMESTONE	*****		
273A15 CC 34	0.63	0.73	0.82	3.73	0.50	0.00	41.0	GRANOFELS		0.93	-0.16 M
273A16 02 01	0.00	0.73	0.00*****		0.00	0.00	71.0	GRABBRO			
273A16 02 02	0.00	0.73	0.00*****		0.50	0.00	55.0	GRANITE			
273A17 02 01	0.00	0.73	0.00*****		0.60	0.00	42.0	GRANITE			
273A17 02 02	0.00	0.73	0.00*****		0.00	0.00	70.0	BASALT			
273A17 03 03	0.40	0.58	0.65	4.92	0.60	0.00	36.3	GRANITE		0.85	-0.15 M
273A22 02 01	0.00	0.58	0.00*****		0.50	0.00	50.0	GRANITE			
273A22 03 02	0.00	0.58	0.00*****		0.40	0.00	39.0	GRANITE			
273A22 03 03	0.00	0.58	0.00*****		0.40	0.00	61.0	BASALT			
273A24 CC 01	0.00	0.58	0.00*****		0.00	0.00	62.0	HORNFELS			
273A25 01 01	0.00	0.58	0.00*****		0.40	0.00	51.0	GRABBRO			
273A25 CC 02	0.00	0.58	0.00*****		0.00	0.00	37.0	GRABBRO			
273A25 CC 03	0.00	0.58	0.00*****		0.00	0.00	82.0	DIABASE			
273A25 CC 04	0.52	0.80	0.70	-1.60	0.50	0.00	18.6	GRABBRO		0.89	0.19 M
273A25 CC 05	0.00	0.80	0.00*****		0.50	0.00	48.0	GRANITE			
273A26 01 01	0.00	0.80	0.00*****		0.00	0.00	55.0	GNEISS			
273A26 CC 02	0.54	0.73	0.74	1.63	0.50	0.00	28.0	DIABASE		0.91	-0.01 M
273A27 01 01	0.00	0.73	0.00*****		0.00	0.00	64.0	GRANITE			
273A27 01 02	0.00	0.73	0.00*****		0.40	0.00	64.0	BASALT			
273A27 CC 03	0.60	0.80	0.77	0.00	0.60	0.00	36.0	ORTHOQUARTZITI		0.92	0.06 M
273A27 CC 04	0.00	0.80	0.00*****		0.40	0.00	54.0	GRABBRO			
273A27 CC 05	0.00	0.80	0.00*****		0.40	0.00	60.0	GRANITE			
274 01 06 01	0.52	0.69	0.73	2.76	0.70	0.00	4.3	GRAYWACKE		0.90	-0.08 M
274 01 06 02	0.45	0.46	0.76	10.63	0.10	0.00	7.0	SILICIC VOLCA		0.87	-0.51 M
274 01 06 03	0.64	0.68	0.84	6.17	0.50	0.00	11.9	ORTHOQUARTZITI		0.93	-0.28 M
274 01 CC 04	0.38	0.51	0.65	7.74	0.50	0.00	4.8	MUDSTONE	S 0.84	-0.32 M	
274 01 CC 05	0.00	0.51	0.00*****		0.50	0.00	6.2	PHYLLOLITE			
274 01 CC 06	0.53	0.77	0.71	-0.30	0.20	0.00	5.1	SILICIC VOLCA		0.90	0.11 M
274 01 CC 07	0.20	0.62	0.39	-1.40	0.50	0.00	5.3	PHYLLOLITE		0.64	0.49 M
274 01 CC 08	0.83	0.91	0.91	0.55	0.10	0.00	6.0	GRANITE		0.95	-0.01 M
274 01 CC 09	0.66	0.69	0.86	6.23	0.40	0.00	5.0	METAQUARIZITE		0.93	-0.28 M
274 01 CC 10	0.30	0.57	0.54	3.81	0.50	0.00	4.8	PHYLLOLITE		0.78	0.08 M
274 01 CC 11	0.00	0.57	0.00*****		0.30	0.00	13.8	METAM RHMIC			
274 01 CC 12	0.62	0.92	0.75	-4.67	0.50	0.00	6.5	CHERT		0.92	0.27 M
274 01 CC 13	0.58	0.78	0.76	0.66	0.30	0.00	9.8	SILICIC VOLCA		0.92	0.03 M
274 01 CC 14	0.31	0.95	0.47	-13.78	0.60	0.00	10.2	BASALT ALTERE	S 0.72	0.66 M	
274 01 CC 15	0.37	0.86	0.54	-7.53	0.20	0.00	9.3	GRANITE		0.79	0.50 M
274 01 CC 16	0.44	0.70	0.65	0.75	0.50	0.00	9.7	GRAYWACKE	S 0.87	0.10 M	
274 01 CC 17	0.38	0.67	0.60	0.94	0.50	0.00	10.7	DIAMICTITE	S 0.83	0.15 M	
274 01 CC 18	0.34	0.69	0.55	-1.16	0.30	0.00	10.4	PHYLLOLITE		0.80	0.30 M
274 01 CC 19	0.00	0.69	0.00*****		0.20	0.00	20.2	DIABASE			
274 01 CC 20	0.54	0.56	0.81	8.74	0.70	0.00	12.6	MUDSTONE	S 0.90	-0.43 M	
274 01 CC 21	0.65	0.95	0.76	-5.49	0.40	0.00	13.9	SANDSTONE		0.92	0.28 M
274 01 CC 22	0.34	0.60	0.58	3.12	0.60	0.00	19.4	GRAYWACKE	S 0.81	0.06 M	
274 01 CC 23	0.38	0.69	0.59	-0.09	0.60	0.00	17.1	GRAYWACKE		0.83	0.21 M
274 01 CC 24	0.51	0.69	0.72	2.55	0.20	0.00	20.2	JASPER		0.90	-0.06 M
274 01 CC 25	0.46	0.66	0.69	3.02	0.50	0.00	22.6	BASALT		0.88	-0.07 M
274 02 01	0.42	0.59	0.67	5.09	0.50	0.00	9.7	GRAYWACKE		0.86	-0.18 M
274 03 01 01	0.43	0.64	0.66	3.20	0.40	0.00	7.0	VEIN QUARTZ		0.87	-0.06 M
274 03 01 02	0.50	0.68	0.71	2.86	0.30	0.00	7.6	VEIN QT & FE		0.89	-0.08 M
274 03 01 03	0.63	0.82	0.78	-0.32	0.50	0.00	11.0	DIABASE		0.93	0.07 M
274 03 01 04	0.51	0.98	0.64	-9.03	0.40	0.00	13.6	HORNFELS		0.87	0.47 M
274 03 01 05	0.43	0.66	0.65	2.33	0.30	0.00	15.9	METAQUARTZITE		0.86	0.01 M
274 03 01 06	0.50	0.73	0.70	0.85	0.50	0.00	15.8	ORTHOQUARTZITI		0.89	0.06 M
274 03 01 07	0.56	0.71	0.76	2.91	0.60	0.00	15.8	HORNFELS		0.91	-0.10 M
274 03 06 08	0.35	0.71	0.56	-1.41	0.40	0.00	42.7	HORNFELS		0.81	0.30 M
274 03 06 09	0.49	0.69	0.70	2.21	0.40	0.00	10.5	GRANITE		0.89	-0.03 M
274 04 02 01	0.65	0.88	0.78	-2.56	0.20	0.00	7.3	QUARTZ		0.93	0.17 M
274 04 02 02	0.36	0.51	0.63	7.34	0.40	0.00	8.7	ARGILLITE	S 0.83	-0.27 M	
274 04 02 03	0.52	0.64	0.75	4.72	0.50	0.00	12.6	DIAMICTITE		0.90	-0.21 M
274 04 CC 04	0.56	0.60	0.80	7.20	0.40	0.00	6.7	?		0.91	-0.35 M
274 04 CC 05	0.46	0.70	0.67	1.06	0.50	0.00	8.2	SILICIC VOLCA		0.87	0.07 M
274 04 CC 06	0.44	0.47	0.75	10.21	0.50	0.00	9.1	GRANITE		0.87	-0.50 M
274 04 CC 07	0.44	0.46	0.75	10.58	0.50	0.00	12.1	DIAMICTITE	S 0.86	-0.52 M	
274 05 01 01	0.38	0.88	0.55	-7.84	0.40	0.00	6.1	GABBRO		0.81	0.50 M
274 05 01 02	0.00	0.88	0.00*****		0.20	0.00	8.6	GRANITE ALTER			
274 05 01 03	0.60	0.76	0.78	1.82	0.40	0.00	6.1	= 274 5-1 2		0.92	-0.05 M
274 05 01 04	0.50	0.76	0.69	-0.34	0.50	0.00	8.8	GRANITE ALTER		0.89	0.13 M
274 05 01 05	0.20	0.75	0.38	-8.83	0.30	0.00	10.2	GRAYWACKE		0.63	0.63 M
274 05 01 06	0.00	0.75	0.69	-0.00*****	0.40	0.00	14.9	PHYLLOLITE			
274 05 01 07	0.47	0.83	0.64	-3.94	0.50	0.00	12.9	SILICIC VOLCA		0.87	0.32 M
274 05 01 08	0.60	0.90	0.74	-4.23	0.50	0.00	16.8	HORNFELS		0.91	0.26 M
274 05 02 09	0.34	0.59	0.58	3.67	0.40	0.00	7.4	METAQUARTZITE		0.81	0.02 M
274 05 02 10	0.56	0.83	0.72	-2.13	0.20	0.00	7.6	GRANITE?		0.91	0.19 M
274 05 02 11	0.42	0.71	0.63	0.00	0.30	0.00	8.0	GRANITE?		0.85	0.17 M
274 05 02 12	0.68	0.69	0.87	6.88	0.60	0.00	10.6	BASALT ALTERE		0.93	-0.29 M
274 05 02 13	0.00	0.69	0.00*****		0.20	0.00	17.1	BASALT ALTERE			
274 05 02 14	0.34	0.91	0.51	-10.59	0.20	0.00	15.1	GRANITE		0.77	0.59 M
274 05 03 15	0.00	0.91	0.00*****		0.30	0.00	9.6	GNEISS			
274 05 03 16	0.48	0.74	0.68	-0.00	0.50	0.00	8.8	FELDSPAR		0.88	0.12 M
274 05 03 17	0.41	0.73	0.61	-1.08	0.40	0.00	6.8	SILICIC VOLCA		0.84	0.24 M
274 05 03 18	0.34	0.81	0.53	-6.23	0.40	0.00	6.9	ARGILLITE		0.78	0.48 M
274 05 03 19	0.56	0.64	0.79	5.65	0.60	0.00	8.9	SILICIC VOLCA		0.91	-0.27 M

## CHARACTERISTICS OF PEBBLES FROM CENOZOIC MARINE GLACIAL SEDIMENTS

C/A	B/A	SPH	OPI	KRNSS	FRNSS	SIZE	LITHOLOGY	STR	ASPH	WSHAPE
274 06 03 20	0.00	0.64	0.00*****	0.50	0.00	28.1	GNEISS	*****	8	
274 05 03 21	0.00	0.64	0.00*****	0.50	0.00	41.0	GABBRO	*****	8	
274 05 CC 22	0.45	0.81	0.63 -3.32	0.50	0.00	5.5	METAGRAZITITE	0.86	0.31	H
274 05 CC 23	0.00	0.81	0.00*****	0.20	0.00	7.9	GRANITE	*****	N	
274 05 CC 24	0.00	0.81	0.00*****	0.20	0.00	11.4	# 274-5 CC 23	*****	N	
274 05 CC 25	0.30	0.92	0.46-12.85	0.20	0.00	5.2	METASILVULCAN	0.72	0.65	H
274 05 CC 26	0.71	0.91	0.82 -2.83	0.40	0.00	5.9	HORNFELS	0.94	0.15	H
274 05 CC 27	0.51	0.62	0.74 5.29	0.40	0.00	6.2	GRANITE	0.90	-0.24	H
274 05 CC 28	0.28	0.87	0.45-11.32	0.30	0.00	6.1	BASALT ALTERE	0.71	0.63	H
274 05 CC 29	0.00	0.87	0.00*****	0.20	0.00	9.1	GRANITE	*****	N	
274 05 CC 30	0.47	0.81	0.65 -2.95	0.50	0.00	8.3	METAQUARTZITE	0.87	0.28	H
274 05 CC 31	0.56	0.77	0.74 0.18	0.20	0.00	8.6	METASILVULCAN	0.91	0.07	H
274 05 CC 32	0.65	0.72	0.83 4.38	0.20	0.00	8.3	METASILVULCAN	0.93	-0.19	H
274 05 CC 33	0.45	0.93	0.60 -8.43	0.50	0.00	7.2	GRANITE	0.84	0.48	H
274 05 CC 34	0.41	0.65	0.63 2.10	0.50	0.00	10.4	GRANITE	0.85	0.04	H
274 05 CC 35	0.00	0.65	0.00*****	0.50	0.00	21.0	PHYLLITE	S*****	8	
274 05 CC 36	0.56	0.75	0.74 0.94	0.40	0.00	11.6	SILICIC VOLCA	0.91	0.02	H
274 05 CC 37	0.00	0.75	0.00*****	0.40	0.00	18.0	HORNFELS	*****	8	
274 05 CC 38	0.32	0.67	0.54 -0.28	0.20	0.00	11.5	SCHIST	0.79	0.28	H
274 05 CC 39	0.45	0.87	0.62 -5.64	0.30	0.00	14.4	METASILVULCAN	0.85	0.40	H
274 05 CC 40	0.43	0.59	0.68 5.07	0.30	0.00	13.0	GNEISS	0.87	-0.19	H
274 05 CC 41	0.47	0.82	0.65 -3.43	0.20	0.00	18.8	BRECCIA	0.87	0.30	H
274 05 CC 42	0.69	0.79	0.85 2.58	0.50	0.00	15.1	GNEISS	0.94	-0.10	H
274 05 CC 43	0.39	0.57	0.65 5.32	0.50	0.00	14.7	GRANOFELS	0.85	-0.17	H
274 05 CC 44	0.31	0.52	0.57 6.15	0.30	0.00	26.3	SILICIC VOLCA	0.80	-0.11	H
274 06 01 01	0.64	0.70	0.84 5.23	0.50	0.00	12.0	VEIN QTZ & FS	0.93	-0.23	H
274 06 01 02	0.52	0.78	0.70 -0.70	0.50	0.00	17.6	BASALT ALTERE	S 0.90	0.14	H
274 06 04 03	0.00	0.78	0.00*****	0.30	0.00	9.2	GRANOFELS	*****	8	
274 06 04 04	0.58	0.97	0.70 -7.50	0.50	0.00	16.1	GNEISS	0.90	0.39	H
274 06 05 05	0.57	0.79	0.74 -0.25	0.60	0.00	6.4	DIAMICTITE	0.91	0.09	H
274 06 05 06	0.32	0.70	0.53 -1.74	0.20	0.00	8.0	METASILVULCAN	0.78	0.34	H
274 06 05 07	0.20	0.87	0.36-16.68	0.10	0.00	10.9	SCHIST	0.60	0.73	H
274 06 05 08	0.46	0.85	0.63 -4.80	0.40	0.00	12.0	HORNFELS	0.86	0.36	H
274 06 05 09	0.00	0.85	0.00*****	0.50	0.00	16.5	SANDSTONE	*****	8	
274 06 05 10	0.14	0.70	0.31-10.40	0.30	0.00	12.1	ARGILLITE	0.52	0.71	H
274 06 05 11	0.48	0.62	0.72 5.01	0.10	0.00	36.3	DIABASE ALTEH	0.89	-0.21	H
274 06 06 12	0.00	0.62	0.00*****	0.50	0.00	10.1	VEIN QUARTZ	*****	8	
274 06 06 13	0.00	0.62	0.00*****	0.30	0.00	11.6	MUDSTONE	*****	N	
274 07 02 01	0.31	0.82	0.49 -7.92	0.20	0.00	4.8	METAM RPHIC	0.75	0.54	H
274 07 02 02	0.00	0.82	0.00*****	0.50	0.00	8.9	GRANITE	*****	N	
274 07 02 03	0.00	0.82	0.00*****	0.50	0.00	9.0	GRANOFELS	*****	8	
274 07 02 04	0.25	0.63	0.46 -0.40	0.30	0.00	12.7	ORTHOQUARTZII	0.71	0.38	H
274 07 CC 05	0.00	0.63	0.00*****	0.50	0.00	44.0	GNEISS	*****	N	
274 08 CC 01	0.54	0.60	0.79 6.62	0.40	0.00	9.7	MUDSTONE	0.90	-0.33	H
274 08 CC 02	0.00	0.60	0.00*****	0.40	0.00	11.7	HORNFELS	*****	8	
274 08 CC 03	0.44	0.63	0.67 3.60	0.20	0.00	9.7	METASILVULCAN	0.87	-0.09	H
274 08 CC 04	0.29	0.80	0.47 -7.49	0.30	0.00	11.5	HORNFELS	0.73	0.55	H
274 08 CC 05	0.45	0.51	0.73 8.66	0.60	0.00	11.3	SCHIST	0.87	-0.42	H
274 08 CC 06	0.53	0.55	0.80 8.51	0.40	0.00	11.4	GRANITE	0.90	-0.42	H
274 08 CC 07	0.54	0.59	0.79 7.18	0.30	0.00	11.9	GRANITEALTERE	0.90	-0.35	H
274 08 CC 08	0.50	0.77	0.69 -0.50	0.40	0.00	15.1	ORTHOQUARTZIT	S 0.89	0.14	H
274 08 CC 09	0.46	0.69	0.68 1.81	0.50	0.00	19.1	ARGILLITE	S 0.88	0.02	H
274 08 CC 10	0.00	0.69	0.00*****	0.20	0.00	26.5	PEGMATITE	*****	N	
274 08 CC 11	0.00	0.69	0.00*****	0.40	0.00	24.0	BASALT	*****	8	
274 08 CC 12	0.00	0.69	0.00*****	0.40	0.00	29.2	BASALT ALTERE	S*****	8	
274 09 01 01	0.60	0.67	0.81 5.39	0.50	0.00	6.4	HORNFELS	0.92	-0.25	H
274 09 01 02	0.49	0.77	0.68 -1.11	0.50	0.00	13.6	GRANOFELS	0.88	0.18	H
274 09 01 03	0.24	0.61	0.45 0.52	0.20	0.00	13.0	DIABASE ALTEH	0.70	0.36	H
274 09 01 04	0.00	0.61	0.00*****	0.30	0.00	25.2	GRANODIORITE	*****	8	
274 09 01 05	0.30	0.61	0.53 1.94	0.50	0.00	23.5	HORNFELS	0.77	0.20	H
274 09 01 06	0.40	0.71	0.61 -0.50	0.60	0.00	26.3	ARGILLITE	0.84	0.21	H
274 09 02 07	0.28	0.62	0.50 0.94	0.20	0.00	5.0	PHYLLITE	0.75	0.28	H
274 09 02 08	0.62	0.92	0.75 -4.64	0.30	0.00	7.4	GRANOFELS	0.92	0.27	H
274 09 01 09	0.00	0.92	0.00*****	0.20	0.00	16.1	FELDSPAR	*****	8	
274 09 03 10	0.51	0.80	0.68 -2.00	0.40	0.00	25.4	ARGILLITE	S 0.89	0.22	H
274 09 04 11	0.43	0.75	0.63 1.34	0.30	0.00	5.5	DIABASE ALTERE	0.86	0.23	H
274 09 04 12	0.24	0.65	0.44 -1.70	0.30	0.00	7.2	ARGILLITE	S 0.69	0.44	H
274 09 04 13	0.57	0.96	0.70 -7.08	0.40	0.00	8.0	GRANOFELS	0.90	0.38	H
274 09 04 14	0.00	0.96	0.00*****	0.20	0.00	13.6	CHERT	*****	8	
274 09 04 15	0.00	0.96	0.00*****	0.60	0.00	13.8	GRAYWACKE	*****	8	
274 09 04 16	0.73	0.79	0.88 3.87	0.50	0.00	14.3	ORTHOQUARTZIT	0.94	-0.15	H
274 09 04 17	0.35	0.67	0.57 0.19	0.50	0.00	15.8	GNEISS	0.81	0.22	H
274 09 05 18	0.30	0.64	0.52 0.42	0.50	0.00	11.1	DIABASE ALTEH	0.77	0.28	H
274 09 06 19	0.45	0.55	0.72 7.26	0.40	0.00	5.0	VEIN QUARTZ	0.88	-0.34	H
274 09 06 20	0.45	0.78	0.64 -2.33	0.30	0.00	5.8	BASALTIC TUFF	0.86	0.27	H
274 09 06 21	0.42	0.67	0.64 1.40	0.20	0.00	5.8	BASALT	0.86	0.07	H
274 09 06 22	0.49	0.72	0.69 0.98	0.50	0.00	6.0	VEIN QUARTZ	0.89	0.06	H
274 09 06 23	0.40	0.64	0.64 2.65	0.40	0.00	6.4	BASALT	0.85	0.01	H
274 09 06 24	0.53	0.82	0.70 -2.27	0.60	0.00	8.3	ORTHOQUARTZIT	0.90	0.22	H
274 09 06 25	0.40	0.80	0.59 -3.87	0.40	0.00	11.8	HORNFELS	S 0.83	0.36	H
274 09 06 26	0.49	0.53	0.77 8.67	0.50	0.00	12.1	GNEISS	0.89	-0.43	H
274 09 CC 27	0.53	0.68	0.75 3.4d	0.50	0.00	5.5	METAM RPHIC	0.90	-0.13	H
274 09 CC 28	0.00	0.68	0.00*****	0.10	0.00	8.8	GRANITE	*****	N	
274 09 CC 29	0.30	0.58	0.53 3.30	0.50	0.00	8.6	ARGILLITE	S 0.78	0.12	H
274 09 CC 30	0.49	0.56	0.75 7.45	0.40	0.00	29.3	METASILVULCAN	S 0.89	-0.36	H
274 10 02 01	0.67	0.87	0.80 -1.79	0.60	0.00	5.3	GRANODIORITE	0.93	0.13	H
274 10 02 02	0.39	0.99	0.54-12.30	0.50	0.00	6.5	FELDSPAR	0.79	0.60	H
274 10 02 03	0.50	0.64	0.73 4.17	0.60	0.00	8.2	GRAYWACKLE	0.89	-0.16	H
274 10 02 04	0.00	0.64	0.00*****	0.50	0.00	18.8	DIABASE ALTEH	*****	8	
274 10 03 05	0.63	0.88	0.77 -2.81	0.40	0.00	7.0	FELDSPAR	0.92	0.19	H
274 10 03 06	0.56	0.84	0.72 -2.30	0.50	0.00	7.7	BASALT	0.90	0.20	H
274 10 03 07	0.00	0.84	0.00*****	0.50	0.00	10.7	GNEISS	*****	8	
274 10 03 08	0.60	0.63	0.82 6.81	0.50	0.00	9.7	METAQUARTZITE	0.92	-0.33	H
274 10 03 09	0.00	0.63	0.00*****	0.50	0.00	50.0	JASPER	S*****	S	
274 10 04 10	0.00	0.63	0.00*****	0.60	0.00	9.9	CHERT	*****	8	
274 10 04 11	0.42	0.90	0.58 -7.87	0.40	0.00	10.9	HORNFELS	S 0.83	0.48	H

C/A	B/A	SPH	OPI	KRNSS	FRNSS	SIZE	LITHOLOGY	STR	ASPH	WSHAPE		
274	10 04 12	0.44	0.87	0.61	-6.04	0.20	0.00	16.6	HORNFELS	0.85	0.42	
274	10 04 13	0.00	0.87	0.00	*****	0.50	0.00	24.4	= 274 10-4 14	*****	N	
274	10 04 14	0.48	0.60	0.72	5.51	0.50	0.00	27.7	GRANITE ALTER S	0.89	0.24	
274	10 05 15	0.00	0.60	0.00	*****	0.30	0.00	11.9	GABBRO	*****	N	
274	10 05 16	0.47	0.61	0.71	4.92	0.50	0.00	11.3	MN*COATED	0.86	0.20	
274	10 05 17	0.65	0.81	0.81	0.57	0.30	0.00	12.8	MN*COATED	0.93	0.01	
274	10 05 18	0.35	0.67	0.57	0.27	0.30	0.00	11.2	GRANOFELS	0.81	0.22	
274	10 05 19	0.56	0.60	0.80	7.24	0.30	0.00	20.5	URTHOQUARTZIT	0.91	0.36	
274	10 05 20	0.61	0.70	0.81	4.61	0.50	0.00	20.7	MN*COATED	0.92	0.21	
274	10 05 21	0.68	0.96	0.78	-5.30	0.40	0.00	24.3	PEGMATITE	0.93	0.26	
274	10 06 22	0.51	0.74	0.71	0.75	0.30	0.00	7.9	MN*COATED	0.89	0.06	
274	10 06 23	0.32	0.48	0.60	8.12	0.40	0.00	37.3	HORNFELS	S	0.81	-0.27
274	11 01 01	0.53	0.77	0.72	-0.32	0.20	0.00	9.5	GRANITE	0.90	0.11	
274	11 02 02	0.39	0.67	0.61	0.99	0.50	0.00	5.6	MN*COATED	0.84	0.14	
274	11 02 03	0.52	0.87	0.68	-4.27	0.30	0.00	7.1	MN*COATED	0.89	0.31	
274	11 02 04	0.54	0.67	0.76	4.14	0.10	0.00	7.5	MN*COATED	0.91	-0.18	
274	11 02 05	0.46	1.25	0.55	-20.98	0.10	0.00	21.7	DIABASE ALTER S	0.80	0.71	
274	12 02 01	0.00	1.25	0.00	*****	0.30	0.00	13.4	MN COATED	*****	U	
274	12 02 02	0.00	1.25	0.00	*****	0.30	0.00	12.0	MN*COATED	*****	N	
274	12 02 03	0.36	0.57	0.61	4.77	0.40	0.00	49.7	gneiss	0.83	-0.10	
274	12 04 04	0.46	0.55	0.72	7.18	0.40	0.00	8.6	MN*COATED	0.86	-0.30	
274	12 04 05	0.76	0.87	0.87	0.47	0.40	0.00	10.3	URTHOQUARTZIT	0.95	-0.00	
274	12 04 06	0.56	0.79	0.74	-0.28	0.50	0.00	11.4	GRANOFELS	0.91	0.09	
274	12 04 07	0.62	0.78	0.79	0.98	0.50	0.00	13.8	GRANITE	0.92	-0.00	
274	12 04 08	0.47	0.64	0.70	3.69	0.60	0.00	16.9	GRANITE MN-CU D	0.86	-0.12	
274	12 04 09	0.29	0.66	0.50	-0.70	0.50	0.00	22.7	DIABASE MN-CU D	0.75	0.34	
274	12 06 10	0.39	0.40	0.72	17.40	0.50	0.00	5.7	ARGILLITE	0.54	-0.59	
274	12 06 11	0.33	0.67	0.55	-0.26	0.40	0.00	5.9	METAM PHMIC	0.79	0.27	
274	12 06 12	0.27	0.96	0.43	-16.36	0.30	0.00	7.9	ARGILLITE	0.60	0.70	
274	12 06 13	0.46	0.66	0.68	2.67	0.40	0.00	8.0	HORNFELS	0.88	-0.04	
274	12 06 14	0.53	0.76	0.72	0.45	0.50	0.00	20.3	URTHOQUARTZIT	0.90	0.07	

SIZE	MEAN = 13.72	STDEV = 7.97	SUM SQUARES *****	VALUES = 578
SPHERICITY	MEAN = 0.08	STDEV = 0.11	SUM SQAURES = 6.74	VALUES = 578
OBLATE INDEX	MEAN = 0.37	STDEV = 5.34	SUM SQAURES *****	VALUES = 578
K ROUNDNESS	MEAN = 0.44	STDEV = 0.12	SUM SQAURES = 10.79	VALUES = 789
F ROUNDNESS	MEAN = 0.25	STDEV = 0.17	SUM SQAURES = 9.66	VALUES = 350
A SPHERICITY	MEAN = 0.67	STDEV = 0.06	SUM SQAURES = 2.19	VALUES = 578
WILL SHAPE	MEAN = 0.07	STDEV = 0.28	SUM SQAURES = 45.85	VALUES = 578

**STRIATED CLASTS**

		VOLCANIC	=	45 ( 5%)	METAMORPHIC	=	492 (55%)
HORNBLENDITE	* 270 10=2 4	SILICIC VOLC	=	13 ( 1%)	3GNEISS	=	57 ( 6%)
FELDSPAR	FELDSPAR	ANODESITE	=	1 ( 0%)	3SCHIST	=	60 ( 7%)
FELDSPAR	* 270 32=2 2	BASALT	=	31 ( 3%)	3PHYLLITE	=	23 ( 3%)
FELDSPAR	* 270 33=2 1	PLUTONIC	=	235 (26%)	4GRANOFELS	=	62 ( 7%)
?	* 270 33=2 1	1GRANITE	=	116 (13%)	4MURNFELS	=	62 ( 7%)
FELDSPAR	* 270 38=1 1	1GRANODIORITE	=	30 ( 3%)	4METAQUARTZITE	=	27 ( 3%)
HORNBLENDITE	* 270 38=1 1	2DIORITE	=	9 ( 1%)	4METASILVOLC	=	26 ( 3%)
FELDSPAR	* 270 38=1 1	2DIABASE	=	56 ( 6%)	4METABASALT	=	15 ( 2%)
CORDIERITE	* 270 38=1 1	2GABBRO	=	24 ( 3%)	4VEIN QUARTZ	=	33 ( 4%)
*268 7=1 3	* 270 39=1 1	1GRANITIC	=	146 (16%)	4METAM UNCLAS	=	13 ( 1%)
CHERT	* 270 39=1 1	2GABBROIC	=	89 (10%)	4GHAYHACKE	=	49 ( 6%)
SHELL	*273 3CC 1	SEDIMENTARY	=	117 (15%)	4ARGILLITE	=	56 ( 6%)
CHERT	*273 5=1 3	6ORTHOQUARTZITE	=	26 ( 3%)	3FOLIATED	=	140 (16%)
MICROCLINE	*273 5CC 6	6SANDSTONE	=	20 ( 2%)	4NON-FOLIATED	=	352 (40%)
CHERT	*273 5CC 6	6LIMESTONE	=	23 ( 3%)			
PLAGIOCLASE	MISSING	6MUDSTONE	=	30 ( 3%)			
CHERT	FELDSPAR	DIAMMICKITE	=	18 ( 2%)			
ORTHOCLASE	* 273A 9CC 1						
*270 31 3 7	CHERT						
*270 31 3 7	CHERT						
CARBONATITE	JASPER						
CHERT	?QUARTZ						
*270 39 1 8	?						
*270 39 1 8	* 274 5=1 2						
*270 40 3 5	FELDSPAR						
CHERT	* 274 5 CC 23						
MARBLE	BRECCIA						
FELDSPAR	PEGMATITE						
SAME AS 14CC 1	FELDSPAR						
SAME AS 14CC 5	CHERT						
FELDSPAR	FELDSPAR						
SAME AS 22=1=2	FELDSPAR						
DOLOMITE	JASPER						
* 270 2=2 10	CHERT						
DOLOMITE?	* 274 10=4 14						
FELDSPAR	MN=COATED						
FELDSPAR	MN=COATED						
CHERT	MN=COATED						
APLITE	PEGMATITE						
* 270 3=1 2	MN=COATED						
CORDIERITE	MN=COATED						
BRECCIA	MN=COATED						
FELDSPAR	MN=COATED						
MARBLE	MN COATED						
FELDSPAR	MN=COATED						
FELDSPAR	MN=COATED						
* 270 9=2 1	TOTAL OTHER	=	93 ( 9%)				