

SURVEY OF HIGHWAY CONSTRUCTION MATERIALS  
IN THE TOWN OF PLYMOUTH, WINDSOR COUNTY, VERMONT

prepared by

Engineering Geology Section, Materials Division  
Vermont Department of Highways

in cooperation with

United States Department of Commerce  
Bureau of Public Roads

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1. Various departments and individuals of the Vermont State Department of Highways, notably the Planning and Mapping Division and the Highway Testing Laboratory,
2. Professor D.P. Stewart of Miami University, Oxford, Ohio,
3. Professor C.G. Doll, Vermont State Geologist, University of Vermont, Burlington, Vermont,
4. United States Department of Commerce, Bureau of Public Roads.

### History

The Materials Survey Project was formed in 1957 by the Vermont State Department of Highways with the assistance of the United States Bureau of Public Roads. Its prime objective was to compile an inventory of highway construction materials in the State of Vermont. Prior to the efforts of the personnel of the Survey as described in this and other reports, searches for highway construction materials were conducted only as the immediate situation required. Thus only limited areas were surveyed, and no overall picture of material resources was available. Highway contractors or resident engineers are usually required to locate the materials for their respective projects and have samples tested by the Highway Testing Laboratory. The additional cost of exploration for construction materials is passed onto the State in the form of higher construction costs. The Materials Survey Project was established to minimize or eliminate this factor by enabling the State and its contractors to proceed with information

on material sources available beforehand. Prior knowledge of locations of suitable material is an important factor in planning future highways.

The sources of construction materials are located by this Project through ground reconnaissance, study of maps and aerial photographs, and geological and physiographic interpretation. Maps, data sheets, and work sheets for reporting the findings of the Project were designed with their intended use in mind. These maps and data sheets were devised to furnish information of particular use to the contractor or construction man. For maximum benefit, the maps, data sheets, and this report should be studied simultaneously.

#### Inclosures

Included in this folder are two surface-geology maps, one defining the location of tests conducted on bedrock sources, the other defining the location of tests conducted on granular materials. These maps are derived from 15-minute or 7½-minute quadrangles of the United States Geological Survey enlarged or reduced to 1:31250 or 1" = 2604'. Delineated on the Bedrock Map are the various rock types of the area. This information was obtained from numerous sources: Vermont Geological Survey Bulletins, Vermont State Geologist Reports, United States Geological Survey Bedrock Maps, and the Centennial Geological Map of Vermont, as well as other references.

The granular materials map depicts areas covered by various types of glacial deposits (outwash, moraines, kames, kame terraces, eskers, etc.) by which potential sources of gravel and sand may be recognized. This information was obtained primarily from a survey being conducted by Professor D.P. Stewart of Miami University, Oxford, Ohio, who has been mapping the glacial features of the State of Vermont during the summer months since

1956. Further information was obtained from the Soil Survey (Reconnaissance) of Vermont conducted by the Bureau of Chemistry and Soils of the United States Department of Agriculture, and from Vermont Geological Survey Bulletins, United States Geological Survey Quadrangles, aerial photographs, and other sources. On both maps the areas tested are represented by Identification Numbers. Several tests are usually conducted in each area represented by an Identification Number, the number of such tests being more or less arbitrarily determined either by the character of the material or by the topography.

Also included in this folder are data sheets for both the Bedrock and Granular Materials Survey, which contain detailed information for each test conducted by the Project as well as information obtained from other sources, and including an active card file compiled by the Highway Testing Laboratory. The latter information was gathered over a period of years by many persons and consequently lacks the organized approach and detail required for effective use. The information on the cards varied widely in completeness. Transfer of information from the cards to the data sheets was made without elaboration or verification. When possible, the locations of the deposits listed in the card files have also been plotted on the maps; however, some cards in the file were not used because the information on the location of the deposit was incomplete or unidentifiable. Caution should be exercised wherever this information appears incomplete. This Project does not assume responsibility for the information taken from the card files.

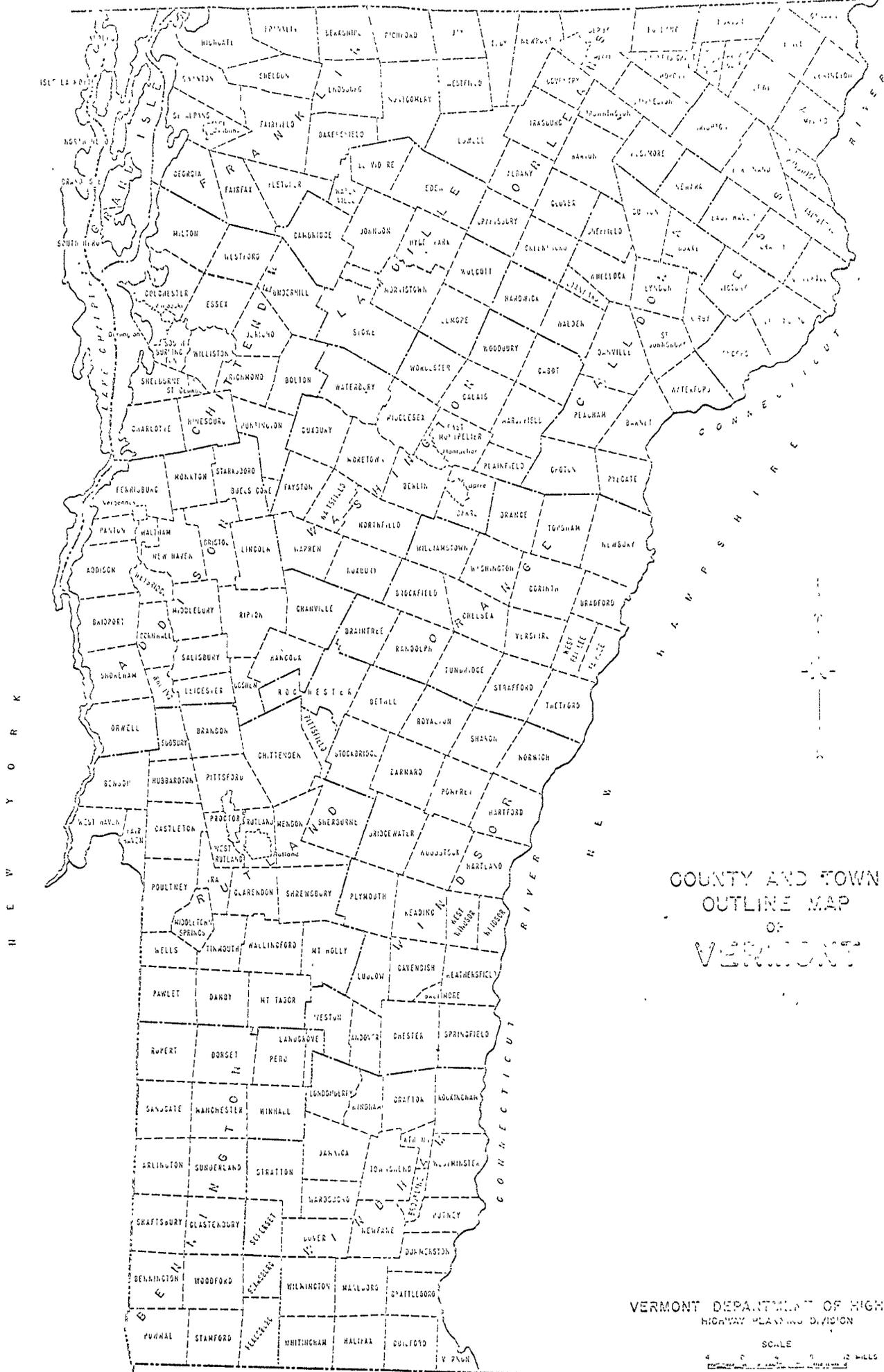
Work sheets contain more detailed information on each test and a detailed sketch of each Identification Number Area. The work sheets and laboratory reports are on file in the office headquarters of this Project.

LOCATION

The town of Plymouth is situated in the western side of the south-central part of Windsor County. The town lies partly in the Rutland (d), Wallingford (c), Ludlow, and Woodstock Quadrangles, and is bounded by the towns of Mount Holly and Ludlow to the south, Shrewsbury to the west, Bridgewater to the north, and Reading to the east. (See County and Town Outline Map of Vermont on the following page).

The western third of Plymouth lies within the Green Mountain Physiographic Region, and the central and eastern parts of town are part of the central plateau, or Vermont Piedmont Physiographic Region. The town is underlain entirely by rocks of the Green Mountain Stratigraphic Sequence.

The major structural trend in Plymouth is north-northwest and south-southeast. Elevations range from 3,278' (Salt Ash Mountain), to 1,062' (Lake Echo). Major drainage in the town is by the Black River, Kingdom Brook, and Broad Brook.



COUNTY AND TOWN  
 OUTLINE MAP  
 OF  
 VERMONT

VERMONT DEPARTMENT OF HIGHWAYS  
 HIGHWAY PLANNING DIVISION

SCALE  
 1" = 10 MILES

## SURVEY OF ROCK SOURCES

### Procedure for Rock Survey

The routine employed by the project in a survey of possible sources of rock for highway construction is divided into two main stages; office and field investigations.

The office investigation is conducted primarily during the winter months and comprises the mapping and description of rock types as indicated in various reference sources. Many different sources of information are utilized, as indicated in the bibliography. These references differ considerably in dependability due to new developments and studies that have contributed to the obsolescence of a number of reports. In addition, the results of samples taken by other individuals are analyzed, and the location at which these samples were taken is mapped when possible. In other words, as complete a correlation as possible is made of all the information available concerning the geology of the area under consideration.

The field investigation is begun by making a cursory preliminary survey of the entire area. The information obtained in the preliminary survey, together with the information assimilated in the office investigation, is employed to determine the areas where testing and sampling will be concentrated. When a promising source has been determined by rock type, volume of material, accessibility, and adequate exposure and relief, chip samples are taken with a hammer across the strike or trend of the rock. The samples are submitted to the Material Testing Laboratory for abrasion testing both by the Deval Method (AASHO T-3) and the Los Angeles Method (AASHO T-96). It should be kept in mind that the samples taken by the chip method are often within the weathered zone of the outcrop and consequently may give a less satisfactory test result than fresh material deeper in the rock structure. When the material is uniform and acceptable abrasion tests result from the chip samples, the material source is included in this report as being satisfactory.

Discussion of Rock and Rock Sources

The rocks of Plymouth lie entirely in the Green Mountain Stratigraphic Sequence according to the Centennial Geologic Map.

The southwest part of Plymouth is underlain by the Mount Holly complex. There are no good accessible outcrops of this complex.

Between the approximate location of the Black River and the Mount Holly complex there are dolomites, quartzites, and schists of the Tyson Formation. There are two occurrences of undifferentiated granitic rock west of Lake Amherst and Tyson village. A narrow strip of Hoosac schist and phyllite rocks is mapped as following the trend of the drainage southeastward from Woodward Reservoir, in the northwest part of town, to below Lake Amherst and Echo Lake and then through Tyson village into Ludlow. East of the Hoosac Formation are the quartzites and dolomites of the Hoosac Formation, Plymouth member.

The Pinney Hollow Formation has been mapped both in, and east of the Plymouth Member. Undifferentiated granitic rock in the Calvin Coolidge State Forest Granite Quarry is surrounded by the Pinney Hollow schist. Interbedded greenstones occur in the southeast part of town.

The eastern third of the town is underlain mainly by phyllites, quartzites, schists, and amphibolites of the Ottauquechee, Stowe, and Missisquoi Formations. Ultramafic igneous rocks were mapped at Five Corners, and on a hilltop about  $1\frac{1}{2}$  miles south of the other outcrop. Both are surrounded by the Ottauquechee Formation. The rock formations in Plymouth trend about north-northwest and south-southeast.

The best source of Item 204 in Plymouth is the granite quarry in Calvin Coolidge State Forest at Map Identification Number 1. Rock at

Map Identification Number 6 (Plymouth Member of Hoosac Formation), and Map Identification Number 5 (Tyson Formation) should be considered next. Map Identification Number 4 (Tyson Formation) if it becomes available could then be considered. Map Identification Number 2 (Plymouth Member of Hoosac Formation) should be considered prior to Map Identification Number 3 (probably Hoosac Formation) which is the least desirable source of Item 204 in Plymouth.

## SURVEY OF SAND AND GRAVEL SOURCES

### Procedure for Sand and Gravel Survey

The method employed by the project in a survey of possible sources of sand and gravel for highway construction is divided into two main stages; office and field investigations.

The office investigation is conducted primarily during the winter months and comprises the mapping of possible potentially productive areas as indicated from various references. Of these references, the survey of glacial deposits mapped by Professor Stewart proves to be valuable, particularly when used in conjunction with other references such as soil-type maps, aerial photographs, and United States Geological Survey quadrangles. The last two are used in the recognition and location of physiographic features indicating glacial deposits and in the study of drainage patterns. In addition, the locations of existing pits are mapped when known. The locations in which samples were taken by other individuals are noted and mapped when possible.

The field investigation is begun by making a cursory preliminary survey of the entire town. All pits and other areas which show physiographic features that give evidence of glacial or fluvial deposition are noted. These locations are later investigated by obtaining samples of pit faces and other exposed materials. Tests pits, dug with a backhoe to a depth of approximately 11 feet, are also sampled. The samples are submitted to the Materials Testing Laboratory where they are tested for gradation and stone abrasion, the latter by the Deval Method (AASHO T-4).

Discussion of Sand and Gravel Deposits

The granular deposits in Plymouth occur either as sands and gravels of ice-contact origin deposited as kame terraces, kame moraines, and kames; or material deposited as proglacial outwash and fluvial gravels. Many ice-contact areas were mapped in Plymouth by D. P. Stewart. The following Map Identification Numbers had material acceptable for Sub-base of Gravel, Item 201: 10, 27, 31, 32, 34.

Probably the order of desirability due to volume or availability of acceptable Item 201 would be Map Identification Numbers 31, 32, 34, 10 and 27.

It is suggested to modify the material which is available, use Sub-base of Crushed Stone, Item 204, or obtain acceptable gravel from a neighboring town.

Sources of material acceptable for Sub-base of Sand, Item 202, are at Map Identification Numbers: 1, 2, 9, 15, 17, 18, 19, 20, 33.

In their order of availability or volume - the following Map Identification Numbers should be checked first: 33, 19 (owner needs an easement across neighbor's land), 2, 15, 17, 18, 20 and 9 (very limited).

Numbers 9, 19, and 33 would be willing to sell, but the owners of other areas (2, 15, 17, 18 and 20) would probably not sell at the present time. Overall, the granular situation in Plymouth is not good. Many features are in large holdings owned by people who intend to develop house lots, or to keep their land untouched. Areas with pits are extremely limited in available material or else the remaining material is not very good. There are granular features which have been built on or sub-divided in the last decade. This is another limiting factor in the

search for adequate sources of acceptable road-building material, not only in Plymouth but throughout the State.

## SUMMARY OF ROCK FORMATIONS IN THE TOWN OF PLYMOUTH

Green Mountain Sequence

Missisquoi Formation (Moretown member) - Quartzite and quartz-plagioclase granulite in layers 1/8" to several inches thick, separated by pinstripe partings that contain muscovite, chlorite, epidote, biotite, and locally garnet; also greenish quartz-sericite-chlorite phyllite and schist, and minor carbonaceous phyllite.

Missisquoi formation (Whetstone Hill member) - Carbonaceous black to light gray phyllite and schist containing porphyroblasts of biotite and garnet; beds of gray micaceous quartzite, fine-grained biotite gneiss and amphibolite.

Stowe formation - Quartz-sericite (muscovite-paragonite) - chlorite phyllite and schist; porphyroblasts of albite, garnet, chloritoid or kyanite are common locally. Schist contains abundant segregations of granular white quartz.

Ottauquechee formation - Black carbonaceous phyllite or schist containing interbeds of massive quartzite commonly criss-crossed by veins of white quartz; quartzite is dark gray and carbonaceous, light gray, or white; also includes light green quartz-sericite-chlorite phyllite or schist, and sericitic quartzite. Schist contains abundant porphyroblasts of garnet and biotite from Ludlow, south.

Pinney Hollow formation - Pale green quartz-sericite (muscovite-paragonite) - chlorite phyllite and schist with abundant magnetite, chloritoid phyllite and schist, quartz-sericite-albite-chlorite schist, and rare beds of carbonaceous and schistose quartzite; garnet porphyroblasts common south of Ottauquechee River.

Hoosac formation - Quartz-sericite-albite-chlorite schist characterized by albite porphyroblasts - biotite and garnet porphyroblasts common southward; locally carbonaceous.

Hoosac formation (Plymouth member) - Quartzite, schistose quartzite, dolomitic quartzite; carbonaceous phyllite; buff to dark gray dolomite with partings locally of carbonaceous phyllite; quartz-sericite-chlorite-albite schist; carbonaceous albite schist;

Tyson formation - Feldspathic quartz-mica schist containing biotite, chlorite, and carbonate; many beds contain pebbles of quartz and feldspar; cobble or boulder conglomerate commonly at base; thin beds of quartzite, carbonaceous phyllite, and schistose dolomite in upper part, overlain at top by massive buff dolomite as much as 30 feet thick.

Undifferentiated Granitic Rocks - Fine-to coarse-grained granitoid rocks including granodiorite and quartz monzonite occurring as sills

and irregular bodies.

Mount Holly Complex - Locally in massive beds as much as 30 feet thick, micaceous quartzite, and quartz-mica schist that commonly contains garnet or pseudomorphs (largely chlorite) after garnet; schists are locally rusty weathered and contain conspicuous flakes of graphite; also includes amphibolite and minor hornblende gneiss, biotite gneiss, and pegmatite.

Mount Holly Complex - Mainly fine-to medium-grained biotitic gneiss, locally muscovitic, and in western areas chloritic; massive and granitoid in some localities, fine-grained or schistose and compositionally layered in others; also abundant amphibolite and hornblende gneiss, and minor beds of mica schist, quartzite, and calc-silicate granulite; includes numerous small bodies of pegmatite and gneissoid granitic rock.

GLOSSARY OF SELECTED GEOLOGIC TERMS

Alluvial - Pertaining to material carried or deposited by running water.

Breccia - A rock consisting of consolidated angular rock fragments larger than sand grains. There may be fault, talus, and volcanic breccia.

Calcareous - Pertaining to or containing calcium carbonate.

Carbonate Rocks - Rocks composed of the molecule  $\text{CO}_3$  combined with calcium, magnesium, etc. Includes limestones and dolomites.

Delta - A predominantly alluvial deposit built by a stream entering the sea or other body of water. Usually it has the form of the Greek letter delta.

Dolomite - A rock consisting predominantly of the mineral calcium magnesium carbonate (dolomite), containing carbon dioxide 47.7%, lime 30.4%, magnesia 21.9%.

Esker - A long, narrow winding ridge of mixed sand and gravel deposited by a stream of meltwater flowing in a tunnel or crevasse in stagnant glacial ice.

Gneiss - Originally meaning a more or less banded metamorphic rock with the mineral composition of granite. The term now designates a foliated metamorphic rock with no specific composition implied, but having layers that are mineralogically unlike and consisting of particles visible to the eye. Usually gneiss displays an alternation of granular mineral and schistose minerals with the rock tending to split along the schistose bands.

Ice Contact - Refers to sediments which have accumulated in contact with stagnant or wasting glacial ice. They assume the varied topographic forms expressed by eskers, kames, and kame terraces.

Kame - A conical hill of generally poorly stratified drift deposited in contact with glacial ice by streams flowing in or on the ice.

Kame Terrace - Stratified sands and gravels deposited by streams between a glacier and an adjacent valley wall.

Kame Moraine - An accumulation of material deposited directly from the frontal portion of the glacial ice and partially sorted by water action. The deposits may take the form of coalescent knolls, hummocks, and ridges.

Limestone - A bedded sedimentary rock consisting chiefly of calcium carbonate. The most important and widely distributed of the carbonate rocks.

Marble - A soft, white rock being the metamorphic form of limestone in which the calcium carbonate (calcite) is recrystallized and the calcite crystals are overgrown and interlocked with additional calcite. Commercially it is a trade name applied to any carbonate rock of good color and texture and hard enough to take a polish.

Metamorphic Rocks - Rocks that owe their distinctive characteristics to the transformation of preexisting rocks through intense heat or pressure or both.

Phyllite - A fine-grained, foliated metamorphic rock intermediate between the mica schists and slates into which it may grade. The foliation is made possible by the development of a large amount of potash mica, sericite, which also gives the rock a distinctive silvery appearance.

Physiographic - Pertaining to the physical divisions of the earth.

Quartzite - A compact metamorphic rock composed of quartz grains so firmly cemented that fracture takes place across the grains and the cementing material with equal ease.

Siliceous - Containing or pertaining to silica (silicon dioxide,  $\text{SiO}_2$ ).

Slate - A very fine-grained homogeneous metamorphic rock which splits smoothly along parallel cleavage planes and yields roughly similar slabs.

Till - An unsorted, unstratified, and unconsolidated heterogeneous mixture of clay, silt, sand, gravel, and boulders deposited directly by glacial ice.

PELIOGRAPHY

- A survey of the glacial geology of Vermont being conducted by D. P. Stewart, the partial results of which are published in Vermont Geological Survey Bulletin No. 19; 1961.
- Soil Survey (Reconnaissance) of Vermont, W. J. Latimer; 1930; Bureau of Chemistry and Soils, United States Department of Agriculture.
- Soil Exploration and Mapping; 1950; Highway Research Board, Bulletin 26.
- Survey of Highway Aggregate Materials in West Virginia; December, 1959; Engineering Station, West Virginia University, Morgantown, West Virginia.
- Materials Inventory, Bangor Quadrangle, South Half; September, 1959; University of Maine.
- Glacial Geology and the Pleistocene Epoch, R. F. Flint; 1947; John Wiley and Sons, Inc.
- A Handbook of Rocks, J. F. Kemp; June 1946; D. Van Nostrand Company, Inc.
- Reports of the Vermont State Geologist, G. H. Perkins: 1931-1932.
- Rock and Rock Minerals, L. V. Pirsson; June, 1949; John Wiley and Sons, Inc.
- Glossary of Selected Geologic Terms, W. L. Stokes and D. J. Varnes; 1955; Colorado Scientific Proceedings, Vol. 16.
- Microscopic Petrography, E. W. Heinrich; 1956; McGraw-Hill Book Company, Inc.
- Centennial Geologic Map of Vermont, C. G. Doll; 1961.
- The Geology of the Rutland Area, Vermont; William F. Brace; 1961; Vermont Geological Survey Bulletin No. 6
- Bedrock Geology of the Woodstock Quadrangle, Vermont; Ping Hsi Chang, Ernest H. Ern, Jr., and James B. Thompson, Jr.; 1965; Vermont Geological Survey Bulletin No. 29.
- The Surficial Geology and Pleistocene History of Vermont; David P. Stewart and Paul MacClintock; 1969; Vermont Geological Survey Bulletin No. 31.
- Killington Peak Quadrangle, Vermont; Geological Survey, United States Department of the Interior.
- Ludlow Quadrangle, Vermont; Geological Survey, United States Department of the Interior.
- Mount Holly Quadrangle, Vermont; Geological Survey, United States Department of the Interior.

Woodstock Quadrangle, Vermont; Geological Survey, United States Department  
of the Interior.

## PARTIAL SPECIFICATIONS FOR HIGHWAY CONSTRUCTION MATERIALS

Listed below are partial specifications for Highway Construction Materials as they apply to this report at date of publication. For a complete list of specifications see Standard Specifications for Highway and Bridge Construction, approved and adopted by the Vermont Department of Highways in April, 1964.

Item 105, Granular Borrow

"Article 105.02 - Materials. The granular borrow shall be obtained from approved sources and shall consist of satisfactorily graded, free-draining, hard durable stone and coarse sand practically free from loam, silt, clay, and organic matter.

"The sand portion (material passing the No. 4 screen) shall have not more than ten percent (10%) passing the No. 270 mesh sieve and shall show a color of not more than three and one-half ( $3\frac{1}{2}$ ) as determined by the colorimetric test described in AASHO Method of Test, Designation T-21.

"When used in connection with fine grading or in fills where piling is to be driven, the granular material shall all pass the nine-inch (9") square-opening screen."

Item 201, Sub-base of Gravel

"Article 201.02 - Materials. The gravel shall consist of material reasonably free from silt, loam, clay or organic matter. It shall be obtained from approved sources and meet the following requirements:

"Not less than forty percent (40%) stone shall be retained on No. 4 sieve.

"The percent of wear shall be not more than twenty-five (25) when tested by laboratory methods using Method T-4 or more than forty (40) when tested by AASHO Method T-96.

"The stone portion of the gravel shall be uniformly graded from coarse to fine, and the maximum-size particles shall not exceed two-thirds (2/3) of the layer being spread.

"The sand portion, when tested by laboratory methods using Method AASHO T-27, shall meet the grading requirements set up in the following table:

Minimum Percent of Stone	Percent Passing Square Openings	Percent Passing Square Openings
	No. 100	No. 270
40	0-15	0-3
50	0-15	0-4
60	0-15	0-5
70	0-15	0-6

"The sand shall show a color of not more than three and one-half (3½) as determined by the colorimetric test described in the AASHO Method of Test, Designation T-21."

Item 202, Sub-base of Sand

"Article 202.02 - Materials. The sand shall consist of material reasonably free from silt, loam, clay, or organic matter. It shall be obtained from approved sources and meet the following requirements:

"The sand, when tested by laboratory methods using Method AASHO T-27, shall meet the grading requirements set up in the following table:

Square Openings	Percent Passing
1½"	95-100
5/8"	80-100
No. 4	70-100
No. 100	0-18
No. 270	0-5

"The sand shall show a color of not more than three and one-half (3½) as determined by the colorimetric test described in the AASHO Method of Test, Designation T-21."

Item 204, Sub-base of Crushed Rock

"Article 204.02 - Materials. The materials for sub-base, filler, and sand cushion shall be obtained from approved sources and meet the following requirements:

A - Crushed Rock. "The crushed rock shall be uniformly graded, crusher-run material and shall be free from dirt. The ledge from which this material is obtained shall be stripped and cleaned before blasting. Conical stockpiling, or any other method of stockpiling which causes segregation of aggregates, will not be permitted.

"The crushed rock, when tested by laboratory methods using Method AASHO T-27, shall meet the grading requirements set up in the following table:

Square Openings	Percent Passing
4"	95-100
1½"	25-50
No. 4	0-15

"The percent of wear shall not be more than eight (8) when tested by laboratory methods using Method AASHO T-3 or more than forty (40) when tested by AASHO Method T-96."

Item 205, Sub-base of Crushed Gravel

"Article 205.02 - Materials.

A - Crushed Gravel. "The crushed gravel shall consist of material reasonably free from silt, loam, clay, or organic matter. It shall be obtained from approved sources and produced by a crusher adjusted to deliver a product uniformly graded from coarse to fine.

"When tested by laboratory methods using Method AASHO T-27, it shall meet the grading requirements as set forth below:

		Square Openings	Percent Passing
Sub-base of Crushed Gravel	Coarse-Graded	4"	100
	Item 205-A	No. 4	25-50
	Fine-Graded	1½"	95-100
	Item 205-B	No. 4	30-60

"At least thirty percent (30%) by weight of the stone content of the crushed gravel, that is, the material retained on the No. 4 screen, shall have a minimum of one (1) fractured face as determined by actual count from the sample submitted to the laboratory.

"The percent of wear shall not be more than twenty (20) when tested by laboratory methods using Method AASHO T-4 or more than thirty-five when tested by AASHO Method T-96.

B - Sand. "The sand content of the crushed gravel, that is the material passing the No. 4 screen, when tested by laboratory methods using Method AASHO T-27, shall meet the grading requirements set up in the following table:

Square Openings	Percent Passing
No. 100	0-18
No. 270	0-8

"The sand shall show a color of not more than three and one-half ( $3\frac{1}{2}$ ) as determined by the colorimetric test described in the AASHO Method of Test, Designation T-21."

## TEST I

## PLYMOUTH GRANULAR DATA SHEET NO. 1

Map Ident. No.	Field Test No.	Year Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1 1/2"	5/8"	#4	#100	#270				
1	1	1969	1.5-8	0-1.5	Yes	100	83.4	68.1	5.5	2.5 1.3*	1 1/2	-----	Gran Borr. (Sand)	Owner: Eugene Schlosser This area was formerly owned by Charles Bridge and is located 0.60 mile south of Bridgewater Town line; and west of a small stream west of Vermont Route 100. The pit is somewhat overgrown, but there is access to it over a small wood bridge. The project line runs through Schlosser's land - close to Test #3. Test #1 (B/H) dug at lower part of west face. Log of test: (0'-1.5' ov.) (1.5'-5.5' interbedded sand and silt seams) (5.5'-6.5' pebbly sand) (6.5'-8' gravel).
	2A	1969	1-6	0-1	Yes	100	87.9	71.5	10.0	4.5 3.2*	1 1/2	-----	Sand	Dug in floor, 35' east of Test #1. Log of #2A (B/H) (0'-1' ov.) (1'-6' pebbly sand with a few +6" boulders) (6'-8' material is coarser: coarse sand and fine gravel and several +12" boulders) (8'-10' gravel).
	2B	1969	6-10	---	Yes	75.1	59.3	44.2	62.0	40.0	1	31.8%	---	Test #2B (B.H.) (0'-1' ov.) (6'-8' coarse sand and fine gravel, and several +12" boulders) (8'-10' gravel)

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 2

Map Ident. No.	Field Test No	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing					Color Abrasion		Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270	T-21	T-4-35		
	3	1969	1-4.5	0-1	No	60.7	51.5	35.8	14.0	6.0	5	23.4%	----	bottoms in gravel and boulders. Test #3 (E.H.) dug in low field, 35' N. 20° W. of E stake "501.1E E". Log of hole: (0'-1' ov.) (1'-2' fine gravel) (2'-4.5' coarse gravel) water at 4.5'. 15.2% of the stones in sample are +3".
	4	1969	1-5	0-1	No	63.0	50.1	37.8	12.0	6.0	5	31.8%		Test #4 (E.H.) dug in middle level of field, 135' N. 60° W. of small wooden access bridge. Log of hole: (0'-1' ov.) (1'-3.5' dirty, coarse gravel) (3.5'-5' bouldery gravel). <u>Overall</u> , the material would have to be crushed, if taken from below floor level of pit. There is a steep, wooded ridge northwest of test area which seems to be an extension of the coarse gravels. Material could be used only if crushed and modified, however, it is near the line and might bear consideration

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 3

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1 1/2"	5/8"	#4	#100	#270				
2	1A	1969	1.5-13	0-1.5	Yes	93.5	87.0	77.4	5.2	3.0 2.3*	1	-----	Gr. Bor. (Sand)	Owner: Ken Webb. Area is a wooded, granular ridge trending N. 7° E, with a pit on the south end of ridge just north of Town Highway No. 7, and east of Vermont Route, 100. Area is readily accessible, but owner said that he would allow use of material only <u>after</u> his needs were taken care of. He needs it for camps and private access roads. Test #1A (H.S.) was in upper north face of pit. Log of sample: (0'-1.5' ov.) (1.5'-13' pebbly coarse sand).
	1B	1969	13-21	-----	Yes	95.5	93.0	85.2	13.6	4.5 3.8*	1-	-----	Sand	Test #1B (H.S.) - north face of pit below #1A. (0'-1.5' ov.) (13'-21' pebbly sand).
	2	1969	27-37	0-1.5	Yes	100	95.9	90.4	13.6	6.0 5.4*	1	-----	G. Bor. (Sand)	Test #2 (B/H) dug in lower part of face in north part of pit. Log of sample (0'-1.5' ov.) (27'-31' pebbly sand) (31'-37' pebbly sand with silt seams).

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 4

Map Ident. No.	Field Test No.	Year Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-21	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
	3A	1969	2-6	0-2	Yes	83.1	66.3	50.3	13.0	5.0	1	26.0%	Gr.	Test #3A (B/H) dug in Bor. floor, 25' southwest of (Grav.) Test #2. (0'-2' ov.) (2'-6' gravel with some silt seams)
	3B	1969	6-11	----	Yes	100	100	88.9	32.9	13.0	1	----	----	Test #3E (B/H) (0'-2' ov.) (6'-11' interbedded sand and silt seams with some pebbles). This area is mostly a sand or granular borrow source. There are some promising-looking knolls south of the area, within the camp, which could not be tested.
3	1	1969	1-10	0-1	Yes	100	100	99.5	19.9	6.0	1½	----	Gr. Bor. (Sand)	Owner: Ken Webb. Area is a small pit which for all practical purposes is the northeast extension of material in the pit at Map Identification No. 2. Material does not look good. There is a rolling field east of this pit which could not be sampled. Material looks better than in the pit and may be gravelly. Test #1 (B/H) dug in floor at south end of small littered pit. (0'-1' ov.) (1'-3' sand) (3'-5' silt) (5'-10' silty sand).

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 5

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
4	1	1969	1-3	0-1	No	61.6	45.2	33.2	23.0	3.0	3½	27.0%	Gr. Bor. (Grav.)	Owner: James Hall Area is a downward sloping field west of Vermont Route 100. Part of the lower portion of the field is wet. The north and higher portion terminates at the east as a bank on a road cut. Area is just north of the Woodward Reservoir Fishing Access, and at about Station 475+0. Test #1 (H.S.), dug in highest and northwest part of field, 20' south of woods. (0'-1' ov.) (1'-3' gravel).
	2	1969	1-11	0-1	No	63.3	55.4	40.4	25.0	10.0	2½	34.6%	Gr. Bor. (Grav.)	Test #2: (H.S.) on bank face of road cut, south of dam, and on west side of Vermont Route 100. (0'-1' ov.) (1'-11' sandy gravel). The material looks too soft and silty, and possibly extends to west in a knoll. With modification and crushing it might be a pretty good source.

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 6

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
	3	1969	1-7	0-1	No	87.9	71.0	45.7	23.0	3.0	2	31.8%	Gr. Bor. (Grav.)	Test #3 (B/H) dug on slope of hilly field, 15' northeast of Test #1, and just south of the woods. (0'-1' ov.) (1'-7' gravel) Bottoms at 7' on boulders.
	4	1969	1.5-6	0-1.5	No	100	100	97.0	49.3	21.0	2½	----	----	Test # (B/H) dug in middle of north slope of field, 175' S. 40° E; of Test #3. (0'-1.5' black organic ov.) (1.5'-6' pebbly silt-clay) Bottoms in silt-clay.
5	1	1969	1-15	0-1	No	76.7	66.7	54.0	13.0	5.0	1	27.2%	Gr. Bor. (Grav.)	Owner: Lewis L. Shipman Area is a wooded, flat-topped hill the east slope of which is a bank in the roadcut on the west side of Vermont Route 100. The area is on a sharp curve about 160' east of station 423+0. The average height of the bank is about 25'-30'. Test #1 (hand). Top of bank in road cut. (0'-1' ov.) (1'-15' silty gravel). Stones are covered with gray, silty film. Several +12" boulders and a few +24" ones were noted.

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 7

Map Ident. No.	Field Test No.	Year Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
	2	1969	1.5-6.0	0-1.5	No	71.7	60.5	45.8	14.0	6.0	2½	30.0%	Gr. Bor. (Grav.)	Test #2 (B/H) dug on saddle at top of north slope, and 80' northwest of Test #1. (0'-1.5' ov.) (1.5'-3' boulders) (3'-5' dirty gravel) (5'-6' boulders) bottoms at 6' in boulders. Would need screening, crushing and modifying to use as gravel. There were many +6" boulders present but none were sampled.
	3	1969	1-4.5	0-1	No	100	100	68.5	30.0	11.0	3½	----	----	Test #3 (B/H) middle level at turn in woods road -- southwest of road cut. (0'-1' ov.) (1'-4.5' dirty, bouldery gravel). Pretty boney and somewhat silty. Note: Owner probably would not want to sell.
6	1	1969	1-6	0-1	No	77.1	57.5	42.6	18.0	6.0	2½	25.2%	Gr. Bor. (Grav.)	Owner: Ken Webb. Area is a small, steep-sided knoll which trends a little east of north, and drops off on its east and west slopes rather sharply. The area is on the west side of a private road which runs between Town Highways Nos. 6 and 7 on the east side of Woodward Reservoir.

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 8

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
7	1A	1969	1-6	0-1	Yes	100	100	100	69.0	25.0	1	----	----	<p>Test #1 (B/H) at top of knoll, 15' south of fence, and 180' N. 30° E. of cracker barrel hut, a camp building. The top of knoll is about 12' above road level.</p> <p>Test #1: (0'-1' ov.) (1'-6' coarse gravel).</p> <p>Check with owner to see what he is willing to sell at a given time.</p> <p><u>Owner: Maxwell E. Putnam</u></p> <p>Area is old, shallow pit on southeast edge of hay field which is above, and northwest of Putnam's house. Area is 0.5 mile from Bridgewater town line on Vermont Route 100A.</p> <p>Pit is about 60' x 120', and the average height of faces is 5'-8', with many faces lower than that. The field to the northwest is somewhat hilly, rolling or knobby in places; but testing was not allowed.</p>
*Percentage of Total Sample														

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 9

Map Ident. No.	Field Test No.	Year Tested	Depth of Sample (Ft)	Overburden (Ft)	Exist- ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
	1B	1969	6-11	-----	Yes	100	100	99.6	43.8	17.0	1	-----	-----	Test #1A: (B/H) dug in floor, near southwest end of pit. (0'-1' ov.) (1'-6' inter-bedded silt, clay, and fine sand.) Bottoms in sand at 6'.
										16.9*				Test #1B: (E/H) (0'-1' ov.) (6'-11' sand). Overall, the area did not look very promising.
8	1	1969	1-22	0-1	No	100	81.3	75.9	39.5	9.0	1½	-----	Gr. Bor. (Sand)	Owner: Wilmer Schmell. Area is a rounded hill with steep slopes, its long axis trending east-west. This hill is about 0.9 mile from Bridgewater town line, and about 0.08 mile north of Vermont Route 100A. At this point there is a turnout area on S. B. lane, 275' southwest of bridge. Telephone line trends N 50° E. and passed the southeast part of the hill. Test #1 (hand) down east slope. (0'-1' ov.) (1'-8' stony sand) (8'-22' sand). The sand is rather fine, and has some silt seams and pebble layers. If area is to be exploited, ask where spring is; also, a road would have to be dozed in.

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 10

Map Ident. No.	Field Test No.	Year Tested	Depth of Sample (Ft)	Over-burden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHS Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
9	1	1969	1-6.5	0-1	Yes	70.5	50.4	35.3	10.0	1.5*	1½	-----	Gr. Bor. (Grav.)	Owner: Sailer Bros. Old, small pit is located behind sawmill, about 350' west of a point which is 1.60 miles from Bridgewater town line on Vermont Route 100A. Area is bounded on the southwest by a stone wall and John Sailer, Jr.'s land. Test #1 (H.S.) in southwest face of pit. (0'-1' ov.) (1'-6.5' dirty, soft gravel with some silt seams). Bottoms in sand at 6.5'.
2	1969	1-7	0-1	Yes	100	100	100	3.0	1.5*	1½	-----	Sand	There are stones higher and at the west end of pit. There is insufficient proper size stone for percent of wear test. Meets grading for Sub-base of Gravel, Item 201. Test #2: (H.S.) southeast face of pit, 60' east of Test #1. Test #2 taken in 2 steps due to the beds dipping east or southeast. Step #1: (0'-1' ov.) (1'-4' dark brown "winter" sand)	

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 11

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
	3	1969	1-11	0-1	Yes	100	100	100	22.0	4.0 4.0*	1	-----	Gr. Bor. (Sand)	<p>Step #2, below and 7' east of step #1, (0'-1' ov.) (4'-7' interbedded brown and rusty colored sand). Beds dip east or southeast.</p> <p>Test #3 (B/H)--dug in floor 20' northwest of test #2. (0'-1' ov.) (1'-3' silt) (3'-5' silty sand) (5'-9' sand) (9'-10' silt) (10'-11' sand).</p> <p>Overall, material is quite fine, soft and limited to the pit. I believe the material extends southwest of pit, but John Sailer, Jr. did not want any testing on his land.</p>
10.	1	1969	1.5-7	0-1.5	Yes	100	100	99.2	43.7	22.0	1	-----	-----	<p>Owner: C. E. Wheeler</p> <p>Area is a small pit located on the northeast end of a grassy knoll, west of Vermont Route 100A, 2.19 miles from the Bridgewater town line. A power line trending about N. 30° E. passes over the pit. There is piled material to the northwest. The pit is about 30' x 30' and the maximum face height is 12'. Owner spoke about using land for house lots.</p>

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 12

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing					Color Abrasion AASHO AASHO		Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270	T-21	T-4-35		
	2	1969	6-9	0-6	Yes	86.3	65.4	46.3	5.0	3.0	1	20.1%	Gravel	Test #1 (H.S.) south face of pit, just under power line. (0'-1.5' ov.) (1.5'-7' interbedded lenses of silt, sand and clay). Improves with depth.
	3	1969	0.5-11	0-0.5	Yes	100	98.6	89.4	30.4	21.0	1	-----	-----	Test #2 (H.S.) east face of pit. (0'-6' silty ov.) (Floor level at 6') (6'-9' gravel, ice-contact material that looks good).
	11	1969	-----	-----	Yes					10.8*				Test #3 (D/H): dug in floor below power line; ledge or large boulder in east end of hole. (0'-0.5' ov.) (0.5'-5' dirty sandy gravel) (5'-11' silty sand). <u>Owner: Harry Harootonian</u> (Former: Bradley Pit). Now: <u>Hidden Valley Acres Camp-grounds.</u> Area is old pit, south of old quarry. Only possible extension would be to north-west of pit due to bedrock near or at surface; also, the owner wanted no digging east, southeast or south of access road near foundation in field.

\*Percentage of Total Sample



TABLE I

## GRAMULAR PLYMOUTH DATA SHEET NO. 14

Map Ident. No.	Field Test No.	Year Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHC T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
12	1	1969	1.5-6	0-1.5	No	70.1	49.9	37.4	17.0	7.0	1½	36.5%	Gr. Bor. (Grav.)	Owner: Mrs. Clifford Stetson Area is a hilly, rocky field south of the Town Clerk's office, and east of it across Vermont Route 100. Area is just north and above Mrs. Stetson's house. Access road is 1.79 south of end of project line on Vermont Route 100. Large boulders occur on surface. Test #1 (B/H). Dug on small knoll near north end of field. (0'-1.5' ov.) (1.5'-5', very coarse gravel) (5'-6', better looking gravel that would take a lot of stripping to get to.) Material is bony. Many large boulders occur in nearby walls, and scattered erratics abound. A crusher would be needed.
13	1	1969	1.5-5	0-1.5	No	72.8	66.8	39.8	25.0	11.0	3	35.2%	----	Owner: Earle V. Brown. Area is a small terrace east of, <u>and above</u> , Vermont Route 100, and just south

\*Percentage of Total Sample

TABLE I

PLYMOUTH GRANULAR DATA SHEET NO. 15

Map Ident. No.	Field Test No.	Year Tested	Depth of Sample (Ft)	Over-burden (Ft)	Exist-ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
														(0.02 mile) of Junction Vermont Route 100 with Vermont Route 100A. Terrace is mostly wooded and drops off to the north. Test #1 is 25' north of old stone wall, near the change of slope in south-east part of area. R. Snow's land is south of stone wall. Test #1: (0'-1.5' ov.) (1.5'-5' bouldery, dirty gravel). Bottoms on boulders at 5'. Not very good looking but might be usable with a crusher.
14	1	1969	2-22	0-2	Yes	100	100	69.4	36.0	12.0	2	----	-----	Owner: John Coolidge, Area is small grassy ridge just east of Vermont Route 100A, west of small brook. Pit is on east side of ridge, east of junction of State Aid Highway No. 1 with Vermont Route 100A. There is a very limited amount of material. Test #1 (H.S.) (0'-2' ov.) (2'-4' gravel) 4'-12' sand) (12'-13' gravel) (13'-14' clay) (14'-16' gravel) (16'-22' sand)

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 16

Map Ident No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
15	1	1969	2-12	0-2	Yes	100	38.2	77.7	7.0	1.5 1.2*	1½	-----	Sand	Owner: John Coolidge. Pit is on west end of ridge that is east from Map Identification No. 14 across a small brook. Test #1 (H.S.): Down the northeast face below a maple and a pine tree. (0'-2' ov.) (2'-8' pebbly sand) (8'-12' sand).
	2	1969	2.5-4	0-2.5	Yes	100	100	99.2	18.8	3.0 3.0*	1	-----	Gr. Borr. (Sand)	Test #2 (H.S.): Along the north face. (0'-2.5' ov.) (2.5'-14' sand, with occasional layers of pebbles).
	3	1969	1-7	0-1	Yes	100	96.9	86.7	9.5	4.0 3.5*	1½	-----	Sand	Test #3 (B/H): Dug in floor near north face of lower level of pit. (0'-1' ov.) (1'-7' pebbly sand and an occasional cobble). Water at 7'.
	4	1969	1-11	0-1	Yes	100	100	100	25.0	5.0 5.0*	1	-----	Gr. Borr. (Sand)	Test #4 (B/H): Dug in floor of upper level near north face. (0'-1' ov.) (1'-11; sand). Clean, mortar sand, no pebbles. There is a possible extension of the feature to the east and north. The present owner might not want to sell material from this area.

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET 17

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks	
						1½"	5/8"	#4	#100	#270					
16	1	1969	1-6	0-1	No	68.2	60.0	49.2	15.0	7.0	1½	26.4%	Gr. Borr. (Grav.)	Owner: John Coolidge. Area is a small, grassy north-south trending ridge with a steep east side. It lies just south of stone wall with wire fence and is in pasture that is northeast of Vermont Route 100A underpass used for horses. Access is just north of the underpass at point 1.26 miles northeast of the junction of Vt. Rte. 100A with Vt. Rte. 100. Test #1(B/H): Dug on top of grassy ridge. (0'-1' ov.) (1'-6' gravel). Bottoms on very coarse gravel at 6'. Test #2 (B/H): Dug at base of slope on east side of ridge. (0'-1' ov.) (1'-3' dirty gravel) (3'-boulders). Not Sampled.	
	2	1969	1-3	0-1	No	N	O	T	S	A	M	P	L	E	D
17	1	1969	1.5-26	0-1.5	Yes	100	87.6	82.3	5.8	2.0	1½	-----	Sand	Owner: John Coolidge. Area is a 300' long, nearly north trending, granular ridge with a small pit at the base of its south end. Ridge is in planted pine woods, east of a stone wall. Pit is in southeast corner of a pasture that was described at Lap Identification No. 16.	

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 12

Map Ident. No.	Field Test No.	Year Tested	Depth of Sample (Ft)	Over-Burden (Ft)	Exist-ing Pit	Sieve Analysis					Color Abrasion Passes			Remarks
						% Passing					AASHO T-21	AASHO T-4-35	VHD Spec.	
						1½"	5/8"	#4	#100	#270				
	2	1969	1-11	0-1	Yes	100	97.6	92.2	6.5	3.0	1½	-----	Sand	Test #1 (H.S.). Down the face. (0'-1.5' ov.) (1.5'-4' pebbly sand) (4'-26' sand). Good "winter" sand.
										2.3*				Test #2 (B/H): Dug 80' S. 65° W. of Test #4. (0'-1' ov.) (1'-3' gravelly sand) (3'-11' pebbly sand). Seems pretty good.
	3	1969	1-10	0-1	Yes	100	100	96.0	24.0	4.0	1	-----	Gr. Borr. (Sand)	Test #3 (B/H): Dug on the top of a small spur of the ridge, 60' N. 20° E. of Test #2. Material is possible ice-contact. (0'-1' ov.) (1'-4' pebbly sand) (4'-5' fine gravel) (5'-10' sand). Bedding dips northerly.
										3.8*				Test #4 (B/H): Dug in pit floor just south of Test #1. (0'-1.5' ov.) (1.5'-5' gravel). Bottoms of 5' in gravel. The material seems to get coarser with depth. If present owner would sell, material might be a worthwhile source. Fe, however appears interested in preserving the land in its present state.
	4	1969	1.5-5	0-1.5	Yes	75.7	60.6	44.4	5.0	2.0	1	34.1%	Gr. Borr. (Grav.)	

\*Percentage of Total Sample

PLYMOUTH GRANULAR DATA SHEET NO. 18A

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion, AASHO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						2"	1 1/2"	1"	#4	#100	#200			
18	1	1969	1-10	0-1	No	100	100	87.2	79.8	12.0	2.4	---	Sand	Owner: William J. Bryant. Area is small grassy knoll in field, east of Vermont Route 100A and south of John Coolidge property.
	2	1969	1-11	0-1	No	100	95.0	91.4	84.5	18.0	2.6	---	Sand	Test #1 was dug near east summit of knoll, 50' southwest of pine tree. Log of test #1: 0'-1', overburden; 1'-7', sand; 7'-10', fine gravel. Test #2 was dug 6' below and 100' west northwest of test #1. Log of test #2: 0'-1', overburden; 1'-10', sand; 10'-11', fine gravel. Property is not available for exploitation.

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 19

Map Ident. No.	Field Test No.	Year Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis					Color T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
19	1	1969	1-8	0-1	Yes	100	99.0	91.2	6.4	2.0	1½	-----	Sand	Owner: Mrs. Katherine Ormsby. Area is small, old pit 0.25 mile north of Town Highway No. 5, and 0.32 mile west of its junction with Town Highway No. 14. The pit is on the lower northwest slope of a wooded ridge which trends about S. 50° E., the direction of possible major extension. Minor extension is possibly northward. A right-of-way through land owned by Milton Moore on the south would be desirable for development of the area. The land west and northwest of the feature is low and marshy. Test #1 (H.S.) east face of pit. Some slough. (0'-1' ov.) (1'-2' pebbly sand). Looks pretty good for winter and
	2	1969	1-8	0-1	Yes	100	97.8	96.2	52.9	9.0	1	-----	Gr. Borr. (Sand)	Test #2 (B/H): Dug on face, 20' north of Test #1. (0'-1' ov.) (1'-3.5' pebbly sand) (3.5'-4.5' fine sand)

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 20

Map Ident. No.	Field Test No.	Year Tested	Depth of Sample (Ft)	Over-burden (Ft)	Exist-ing Pit	Sieve Analysis					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1 1/2"	5/8"	#4	#100	#270				
	3	1969	0.5-10	0-0.5	Yes	100	100	100	56.0	8.0 2.0*	1 1/2	-----	Gr. Borr. (Sand)	(4.5'-5.5' pebbly sand) (5.5'-6.5' fine sand) (6.5'-8' pebbly sand). Test #3(B/H): In floor, 30' southwest of Test #2. (0'-0.5' ov.)(0.5'-10.0' sand). No pebbles in material.
	4	1969	1-7	0-1	Yes	93.9	79.7		5.0	1.5	3	24.9%	Gr. Borr. (Grav.)	Test #4(B/H): Dug on slope of small ridge, 60' north of Test #2. (0'-1' ov.) (1'-4' pebbly sand) (4'-7' fine gravel). Bottoms at 7' in gravel. This area would be a source of granular borrow.
20	1	1969	2-9	0-2	Yes	100	100	93.7	15.0*	3.0 2.8*	1	----	Sand	Owner: William J. Bryant Area is a small, over-grown pit on the south side of a low, narrow ridge which trends N. 60° W. The ridge is from 10'-50' wide and has a stream, and a marsh around its lowest perimeter except on the south. The area could be easily developed after

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 21

Map Ident. No.	Field Test No.	Year Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
	2	1969	1-9	0-1	Yes	95.4	93.1	83.3	10.0	3.0 2.5*	1½	-----	Sand	<p>trees and shrubs have been cleared. A few cobbles and boulders were noted, as well as some silt or clay seams down the face.</p> <p>Test #1 (H.S.) north face. (0'-2' ov.) (2'-5' brown, fine sand) (5'-9' gray pebbly sand). The sloughing was too deep for further hand-sampling.</p> <p>Test #2 (E/H) dug in floor, 80' north of Town Highway No. 5 (0'-1' ov.) (1'-9' pebbly sand). Much water starting at 4'. <u>Pretty good looking material.</u></p>
21	1A	1969	1-19	0-1	Yes	100	100	71.0	40.0	10.0	1	-----	Gr. Borr. (Sand)	<p><u>Owner: Joseph Moore.</u> Area is a small old pit west of Town Highway No. 14, and 100' south of the junction of Town Highways Nos. 5 and 14. There might be a possible extension up the steep wooded knoll to the west.</p>

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 22

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Exist-ing Pit	Sieve Analysis					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						1½"	5/8"	#4	#100	#270				
	1B	1969	19-25	-----	Yes	100	100	50.5	72.0	42.0	1	-----	-----	Test #1A. (H.S.) west face of upper level of pit (0'-1' ov.) (1'-8' silt and sand, interbedded) (8'-15' gravel bed) (15'-19' sand and silt (20'-25' sand and slough).
	2	1969	0.5-4	0-0.5	Yes	100	100	70.0	53.0	32.0	1	-----	-----	Test #1B (B/H) lower part of west face of upper level. (0'-1' ov.) (19'-25' fine sand, silt, clay, and angular stones.) Not very good material.
	3	1969	0.5-8	0-0.5	Yes	100	100	91.6	22.9	3.0 2.7*	1	-----	Gr. Borr. (Sand)	Test #2 (B/H) dug in floor, 15' east of Test #1B. (0'-0.5' ov.) (0.5'-4' silt, angular stones, boulders, and fine sand). Test #3 (B/H) dug in floor, 50' west of Town Highway No. 14. (0'-0.5' ov.) (0.5'-8' pebbly sand, silt, sand, fine sand)

\*Percentage of Total Sample

Overall, this area seems pretty well depleted. An upslope to the west might bear investigation, but the angular rocks found do not look too promising.

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 23

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
22	1	1969	1.5-7	0-1.5	No	60.3	39.8	29.4	12.0	6.0	2	26.5%	Gr. Borr. (Grav.)	Owner says he will sell material from any part of his land.  Owner: H. Powell Yates Area is a brush-grown field, with a gently rounded knoll, which is located east of a private road at a point 0.05 mile south of Town Highway No. 5 and 0.14 mile east of its junction with Town Highway No. 5 and Town Highway No. 14. Area lies south of a field access road. Test #1 (B/H) dug 20' south of access road. (0'-1.5' ov.) (1.5'-7' gravel) (7'-10' boulders and silt) (7'-10' not sampled)
	2	1969	1.5-6	0-1.5	No	74.6	55.6	40.2	8.0	3.0	1½	32.7%	Gr. Borr. (Grav.)	Test #2 (B/H) dug in small clearing, 140' southwest of Test #1, and 30' east of private road at a point 0.07 mile south of Town

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 24

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHC T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
														Highway No. 5. (0'-1.5' ov.) (1.5'-3' fine gravel) (3'-6' gravel) (6'-10' silt and boulders) (6'-10' not sampled). Area would probably not be available.
23	1	1969	1-10.5	0-1	No	100	100	98.8	83.0	39.0 38.5*	1	-----	----	<p>Owner: Joseph Moore.</p> <p>Area is a small grassy knoll, east of the pit access road, east of Moore's summer home, and southwest of Moore's north pond.</p> <p>Feature is 0.16 mile south of the junction of Town Highways No. 5 and No. 14.</p> <p>Test #1 (F/H). Top of east slope of knoll, 70' east of pit access road. (0'-1' ov.) (1'-2' pebbly sand) (2'-10.5' fine sand and silty sand). Not very good looking.</p>
24	1	1969	1-6	0-1	Yes	63.0	50.3	36.9	12.0	6.0	1½	25.9%	Gr. Borr. (Grav.)	<p>Owner: Joseph Moore.</p> <p>Area is a small, newly opened pit, 0.1 mile N. 75° E. of Moore's largest pit (Map Identification No. 25).</p>

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 25

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Paases VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
						2A	1969	1-6	0-1	Yes				
2B	1969	6-14	---	Yes	68.5	57.9	47.8	9.0	2.5	1	32.3%	Gr. Borr. (Grav.)	<p>Test #2B (B/H) (0'-1' ov.) (6'-9' gravel) (9'-10' sand) (10'-14' gravel) (14'-18' sand; not included in sample).</p>	
3	1969	0.5-10	0-0.5	Yes	100	100	99.5	24.9	9.0 9.0*	1	----	Gr. Borr. (Sand)	<p>Test #3 (B/H). Dug in floor in middle of pit. (0'-0.5' ov.) (0.5'-5' gravelly sand) (5'-10' sand) (Bottoms at 10' in boulders).</p>	

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 26

Map Ident. No.	Field Test No.	Year Tested	Depth of Sample (Ft)	Over-burden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
	4	1969	2-8	0-2	Yes	74.8	55.5	38.8	10.0	4.0	1½	37.8%	Gr. Borr. (Grav.)	Test #4 (B/H) dug in floor at west end of pit. (0'-2' ov.) (2'-8' coarse, cobbly gravel) (Bottoms at 8' in bouldery gravel). Overall, area has good crushing size material; however, the stones have a fairly high wear. There appears to be quite a bit of material, and the owner would sell it.
25	1	1969	18-30	0-1	Yes	72.4	59.9	43.8	13.0	7.0	18	29.4%	Gr. Borr. (Grav.)	Owner: Joseph W. Moore. Area is a large pit complex just south of Moore's pond at a point 0.32 mile southeast of the junction of Town Highways Nos. 5 and 14. There are many +3" stones but none were included in sample. This area was previously sampled (F. Lanza, 1958 and 1961), but, has been worked since. Test #1 (B/H) dug on lower part of south face of upper level of pit. Seems to be crushing-size

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 27

Map Ident. No.	Field Test No.	Year Tested	Depth of Sample (Ft)	Over-burden (Ft)	Exist-ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion Passes		Remarks
						1½"	5/8"	#4	#100	#270		AASHO T-4-35	VHD Spec.	
	2	1969	2-7	0-2	Yes	70.1	64.2	45.5	4.0	2.0	3½	34.9%	Gr. Borr. (Grav.)	material. (0'-1' ov.) (1'-4' silt with pebbles) (4'-18' boulders too large to sample) (18'-30' gravel and bouldery gravel). Would need crushing; however, some of the stones look rotten and soft. Test #2 (B/H) dug at point 80' south of upper level of pit, 60' north of bed-rock sloping up to south, and just south of woods road. (0'-2' ov.) (2'-7' pebbly gravel) (7'-9' boulders, not sampled). Some +24", and many 6" boulders precluded sampling last interval.
	3	1969	3-8	0-3	Yes	75.2	57.2	42.2	21.0	7.0	3½	34.2%	Gr. Borr. (Grav.)	Test #3 (E/H) dug in clearing at junction of woods road at point 200' S. 75° E. of Test #2. (0'-3' ov.) (3'-8' dirty, bouldery gravel). Crushing would be needed to use material. Overall, material in area is available; but

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 28

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
26	1	1969	2-8	0-2	No	70.7	60.5	46.5	15.0	6.0	2½	25.5%	Gr. Borr. (Grav.)	<p>Modification of specifications would be needed in order to use it for other than Granular Borrow, Item 105.</p> <p>Owner: Reginald Snow. Area is hilly pasture above east side of Vermont Route No. 100, and 0.05 mile south of its junction with Town Highway NO. 23. The hilly, uncut pasture is long and narrow. The knolls trend east-west and appear somewhat coarse on the surface. Material seems to improve with depth; but would need to be crushed, or used only as Granular Borrow, Item 105.</p> <p>Test #1 (B/H) dug on top of knoll near east end of field. (0'-2' ov.) (2'-6' gravel) (6'-8' bouldery gravel).</p>

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 29

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis					Color AASHTO T-21	Abrasion Passes		Remarks
						% Passing						AASHTO T-4-35	VHD Spec.	
						1 1/2"	5/8"	#4	#100	#270				
	2	1969	2-10	0-2	No	75.9	63.0	42.4	20.0	7.0	1	25.1%	Gr. Borr. (Grav.)	Test #2(B.H.), dug in sag between knolls, 180' S 80° W. of, and about 12' below Test #1. (0'-2' ov.) (2'-6' gravel) (6'-8' boulders) (8'-10 gravel). Material in Test #2 was better with depth, so might improve even more with further digging.
27	1	1969	1-6	0-1	No	67.7	54.3	35.4	5.0	1.5	3 1/2	22.2%	Gravel	Owner: Gilbert P. Wright. Area is narrow field between the Black River and Vermont Route 100. It is located just west of bridge No. 40 on the southwest side of Vermont Route 100. Area is very limited and owner may want to use it for house lots. Test #1(E.H.) dug on small rise near the northwest end of field. (0'-1' ov.) (1'-2' gravel) (2'-6' boulders).
	2	1969	1-3	0-1	No	N O T S A M P L E D								Test #2 (B.H.), dug 10' below and 260' S. 75° E. of Test #1. (0'-1' ov.) (1'-3' boulders and some very coarse gravel). Not sampled. Material very coarse would need to be crushed if usable.

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 30

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
28	1	1969	1-10.5	0-1	No	100	80.7	62.9	19.5	7.0 4.4*	1	-----	Gr. Bor. (Sand)	Owner: Richard Colberg. Area is a rolling field which is below and southwest of an old, bulldozed-in pit which was inaccessible to a back-hoe and had too gentle a slope for hand sampling. In north end of field is a small knoll which was too steep to sample. Area is north or northeast of Map Identification No. 2. Test #1 dug 400' S. 65° W. from top of knoll. (0'-1' ov.) (1'-10' pebbly sand) (10'-10.5' fine gravel and water).
29	1	1969	2-10	0-2	No	75.4	67.0	54.5	13.0	4.0	5	20.8%	----	Owner: Richard L. Colberg. Area is a field north of Town Highway No. 37 beyond a white-fronted house, belonging to Colberg at the time of survey (10/69), and the Black River. The field appears to be very much like the field southeast of Ray Billings house, Map Identification No. 30, but is not as stony. There is a marshy section near the east end of the field. The area does not look very good.

\*Percentage of Total Sample

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						1½"	5/8"	#4	#100	#270				
													Test #1 (B.H.), dug 250' north of the house. (0'-2' ov.) (2'-5' boulders of 2' size) (5'-6' gravel) (6'-10' fine sand or silt, and boulders). Some silt-clay seams noted. The bottom of the hole was wet.	
30	1	1969	0-5	-----	No	NOT SAMPLED					-----	-----	Owner: Richard L. Colberg. Area is a stony field which is located 0.1 mile southwest of the junction of Town Highway No. 37 and Vermont Route 100. The field is bounded on the south and east by woods. Test #1 (B.H.) dug near west edge of field, just east of a shortcut road, southeast of Ray Billings house. (0'-5' large boulders) not sampled.	
	2	1969	0-3	-----	No	NOT SAMPLED					-----	-----	Test #2 (B.H) dug 5' below, and 300' S. 68° E. of Test #1, near east end of field. (0'-3' large boulders) particle size = 6" to ½ yard.	

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 32

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						1½"	5/8"	#4	#100	#270				
31	1	1969	1.5-15	0-1.5	Yes	91.7	76.1	61.5	7.0	3.0	1	----	Gr. Borr. (Grav.)	Owner: Richard L. Colberg Area is a heavily overgrown pit east of Vermont Route 100, and north of the Plymouth Town Dump. The access road is 0.17 mile southeast of the junction of Vermont Route 100 and Town Highway No. 37. Test #1 (H.S.) top of west face of pit is bouldery on surface. (0'-1.5' ov.) (1.5'-5.5' pebbly sand) (5.5'-9' cobbly, fine gravel) (9'-19' pebbly, coarse sand). Material has a gray, silty coating indicative of ice- contact deposition.
	2	1969	1.5-10	0-1.5	Yes	94.0	81.3	62.7	6.0	2.0	1½	21.3%	Gr. Borr. (Grav.)	Test #2 (H.S.) upper part of south southwest face. Material gets coarser to the south. Many boulders mixed with coarse, pebbly sand would require crushing for general use. Access is good. (0'-1.5' ov.) (1.5'-3' pebbly sand) (3'-10' gravel)

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 33

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
	3	1969	28.5-35	0-1.5	Yes	61.5	54.3	36.6	6.0	2.0	1	24.6%	Gravel	Test #3 (B/H) dug on lower part of west face below, but not continuous with Test #1. (0'-1.5' ov.) (28.5'-31' gravelly sand and boulders) (31'-35' gravel). Very many +6" and +12" boulders.
	4	1969	30.5-38	0-1.5	Yes	66.0	49.9	33.8	12.0	4.0	1	24.0	Gravel	Test #4 (B/H) dug at lower part of 38' high south face, 20' east of Test #2. (0'-1.5' ov.) (30.5'-33' fine gravel) (33'-35' bouldery gravel) (35'-38' fine gravel) (38'-boulders)
	5	1969	0.5-5.5	0-0.5	Yes	76.4	64.0	47.3	13.0	6.0	1½	13.8%	Gr. Borr. (Grav.)	Test #5 (B.H.) dug in floor at lowest part and near west side of 60' x 210' pit. (0'-1.5' ov.) (0.5'-5.5' gravel) (5.5', bouldery gravel and water). Major extension is along a wooded ridge which trends S. 40° E.
32	1	1969	0-1.5	1.5-15	Yes	78.4	65.4	44.5	15.0	7.0	3½	17.2%	Gr. Borr. (Grav.)	Owner: Richard L. Colberg. Area is a possible esker with a large pit southwest of Vermont Route 100, with access road 0.07 mile south-east of the junction of Town Highway No. 37 with

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 34

Map Ident. No.	Field Test No.	Year Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion Passes		Remarks
						1½"	5/8"	#4	#100	#270		AASHO T-4-35	VHD Spec.	
														Vermont Route 100. The feature seems to progress generally southeasterly to become Map Identification No. 31 after crossing Vermont Route 100. Test #1 (H.S.) at upper part of 25' north face of pit. (0'-1.5' ov.) (1.5'-5' bony gravel) (5'-11' fine gravel) (11'-15' gravelly sand). Quite silty and dirty.
	2	1969	1-9	0-1	Yes	70.6	61.3	41.2	7.0	3.8	1	21.5%	Gravel	Test #2 (H.S.) south face. (0'-1' ov.) (1'-9' gravel) (9'-15' boulders and gravel). Pretty coarse material.
	3	1969	13.5-20	0-1.5	Yes	78.2	59.5	35.3	15.0	8.0	1½	19.9%	Gr. Borr. (Grav.)	Test #3 (E.H.) lower part of sloughed, south face, 30' east of Test #2. (0'-1.5' ov.) (13.5'-20' coarse gravel). Has more fines than Test #2 and some +6", +12", and 18" boulders.
	4	1969	0.5-5.5	0-0.5	Yes	60.8	46.4	33.8	15.0	6.0	1	24.0%	Gr. Borr. (Grav.)	Test #4 (D/H) dug in lowest part of floor near south end. (0'-0.5' ov.) (0.5'-2' gravel) (2' water)

\*Percentage of Total Sample

## TEST I

## PLYMOUTH GRANULAR DATA SHEET NO. 35

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks			
						1½"	5/8"	#4	#100	#270							
	5	1969	1.5-7.5	0-1.5	Yes	90.9	67.6	44.4	9.0	3.0	1½	21.9%	Gravel	2'-5.5' coarse gravel) Test #5 (B/H) dug in lower part of spur projecting from west face of pit, on second level. (0'-1.5' ov.) (1.5'-7.5' fine-to-coarse gravel beds), bottoms at 7.5' on coarse gravel.			
	6A	1969	0.5-5	0-0.5	Yes	100	100	99.0	64.4	10.0 9.9*	1	----	Gr. Borr. (Sand)	Test #6A: Dug in floor, 65' N. 20° E. of Test #5. (0'-0.5' ov.) (0.5'-5' sand) Beds dip to northeast.			
	6B	1969	5-10	----	Yes	45.9	34.6	29.2	21.0	5.0	1	----	Gr. Borr. (Grav.)	Test #6B: (0'-0.5' ov.) (5'-10' gravel and boulders) Beds dip to northeast. There were insufficient ½"-1" stones available for the percentage of wear test.			
	7	1969	0.5-3	0-0.5	Yes	N	O	T	S	A	I	P	L	E	D	-----	Test #7: Dug in floor near north face of pit. (0'-0.5' ov.) (0.5'-3' boulders) very coarse; not sampled.
	8	1969	2-7	0-2	Yes	64.2	59.3	45.2	13.0	6.0	3½	24.6%	Gr. Borr. (Grav.)	Test #8: Dug above the west face of the north part of pit and on the east side of a woods road. (0'-2' ov.)			

\*Percentage of Total Sample

## TEST I

## PLYMOUTH GRANULAR DATA SHEET NO. 36

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
													(2'-7' coarse, dirty gravel) (7'-boulders).	
33	1	1969	0-15	-----	Yes	100	24.9	67.7	20.0	6.0	2½	39.1%	Gran. Borr.	Owner: Richard L. Colberg. Area is former Billings' Pit which is 0.40 mile from the junction of Town Highway No. 37 and Vermont Route 100. The pit is on the northeast side of Town Highway No. 37, and is currently being worked by the road commissioner, mostly towards the northeast. Test #1 (H.S.) sampled from stockpile south of pit for Sub-Base of Crushed Gravel, fine graded; Item 205E., for which it failed.
	2	1969	0.5-7.5	0-0.5	Yes	100	100	98.8	2.0	1.0 1.0*	1	-----	Sand	Test #2: (H.S.) north face of diggings in floor. Test #2: (0'-0.5', ovbdn.) (0.5'-7.5' interbedded pebbly sand and sand beds). West and east faces of diggings grade down into gravel. Beds dip westward.
	3	1969	0.5-10.5	0-0.5	Yes	100	98.4	92.3	2.2	1.0 0.9*	1	-----	Sand	Test #3 (E/H) dug in floor

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 37

8 Map Ident No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- Burden (Ft)	Exist- ing Pit	Sieve Analysis					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						1 1/2"	5/8"	#4	#100	#270				
	4A	1969	36-44	0-2	Yes	66.8	55.6	43.0	25.0	9.0	1	29.7%	Gr. Borr. (Grav.)	20' south of Test #2. (0'-0.5' ov.) (0.5'-10.5' interbedded pebbly sand and sand). Looks pretty good. Test #4A (B.H.) (H.S.) down the steep spur at the north-central part of the west face of the pit. (0'-2' ov.) (36'-44' gravel and silt). Quite a lot of angular stones.
	4B	1969	44-50	---	Yes	59.7	46.2	34.1	10.0	4.0	1	30.8%	Gr. Borr. (Grav.)	Test #4B (E.H.) (0'-2' ov.) (44'-50' gravel and silt.) Many angular stones.
	5	1969	28-40	0-1.5	Yes	73.0	58.7	41.5	8.0	4.0	1	28.8%	Gr. Borr. (Grav.)	Test #5 (H.S.). Steep face, west and below a bulldozed test-trench on the top of the northeast face. (0'-1.5' ov.) (1.5'-28', not reachable) (28'-40' gravel, sand and silt). Bottoms in slough.
	6	1969	1-10.5	0-1	Yes	96.4	91.7	82.8	4.1	1.5 1.2*	1	-----	Sand	Test #6 (B/H) dug in floor at north end of pit.

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 38

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample	Over-burden (Ft)	Exist-ing Pit	Sieve Analysis					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						1½"	5/8"	#4	#100	#270				
	7	1969	1-10	0-1	Yes	70.2	54.4	41.6	8.0	3.0	1	29.8%	Gr. Borr. (Grav.)	<p>(0'-1' ov.) (1'-6' sand) (6'-8' gravel) (8'-10.5' sand). Looks like pretty good, clean sand.</p> <p>Test #7 (B/H) dug in floor near east side of south end of pit. (0'-1' ov.) (1'-10' interbedded gravel and sand). Probably</p> <p>Angular stones noted. It was impossible to get the back-hoe up on top of the feature to sample. Overall, looks like pretty good, but coarse, gravel up near the top.</p>
34	1	1969	1-17	0-1	No	87.3	69.9	51.3	7.0	2.5	2	21.7%	Gravel	<p>Owner: L. H. Roller</p> <p>The feature is a wooded, granular knob east of Lake Amherst, on a curve on Town Highway No. 42, 0.43 mile south of the junction of Town Highway No. 42 with Town Highway No. 37. There is no access to top of knob for a back-hoe, so only a hand sample was made down the face of the bank at the road cut.</p>

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 39

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing					Color AASHO T-21	Avrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
35	1A	1969	0.5-6	0=0.5	Yes	82.2	71.1	53.8	6.0	3.0	1	27.9%	Gr. Borr. (Grav.)	The bank has quite a few +6" boulders. This feature would be a pretty good material source for a small job, and its removal would allow the curve in the road to be straightened. Overall, it is pretty fair, but on the bony side (0'-1' ov.) (1'-8' gravel) (8'-13' gravelly sand) (13'-17' fine gravel) (17", slough and boulders). Owner: Marion Hermance. Area is known as the Buswell Pit. Extension would be into possible kame terrace feature to north and west but owner of land beyond rock wall at top of face did not allow sampling. Pit is located 0.06 mile north of Town Highway No. 15 at point 0.06 mile west of Vermont Route 100. Only floor was sampled. Faces have been taken back to property line so sampling was not permissible. Faces were very silty.

\*Percentage of Total Sample

TABLE I

## PLYMOUTH GRANULAR DATA SHEET NO. 40

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
	1B	1969	7.5-10	-----	Yes	100	100	96.3	59.7	12.0 11.6*	1	-----	-----	<p>Test #1A (B/H) floor at north end of pit. (0'-0.5' ov.) (0.5'-6' gravel) (6'-7.5' boulders).</p> <p>Test #1B (E/H) below Test #1A. (0'-0.5' ov.) (7.5'-10' sand). Overall, the area is extremely limited, and the material is not very good.</p>

\*Percentage of Total Sample

TABLE I

Supplement

PLYMOUTH PROPERTY OWNERS - GRANULAR

Map Ident. No.

Brown, Earle V.	13
Bryant, William J.	18, 20
Colberg, Richard	28, 29, 30, 31, 32, 33
Coolidge, John	14, 15, 16, 17
Hall, James	4
Harootonian, Harry	11
Hernance, Marion	35
Moore, Joseph	21, 23, 24, 25
Ormsby, Mrs. Katherine	19
Putnam, Maxwell E.	7
Roller, L. H.	34
Sailer Bros.	9
Schlosser, Eugene	1
Schmell, Wilmer	3
Shipman, Lewis L.	5
Stetson, Mrs. Clifford	12
Snow, Reginald	26
Webb, Kenneth	2, 3, 6
Wheeler, C. E.	10
Wright, Gilbert P.	27
Yates, H. Powell	22

TABLE II

## PLYMOUTH ROCK DATA SHEET NO. 1

Area No.	Field Test No.	Year Field Tested	Rock Type	Existing Quarry	Method of Sampling	Abrasion AASHO T-3	Remarks
1	1	1958	Grano-Diorite	Yes	Chip	5.4%	<p>Owner: Calvin Coolidge State Forest.</p> <p>This area is a quarry on the southwest, wooded slope of an unnamed hill or mountain. The access road, State Forest Highway, goes west from Vermont Route 100A at a point 1.81 miles from the Bridgewater Town Line. The quarry and grout piles are 1.06 miles from Vermont Route 100A. It is the best and most abundant supply for Sub-Base of Crushed Rock, Item 204, in the town. The rock is mapped as "Undifferentiated Granitic Rocks" but it is probably a granodiorite. This source could be developed easily as the quarry faces are steep and there is a lot of rock above the quarry which could be easily taken. The access is good.</p> <p>There is a contact, with the Pinney Hollow Schist Formation, about 150 yards south or southwest of the quarry. The most probable extension of the granite is northeast or east into the hill.</p>
	2	1958	Grano-Diorite	Yes	Chip	4.6%	<p>Test #1: Sampled from broken ledge and boulders.</p> <p>Test #2: Sampled from broken ledge and boulders.</p>
	3	1958	Grano-Diorite	Yes	Chip	6.6%	<p>Test #3: Sampled from broken ledge and boulders.</p>

TABLE II

## PLYMOUTH ROCK DATA SHEET NO. 2

Area No.	Field Test No.	Year Field Tested	Rock Type	Existing Quarry	Method of Sampling	Abrasion AASHO T-3	Remarks
2	1	1958	Siliceous Dolomite	Yes	Blast	5.3%	<p>Owner: Azro Johnson.</p> <p>The source is a very small quarry-like rockcut on the northwest side of Vermont Route 100A near the top of the steep grade, and 0.60 mile east of the junction of Vermont Route 100 and Vermont Route 100A. Mainly, the rock is a schistose quartzite, but a significant amount is a thin-bedded, siliceous dolomite with phyllitic partings. This could be considered as a suitable source of Sub-Base of Crushed Rock, Item 204; as it is accessible and has a major extent upslope and to the northwest on a wooded hillside. It would be necessary to either segregate the thin-bedded zones, or to try to run tests which would represent these zones.</p> <p>Test #1 was a blast sample of the east cut (face), and 20' across the strike.</p>
	2	1958	Siliceous Dolomite	Yes	Blast	4.0%	<p>Test #2 was the center cut (face) which was sampled 20' across the strike.</p>
	3	1958	Quartzite	Yes	Blast	3.8%	<p>Test #3 was the west cut (face) and was 20' across the strike.</p> <p>This source is not as good, nor as plentiful, as Rock Area No. 1.</p>

TABLE II

## PLYMOUTH ROCK DATA SHEET NO. 3

Area No.	Field Test No.	Year Tested	Rock Type	Existing Quarry	Method of Sampling	Abrasion AASHO T-3	Remarks
3	RS-53	1958	Quartzose Schist	No	Chip	4.6%	Owner: Unknown Area is a rockcut which is on the west side of Vermont Route 100A at a point 0.32 mile east of its junction with Vermont Route 100. The rock is a quartz-sericite-albite-chlorite schist. It is too thin-bedded to give a representative wear test. Any extension might be up the slope to the northwest. The beds strike north and dip 42° to the east. Evidence of a plunge to the south probably indicates minor folding. Test #1 - random sample of blocks. Test #2 - random sample of blocks. Fails for Sub-Base of Crushed Rock - Item 204. Overall, this area is not recommended as a source.
	RS-52	1958	Quartzose	No	Chip	8.6%	
4	1	1959	Dolomite	Yes	Chip	6.0%	Owner: Harry Harootonian. (Formerly: Plymouth Lime Co.). This quarry was formerly used but has been closed for ten years. There is some extension up hill to the north, and possibly to the south where bedrock was encountered in the floor of a gravel pit. The owner was undecided whether the rock would be available. The beds strike N. 6° W. and dip 54° to the east. There is a possible slight plunge to the southeast.
	1	1959	Dolomite	Yes	Crusher Sample	5.2%	
	2	1959	Dolomite	Yes	Chip	4.9%	
	3	1959	Dolomite	Yes	Chip	5.4%	

TABLE II

## PLYMOUTH ROCK DATA SHEET NO. 4

Area No.	Field Test No.	Year Field Tested	Rock Type	Exist- ing Quarry	Method of Sampling	Abrasion AASHO T-3	Remarks
5	1	1959	Dolomite	Yes	Blast Hole	6.4%	Owner: Cummings and Sniffen. The quarry is located just south of Town Highway No. 6 at the south end of Woodward Reservoir. Station 415+50' of Project (Plymouth-Bridgewater S0147(2)) is in or near the quarry. The quarry is about 50' x 150' and the highest face is about 65'. The access road on Vermont Route 100 is 2.25 miles south of the Bridgewater Town Line.
	2	1959	Dolomite	Yes	Blast	5.6%	
	3	1959	Dolomite	Yes	Blast	5.6%	
	4	1959	Dolomite	Yes	Blast	6.0%	
	5	1959	Dolomite	Yes	Blast	6.0%	
	6	1959	Dolomite	Yes	Blast	7.0%	

TABLE II

## PLYMOUTH ROCK DATA SHEET NO. 5

Area No.	Field Test No.	Year Field Tested	Rock Type	Exist- ing Quarry	Method of Sampling	Abrasion AASHO T-3	Remarks
6	76678	1959	Dolomite	Yes	Blast	4.6%	Owner: Sailer Bros. (Formerly owned by Farmer's Lime Co.) The quarry is located slightly east and north of E of station 505.+00' of Project (Plymouth-Bridgewater SO147(2)). This area could be considered as a source, but there is some thin-bedded, phyllitic rock which would have to be eliminated from the usable material. The access road is 0.45 mile south of the Bridgewater Town Line, on Vermont Route 100.
	76677	1959	Dolomite (Phyllitic)	Yes	Blast	11.4%	
	76687	1959	Dolomite	Yes	Blast	5.2%	

Overall, the source of the best rock is Map Identification No. 1, Calvin Coolidge State Forest Granite Quarry. It is also the most distant from the Project Line of any of the areas that were sampled. Map Identification No.'s 5 and 6 are on the Project Line, and Map Identification No. 4 is less than one mile south of the Project Line.

TABLE II  
Supplement

PLYMOUTH PROPERTY OWNERS - ROCK

Map Ident. No.

Calvin Collidge State Forest	1
Cummings and Sniffen	5
Harootonian, Harry	4
Johnson, Azro	2
Sailer Bros.	6
Unknown	3

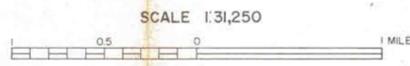




LEGEND

- ROCK, ACCEPTABLE FOR ITEM 204 (sub-base of crushed rock)
- ROCK, NOT ACCEPTABLE FOR ITEM 204
- ⊗ EXISTING QUARRY
- Orange box GRANITE TO DIORITE (light to intermediate igneous rocks)
- Green box AMPHIBOLITE, GABBRO, DIABASE, METADIABASE, GREENSTONE, TRAP DIKES (basic or dark igneous rocks)
- Red box PERIDOTITE, PYROXENITE, SERPENTINITE (ultra-basic igneous rocks)
- Pink box GNEISS
- Light brown box QUARTZITE
- Purple box DOLOMITE
- Blue box MARBLE, LIMESTONE
- White box SCHISTS, SLATES, PHYLLITES, SHALES, CONGLOMERATES
- 3 IDENTIFICATION NUMBER (refer to data sheets)

PLYMOUTH



SCALE 1:31,250

CONTOUR INTERVAL 20 FEET

1970

ROCK MATERIALS MAP

BY  
 VERMONT DEPARTMENT OF HIGHWAYS  
 IN COOPERATION WITH  
 U.S. BUREAU OF PUBLIC ROADS

NOTE: BASED ON U.S.G.S. TOPOGRAPHIC MAPS

DATE				
BY				