

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

prepared by

**Engineering Geology Section, Materials Division  
Vermont Department of Highways**

in cooperation with

**United States Department of Transportation  
Federal Highway Administration**

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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 are 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 materials 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.

#### Inclousures

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 conducted by Professor D. P. Stewart of Miami University, Oxford, Ohio, who had been mapping the glacial features 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, the Surficial Geologic Map of Vermont, 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 Cavendish is located in Windsor County in the south-central part of the State. It is bounded on the north by Reading, on the east by Weathersfield, on the southeast by Baltimore, on the south by Chester and on the west by Plymouth and Ludlow. See County and Town Outline Map of Vermont on the following page.

Cavendish is situated in the Vermont Piedmont Physiographic Subdivision of the New England Upland. The town is characterized by rugged to rolling terrain, elevation of which varies from 2089 feet at the summit of Hawks Mountain on its southeast boundary to less than 620 feet where the Black River crosses the Weathersfield Town Line.

Principal drainage is into the Black River which crosses the central part of the town and ultimately joins the Connecticut River below Springfield. The northeast part of the town is drained by Knapp Brook into the North Branch of the Black River and a lesser area along the Chester Town Line is tributary to the Williams River. Subsidiary drainage generally accords with the north-south trending metamorphic rocks of the area.

Metamorphic serpentinite in a quarry northwest of Proctorsville would be a good source of crushed rock. Granular materials are largely limited to the lower reaches of the Black River and Twentymile Stream, its largest tributary.



## 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 test result from the chip samples, the material source is included in this report as being satisfactory.

## Discussion of Rock and Rock Sources

Probably the best source for Crushed Stone for Sub-base is an occurrence of serpentinite at the west-central border of Cavendish township. Outcroppings of this rock can be examined along the Vermont Route 103 right-of-way at a point about one-half mile east of the Ludlow Town Line. This material was tested at a quarry reached by private road from the western terminus of Town Highway No. 41. (See R-1, Rock Data Sheets)

Another source tested was within a marble facies of the Cavendish formation by an abandoned lime kiln at the north end of Duttonsville Gulf (See R-2, Rock Data Sheets). This source has an excellent location for the setting up of crushing machinery. However, a railway crossing is necessary for access from Town Highway No. 32. The same kind of rock is well exposed on the east slope of Star Hill in north-central Cavendish.

Elsewhere in the town rock suitable for crushing was either inaccessible because of glacial overlay or remote from the existing road network. A possible exception would be gneiss outcroppings along Vermont Route 103 near the south end of Proctorsville Gulf.

## 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. Test 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 (AASHTO T-4), and the Los Angeles Method (AASHTO T-96).

### Discussion of Sand and Gravel Deposits

Granular materials in Cavendish suitable for highway construction and related purposes consist mainly of glaciofluvial deposits. They are confined to elevations below 1,200'. Above this elevation surficial deposition consists largely of glacial till.

According to Dr. D.P. Stewart, principal geologic depositional features occur along the Black River and Twenty Mile Stream. This materials Survey generally agrees with his findings. Stewart determined that an elongate "kame" occurs southward from the vicinity of the Vaino Manner farm, near the northwest corner of Cavendish (see Map Ident. No. 11). A small kame which may have been part of this elongate "kame" occurs on the Gordon Churchill farm but permission was not obtained to sample it.

Further down the Twenty Mile Stream near confluence with its Heald Branch a kame moraine occurs which, apparently, could be a possible source of both sand borrow and gravel (see Map Ident. No 10). However, fine material on the Norri property proved to be too fine for use as granular borrow (see Map Ident. No. 14).

Dr. Stewart shows an area north of Vermont Route 131 and 103 from Proctorsville to the Ludlow Town Line to be kame terrace. This feature was tested at Map Ident. Nos. 8 and 9 but permission to test a smoothed over gravel pit east of Proctorsville village belonging to Charles Schwolow was not secured. Stewart theorized that a shoaling lake occupied the valley floor between Proctorsville Gulf and the Black River. Although this may have been the case in the vicinity of a lumber yard readily visible from Vermont Route 103 (see

(see Map Ident Nos. 4, 5 and 6). This survey determined that the feature near the terminus of Town Highway No. 48 is probably kame terrace (see Map Ident. Nos. 1,2 and 3).

Below the Cavendish Gorge Stewart shows an extensive pebbly sand covering the Black River flood plain. This survey found a number of sources of sand borrow and cushion in the vicinity (see Map Ident. Nos. 15,16,17 and 18). The Lucien Grief pit should be a good but limited source of gravel and it appears to be of kamic origin.

Further down the Black River some small kames or kame terraces occur that would be good materials sources (see Map Ident. Nos. 21,22, 24 and 25). Availability of a good sand borrow and cushion source at the Eric Wallin camp is questionable. (See Map Ident No. 23).

Three areas adjacent to State Aid Highway No. 2 were tested (See Map Ident Nos. 26,27 and 28). The pit owned by Lepp and Gueron could possibly be within a small kame terrace.

This survey found that where the North Branch of the Black River crossed the northeast corner of Cavendish it exposed a boulder clay that would be unacceptable for either gravel for sub-base or sand borrow and sand cushion.

## SUMMARY OF ROCK FORMATIONS IN THE TOWN OF CAVENDISH

Barnard volcanic member (Missisquoi Formation): fine-medium grained biotitic gneiss, hornblende gneiss and amphibolite,

Bull Hill gneiss (Cavendish Formation): quartz-plagioclase-microcline-biotite gneiss characterized in many areas by augen of microcline as much as 2 inches long; fine-medium grained quartz-plagioclase-biotite or biotite muscovite gneiss.

Cavendish Formation: Buff dolomite; minor white to pink calcite marble; actinolitic and diopsidic marbles and beds of actinolite diopside common in Chester dome.

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

Missisquoi Formation: Rusty weathering carbonaceous mica schist, quartzite and micaceous quartzite.

Moretown member (Missisquoi Formation): 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. Schist and phyllite commonly contain biotite and garnet porphyroblasts in southern Vermont.

Mount Holly complex: Mainly fine-to medium-grained biotite 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.

Northfield Formation: Dark grey to black quartz sericite slate or phyllite with fairly widely spaced interbeds a few inches thick of siltstone and silty crystalline limestone like that of the Waits River formation; gray quartz-sericite schist containing abundant porphyroblasts of biotite and garnet in southern Vermont.

Pinney Hollow, Ottauquechee, and Stowe Formations, undifferentiated: Includes quartz-muscovite-garnet-chlorite-biotitic schist, rusty carbonaceous schist, amphibolite, schistose quartzite; schist locally contains porphyroblasts of staurolite and kyanite; on flanks of Chester and Athens domes.

Readsboro member (Cavendish Formation): quartz muscovite schist containing biotite or chlorite and characterized by conspicuous porphyroblasts of sodic plagioclase; less commonly quartz-muscovite-paragonite schist containing garnet, staurolite, and locally kyanite (Gassetts schist).

Shaw Mountain Formation: quartzite, quartz conglomerate, cummingtonite schist, amphibolite, and quartz-sericite schist with porphyroblasts of biotite and garnet.

Ultramafic rocks: dunite, peridotite and serpentinite.

Waits River Formation: gray quartzose and micaceous crystalline limestone weathered to distinctive brown earthy crust; interbedded and intergradational with gray quartz-muscovite phyllite or schist. Where more metamorphosed the limestones contain actinolite, hornblende, zoisite, diopside, wollastonite, and garnet, and locally andalusite, kyanite or sillimanite.

## GLOSSARY OF SELECTED GEOLOGIC TERMS

**Boulder-clay:** A mixture of unsorted rock fragments of all sizes ranging from large boulders to finely pulverized clay material.

**Contact:** The surface, often irregular, which constitutes the junction of two bodies of rock different in kind, age or origin.

**Facies:** In general, the term designates the aspect or appearance of a mass of earth material different in one or several respects from surrounding material.

**Glaciofluvial:** A term used to denote formation by or relation to streams within, upon or emerging from 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.

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

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

**Kame terrace:** Stratified sands and gravels deposited by streams between a glacier and an adjacent valley wall.

**Metaigneous:** Rocks that owe their metamorphic characteristics to the transformation of pre-existing igneous rocks either through intense heat or pressure or both.

**Outwash:** Stratified drift that is stream built beyond the glacier; deposited by meltwater streams issuing from the face of the glacial ice.

**Piedmont:** An area lying at the foot of mountains.

**Schistose:** Of or pertaining to schist; having a tendency to split along the foliation because of parallelism of platy or needle-like grains.

**Serpentinite:** A metamorphic rock consisting primarily of the mineral serpentine derived mainly from the alteration of igneous rocks containing olivine or other magnesium-rich minerals.

**Shoaling lake:** In this context a gravelbank or sandbar that causes the water to become shallow; material within which is coarsened by subsequent wave action.

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

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## 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 July, 1971.

## DIVISION 700 - MATERIALS

Section 703.03, Soils and Borrow Materials

## 703.03 Sand Borrow and Cushion

Sand Borrow shall consist of material reasonably free from silt, loam, clay, or organic matter. It shall be obtained from approved sources and shall meet the requirements of the following table:

Table 703.03A - Gradation Requirements

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	Total Sample	Sand Portion
2"	100	
1½"	90-100	
½"	70-100	
No. 4	60-100	100
No. 100		0-30
No. 200		0-12

## 703.05 Granular Borrow

Granular Borrow shall be obtained from approved sources, consisting of satisfactorily graded, free draining, hard, durable stone and coarse sand reasonably free from loam, silt, clay, and organic material.

The Granular Borrow shall meet the requirements of the following table:

Table 703.05A - Gradation Requirements

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	Total Sample	Sand Portion
No. 4	20-100	100
No. 200		0-15

The maximum size stone particles of the Granular Borrow shall not exceed 2/3 of the thickness of the layer being spread.

Section 704, Aggregate

## 704.05 Gravel for Sub-base

Gravel for Sub-base shall consist of material reasonably free from silt, loam, clay, or organic matter. It shall be obtained from approved sources and shall meet the following requirements.

(a) Grading

The gravel shall meet the requirements of the following table:

Table 704.05A - Gradation Requirements

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	Total Sample	Sand Portion
No. 4	(20-60)	100
No. 100		0-18
No. 200		0-8

The stone portion of the gravel shall be uniformly graded from coarse to fine, and the maximum size stone particles shall not exceed 2/3 the thickness of the layer being placed.

(b) Percent of Wear

The percent of wear of the gravel shall be not more than 25 when tested in accordance with AASHTO T 4, or more than 40 when tested in accordance with AASHTO T 96.

704.06 Crushed Stone for Sub-base

Crushed Stone for Sub-base shall consist of clean, hard, crushed stone, uniformly graded, reasonably free from dirt, deleterious material, pieces which are structurally weak and shall meet the following requirements:

(a) Source

This material shall be obtained from approved sources and the area from which this material is obtained shall be stripped and cleaned before blasting.

(b) Grading

This material shall meet the requirements of the following table:

Table 704.06A - Gradation Requirements

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	Total Sample	
4½"	100	
4"	90-100	
1½"	25- 50	
No. 4	0- 15	

(c) Percent of Wear

The percent of wear of the parent rock shall be not more than 8 when tested in accordance with AASHTO T 3, or the crushed stone a percent of wear of not more than 40 when tested in accordance with AASHTO T 96.

(d) Thin and Elongated Pieces

Not more than 30 percent, by weight, of thin and elongated peices will be permitted.

Thin and elongated pieces will be determined on the material coarser than the No. 4 sieve.

(e) Filler

The filler shall be obtained from approved sources and shall meet the requirements as set up for Sand Cushion, Subsection 703.03.

(f) Leveling Material

The leveling material shall be obtained from approved sources and may be either crushed gravel or stone screening produced by the crushing process. The material shall consist of hard durable particles, reasonably free from silt, loam, clay or organic matter.

This material shall meet the requirements of the following table:

Table 704.06B - Gradation Requirements

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	Total Sample	
1"		100
3/4"		90-100
1/2"		50- 90
No. 4		30- 70
No. 100		0- 20
No. 200		0- 10

704.07 Crushed Gravel for Sub-base

Crushed Gravel for Sub-base shall consist of material reasonably free from silt, loam, clay or organic matter. It shall be obtained from approved sources and shall meet the following requirements:

(a) Grading

The crushed gravel shall be uniformly graded from coarse to fine and shall meet the requirements of the following table:

Table 704.07A - Gradation Requirements

Grading	Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
		Total Sample	Sand Portion
Coarse	4"	100	
	No. 4	25- 50	100
	No. 100		0- 20
	No. 200		0- 12
Fine	2"	100	
	1½"	90-100	
	No. 4	30- 60	100
	No. 100		0- 20
	No. 200		0- 12

(b) Percent of Wear

The percent of wear of the parent gravel shall be not more than 20 when tested in accordance with AASHTO T 4, or the crushed gravel a percent of wear of not more than 35 when tested in accordance with AASHTO T 96.

(c) Fractured Faces

At least 30 percent, by weight, of the stone content shall have at least one fractured face.

Fractured faces will be determined on the material coarser than the No. 4 sieve.

704.09 Dense Graded Crushed Stone for Sub-base

Dense Graded Crushed Stone for Sub-base shall consist of clean, hard, crushed stone, uniformly graded, reasonably free from dirt, deleterious material and pieces which are structurally weak, and shall meet the following requirements:

(a) Source

This material shall be obtained from approved sources and the area from which this material is obtained shall be stripped and cleaned before blasting.

(b) Grading

This material shall meet the requirements of the following table:

Table 704.09A - Gradation Requirements

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	Total Sample	
3 1/2"	100	
3"	90-100	
2"	75-100	
1"	50- 80	
1/2"	30- 60	
No. 4	15- 40	
No. 200	0- 10	

(c) Percent of Wear

The percent of wear of the parent rock shall be not more than 8 when tested in accordance with MASHO T 3, or the crushed stone a percent of wear of not more than 40 when tested in accordance with MASHO T 96.

(d) Thin and Elongated Pieces

Not more than 30 percent, by weight, of thin or elongated pieces will be permitted.

Thin and elongated pieces will be determined on the material coarser than the No. 4 sieve.

704.10 Gravel Backfill for Slope Stabilization

Gravel Backfill for Slope Stabilization shall be obtained from approved sources, consisting of satisfactorily graded, free draining, hard, durable stone and coarse sand reasonably free from loam, silt, clay, and organic material.

The gravel backfill shall meet the requirements of the following table:

Table 704.10A - Gradation Requirements

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	Total Sample	Sand Portion
No. 4	20-50	100
No. 100		0- 20
No. 200		0- 10

The stone portion of the gravel backfill shall be uniformly graded from coarse to fine, and the maximum size stone particles shall not exceed 2/3 the thickness of the layer being placed.

704.11 Granular Backfill for Structures

Granular Backfill for Structures shall be obtained from approved sources, consisting of satisfactorily graded, free draining granular material reasonably free from loam, silt, clay, and organic material.

The granular backfill shall meet the requirements of the following table:

Table 704.11A - Gradation Requirements

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	Total Sample	Sand Portion
3"	100	
2½"	90-100	
No. 4	50-100	100
No. 100		0- 18
No. 200		0- 8

TABLE I

CAVENDISH GRANULAR DATA SHEET NO. 1

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	½"	#4	#100	#200			
1	1	1971	0.5-11	0-0.5	Yes	---	---	---	80	3	1	-----	sand	Owner: Mrs. Bertha Stillwell  Area contains an inactive pit in a kame terrace south of the Black River about 0.7 mile west of the intersection of Town Highway No. 48 with Vermont Rte. 103. There is little extension possible because of a non-granular base. Trees limit development to the south and west. Test # 1 was located in the upper west pit face near south end. Material is : 0.5-11', sand with stones and layers of gravelly sand.
	2	1971	0.5-7.5	0-0.5	Yes			88	85	7	4	-----	sand	Test # 2 was located northwest of the middle of west pit face. Material is: 0.5-2.5', fine gravel; 2.5'-7.5', sand with stones.
	3	1971	0-8.5	----	Yes	82	71	53	48	12	5	23.8	gravel	Test # 3 was located near south end of lower west pit face. Material is : 0-8.5', poorly sorted sandy gravel with a few cobbles and small boulders. Below 8.5' excessive sloughed material made hand sampling prohibitive.
2	1	1971	0.5-11	0-0.5	Yes	82	73	37	29	15	5	19.5	gravel	Owner: Weidman and Kelley  Area contains an inactive pit in a kame terrace south of Town Highway No. 48 about 0.4 mile

Table I

CAVENDISH GRANULAR DATA SHEET NO. 2

Map Ident No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1 1/2"	3/4"	#4	#100	#200			
														west of its intersection with Vermont Route 103. There is an estimated 11,000 yards of granular material south of the pit that is covered with pine forest.
	2	1971	2-6	0-2	Yes	77	62	44	33	14	7	22.1	Gran. Borrow (Grav.)	Test # 1 was in northeast pit face. Material is : 0.5-11' +, gravel with cobbles. Test # 2 was located in north face of upper level near northwest end of pit. Material is : 2'-6', sandy gravel with cobbles.
	3	1971	6-14	0-6	Yes	66	66	54	37	19	11	18.6	Gravel	Test # 3 was in south face near east end of pit. Material is : 6'-8.5', gravel; 8.5'-11', sand; 11'-14', gravel. Bottomed in gravel.
	4	1971	1.0-9.0	0-1	yes	59	53	30	23	10	4	21.8	Gran. Borrow (Grav.)	Test #4 was located 105' south-west of southeast end of pit and 16' above pit floor. Material is: 0-1', silt and stones; 1'-9', sandy coarse gravel.
	5	1971	3-10	0-3	yes	--	--	93	85	7	4	-----	sand	Test # 5 was in woods road 225' west of Test #4. Material is: 0-0.5', sod; 0.5'-3.0', silt and cobbly gravel; 3.0'-10', medium clean sand.
3	1	1971	0-12	---	Yes	72	62	45	35	9	3	24.0	Gravel	Owner: Richard Gilcris. Area is an active pit on a kame within a kame terrace south of

TABLE I

CAVENDISH 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						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	¾"	#4	#100	#200			
														<p>Town Highway No. 48 at point 0.3 mile west of its intersection with Vermont Route 103. Possible extension 100' south of pit was inaccessible to the backhoe.</p> <p>Test # 1 was in east corner of upper southeast pit face. Material was : 0'-6', cobbly gravel; 6'-12', fine gravel.</p> <p>Lower face was being worked and therefore was not tested. Material was 12'-14', gravelly sand; 14'-15' pebbly sand; 16'-26', sand.</p>
4	1	1971	2-54	0-2	Yes	----	--	96	93	38	15	-----	Gran. Borrow (Sand)	<p>Owner: Md. E.M. Sheldon.</p> <p>Area is woodland above high face overlooking lumber yard west of Vermont Route 103 south of Town Highway No. 49. This is part of Kame terrace.</p> <p>Test #1 consisted of fine silty sand with a few stones. This represented the entire west face and was a hand sample.</p>
	2	1971	49-54	0-2	yes	---	---	---	100	41	14	-----	Gran. Borrow (sand)	<p>Test #2 was dug with a backhoe at bottom of face and consisted of fine to medium sand.</p>

TABLE I

## CAVENDISH GRANULAR DATA SHEET NO. 4

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	½"	#4	#100	#200			
5	1	1971	0.5-7.5	0-0.5	Yes	---	---	--	100	21	21	-----	-----	Owner: Richard Gilcris  Area consists of floor of lumber yard west of Vermont Route 103 south of Town Highway No. 49. Floor represents base of extensively excavated same terrace, extension of which would be described as Map Identification No. 4.  Test # 1 was in lower floor, 95' northeast of highest pit face. Material is: 0-0.5', very fine silty sand; 0.5'-9', fine-very fine clean sand. Water was encountered at 7'.
	2	1971	0.5-3.5	0-0.5	Yes	---	--	99	99	91	38	-----	-----	Test # 2 was in center of floor 150' east of Test # 1. Material is: 0-0.5', sandy silt; 0.5-3.5', fine-veryfine clean sand. Water was encountered at 3.5',
	3	1971	0.5-5.0	0-0.5	Yes	--	--	--	100	62	24	-----	-----	Test #3 was in upper level of floor 200' S. 10°E of Test # 1. Material is: 0-0.5, fine sand with wood chips; 0.5-5', orange brown medium-very fine sand with charcoal fragments. Bottom is boulders and 3" + cobbles.
6	1	1971	1-8	0-1	no	---	--	99	95	5	2	-----	sand	Owner: Earl Worth. Area is wooded same terrace east of Vermont Route 103 at point 0.3 mile south of S.A. No. 1 intersection. Tests were taken along woods road. Material is not

CAVENDISH GRANULAR DATA SHEET NO. 5

Table I

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	¾"	#4	#100	#200			
	2	1971	2-11	0-2	no	---	---	Not			Tested		<p>available at time of survey as owner intends to develop as house lots.</p> <p>Test # 1 was at top of road. Material is 1'-8', pebbly medium to coarse sand. Bottom is very fine sand.</p> <p>Test # 2 was in bank east of woods road, 35' below and 230' N. 25°E. of Test # 1. Material is: 2'-11', very fine or silty sand with layers of stony sand. Sample was lost in transit.</p>	
7	1	1971	0.5-4.0	0-0.5	Yes	--	--	89	56	10	4	-----	Gran. Borrow (Grav.)	<p>Owner: George Williams.</p> <p>Area is a depleted double level pit south of Town Highway No. 31 at point 0.23 mile east of State Aid No. 1.</p> <p>Test # 1 was in middle of lower level floor. Material is: 0-0.5', mossy silt; 0.5-4.0', pebbly sand; 4'-5', clay with cobbles.</p>
	2	1971	2.5-5	0-2.5	Yes	----	---	93	88	20	10	-----	sand	<p>Test #2 was in east side of upper level floor, just north of small pool. Material is: 0-2.5', fine sand-silt; 2.5'-5', stony fine sand; 5' +, hard clay and stones.</p>

TABLE I

## CAVENDISH 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						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						2"	1½"	¾"	#4	#100	#200			
8	1	1971	3-75	0-3	Yes	----	--	---	100	45	16	-----	----	<p>Owner: Cavendish Superintendent of Schools.</p> <p>Area is a 77'-high pit face northwest of Proctorsville school.</p> <p>Test # 1 was a hand sample of pit face. Material is : 0-3', sod and silt; 3'-75', fine sand w. stones.</p>
9	1	1971	3-22	0-2	Yes	75	--	48	31	21	8	28.0	Gran. Borrow (Grav.)	<p>Owner: Andrew Blais.</p> <p>Area is an active pit that truncates ridge in kame terrace west of State Aid No. 3 at point 0.4 mile north of its intersection with Vermont Highway 131. Ridge was thickly wooded and crest was inaccessible to a backhoe.</p> <p>Test # 1 was of upper west pit face. Material is; 2'-7', gravely sand; 7'-13', fine gravel; 13'-22', gravel with a cobbly zone from 13'-16'.</p>

CAVENDISH GRANULAR DATA SHEET No. 7

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	¾"	#4	#100	#200			
	2	1971	22-26	----	Yes	89	81	60	50	13	6	25.2	Gran. Borrow (Grav.)	Test #2 was of lower southwest pit face. Material is: 22-26, stony sand.
	3	1971	0-5.5	----	Yes	71	63	45	34	31	18	36.9	----	Test #3 was in floor north of Test #2. Material is: 0-5.5, sandy coarse gravel with an estimated 10% cobbles greater than 3" not included in the sample.
10	1	1971	1-5	0-1	No	94	87	72	57	8	3	26.2	Gran. Borrow (Grav.)	Owner: Don Tyrell  Area is the northeast corner of a field west of Town Highway No. 11, and south of and overlooking Twenty Mile Stream. Feature tested appears to be a fanlike lobe within kame moraine.  Test #1 was in the extreme northeast corner of the field. Material is: 0-1, sod and rusty stones; 1-5, fine-coarse gravel; 5-6.5, silt-clay.
	2	1971	2.5-5.5	0-2.5	No	---	100	95	72	3	2	-----	Sand	Test #2 was next to woods 150' S.45° W of Test #1. Material is: 0-1, sod; 1-2.5, silt; 2.5-5.5, pebbly sand; 5.5-7, silt-clay.
11	1	1971	1-6	0-1	Yes				100	18	8	----	Sand	Owner: Vaino Manner  Area is a pasture north of junction of Town Highway No.9 and

CAVENDISH 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 % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	¾"	#4	#100	#200			
	2	1971	0-3	----	Yes	100	86	74	60	42	27	-----	----	<p>State Aid Highway No.3. Pasture contains several kames which are the sites of some old diggings.</p> <p>Test #1 was in face of digging on southeast slope of south knoll. Material is: 1'-6', sand; 6-8, large boulder; 8-11, clay and stony till.</p> <p>Test #2 was in floor, 20' northeast of Test #1. Material is: 0-1, pebbly coarse sand; 1-3, coarse sand; 3-5+, silty till with angular pebbles and boulders.</p>
	3	1971	1-5	0-1	No	100	79	68	59	69	522	40.8	----	<p>Test #3 was in knoll 34' above and 275' N10° E. of Test #2. Material is: 1-5, layers of sand, angular rock fragments and clay. This knoll may be till moraine instead of a kame.</p>
12	1	1971	1-6	0-1	No	74	60	53	45	28	18	-----	----	<p>Owner: Tiemann Estate</p> <p>Area is field containing low terrace that is east of Town Highway No. 13 at point 0.52 mile north of Town Highway No.5 junction. This is an outwash feature according to Dr. David P. Stewart.</p> <p>Test #1 was in northeast part of field. Material is: 1-6', coarse well-packed cobbly gravel.</p>

## CAVENDISH GRANULAR DATA SHEET NO. 9

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Exist-ing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	1½"	#4	#100	#200			
13	1	1971	1.5-7	0-1.5	No	80	75	57	46	25	17	32.7	-----	<p>Owner: Tiemann Estate</p> <p>Area is field north of house on east side of Town Highway No. 13 at point 0.46 mile north of Town Highway No. 5 junction. This is same outwash feature as at Map Identification No. 12.</p> <p>Test #1 was near north end of field. Material is: 1.5'-6', poorly sorted dirty cobbly gravel; 6'-7', dirty bouldery gravel with silt. Water at 6'.</p>
	2	1971	2-5	0-2	No	64	55	50	44	46	32	-----	-----	<p>Test #2 was near south end of field 35'N65 W of barn. Material is: 2'-5', clay with rotten angular rock fragments.</p>
14	1	1971	0.5-9	0-0.5	No				100	54	16	-----	-----	<p>Owner: Lanfair Norri.</p> <p>Area is hillside north of stone house on Town Highway No. 21. This material is not available.</p> <p>Test #1 was in trail just east of old building excavations. Material is: 0-0.5, silt; 0.5-9, medium-fine silty sand.</p>
15	1	1971	0-5	---	Yes	93	89	75	67	23	15	-----	Gran. Borrow (Grav.)	<p>Owner: Edward J. Dimmock</p> <p>Area is large pit west of Town Highway No. 23 above cemetery.</p>

CAVENDISH GRANULAR DATA SHEET No. 10

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1 1/2"	1/2"	#4	#100	#200			
	2A	1971	1-17	0-1	Yes				100	32	7	-----	sand	Test #1 was in lower level floor. Material is: 0-4', stony sand; 4-5, stony sand. Water at 4'. Test #2a was in upper southwest face of pit. Material is: 1-17, uniform sand with a few small pebbles.
	2B	1971	17-25		Yes				100	44	17	-----	---	Test # 2B was in lower southwest face of pit below Test #2A, Material is: 17'-25', silty sand.
	3	1971	0-8	----	Yes				100	65	24	-----	---	Test # 3 was in upper northwest pit floor. Material is: 0-2', pebbly sand; 2'-8', sand.
	4	1971	1-6	0-1	Yes	100	100	95	82	17	13	-----	Gran. Borrow (Sand)	Test #4 was 30' northwest of Test #5, represents the extension in that direction. Material is: 1'-3', pebbly coarse sand; 3'-6', sand. Bottom bedrock.
	5	1971	1.5-8	0-1.5	Yes	100	88	76	64	17	11	16.6	Gran. Borrow (Grav)	Test #5 was in upper north pit face. Material is: 1.5'-2.5', pebbly sand; 2.5'-8', pebbly fine gravel; 8.0'-?, boulders.
	6A	1971	1-7	0-1	Yes	80	66	50	41	11	7	18.4	Gravel	Test # 6A was in upper northeast face of pit. Material is: 1'-7', clean cobbly gravel.
	6B	1971	7-27		Yes			100	99	25	8	-----	Sand	Test # 6B was below test #6A in Northeast pit face. Material is: 7'-27', clean light gray sand with

CAVENDISH GRANULAR DATA SHEET NO. 11

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"	1½"	½"	#4	#100	#200			
	6C	1971	47-55		Yes	100	100	98	94	28	10	-----	Sand	a few pebbles.  Test #6C was in lower north-east pit face. Material is: 27'-47', heavily sloughed over and inaccessible; 47'-55', sand with pebbles and a few cobbles. Bottom, clean coarse pebbly sand.
16	1A	1971	2-27	0-2	No	100	100	94	85	14	10	-----	Sand	Owner: Govert Van Schaik Area is an exposed sand bank immediately south of Central Vermont Public Service Right-of-Way, between Whitesville and Cavendish village. Access would require construction of a road on the utility company property.  Test #1A was located in the upper face of bank. Material is: 0-2', sod and silt; 2'-27', stony sand changing to fine sand.
	1B	1971	27-53		No	100	100	99	95	16	9	-----	Sand	Test # 1B was in center face of bank. Material is: 27'-53', fine to medium sand.
	1C	1971	53-68		No	100	100	97	90	17	9	-----	Sand	Test #1C was in lower face of bank below Test #1B. Material is: 53-68', fine sand becoming coarser with depth. From 68'-74' of this sand bank was not accessible to hand shovel sampling.

CAVENDISH GRANULAR DATA SHEET NO. 12

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks					
						2"	1 1/2"	1/2"	#4	#100	#200								
17	1	1971	2-30	0-2	Yes	100	100	87	84	11	7	----	Sand	<p>Owner: Central Vermont Public Service.</p> <p>Area is a pit south of Vermont Route No. 131 northeast of road to sewage plant.</p> <p>Test #1 was of upper face of pit in its western extension. Material is: 0-2', sod and silt; 2'-8', pebbly coarse sand; 8'-12', sand; 12'-18', pebbly sand; 18'-30', sand becoming finer with depth.</p>					
18	1A	1971	1-27	0-1	Yes	L	O	S	T	I	N	T	R	A	N	S	I	T	<p>Owner: Town of Cavendish.</p> <p>Area comprises pit on north side of Vermont Route No. 131 east of Cavendish village.</p> <p>Test # 1A was in upper west pit face 60' from its north end. Material is: 1'-27', fine, fairly uniform sand with some silty sand layers.</p>
	1B	1971	27-53		Yes	--	L	O	S	T	I	N	T	R	A	N	S	I	T
19	1	1971	2-27	0-2	Yes	100	100	97	94	41	9	-----	Gran Borrow (Sand)	<p>Owner: Tucker Construction Co.</p> <p>Area is pit south of Town Highway No. 23 at point 0.49 mile east of</p>					

CAVENDISH GRANULAR DATA SHEET NO. 13

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	½"	#4	#100	#200			
														its junction with Vermont Route No. 131.  Test #1 was in west face of pit. Material is: 0-0.5', sod; 0.5'-2', loamy sand; 2'-27', poorly sorted sand, stones. with brown silt seams.
20	1	1971	2-15	0-2	Yes	96	85	59	50	13	3	20.5	Gravel	Owner: Lucien R. Gréif. Area comprises long pit east of Town Highway No. 30 in Whitesville. Test #1 was in southeast pit face. Material is: 0-0.5', sod; 0.5'-2', loamy sand; 2'-15', coarse gravel and sand.
	2	1971	1.5-4.5	0-1.5	Yes	89	74	50	38	11	6	21.3	Sand	Test #2 was in upper north pit face. Material is: 0-0.5, sod; 0.5-1.5, loamy gravel; 1.5-4.5', coarse gravel.
	3	1971	4.5-11		Yes	100	100	88	81	12	5	---	Sand	Test #3 was in lower north pit face. Material is; 4.5-7', sand with stones; 7'-11', medium damp sand.
	4	1971	13-17		Yes	100	100	98	84	4	1	---	Sand	Test #4 was below Test #1 in southeast pit face. Material is: 11'-13', pebbly sand; 13'-17', medium fine sand; bottom, clay with stones.
	5	1971	2-5	0-2	Yes	-----	---N	O T	T E	S T	E D	---	---	Test #5 was 60' due east of Test #1 and represented southeast extension. Material is 0-2', fine

CAVENDISH GRANULAR DATA SHEET NO. 14

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	½"	#4	#100	#200			
	6	1971	3.5-7	0-3.5	Yes	100	100	99	90	29	17	-----	-----	sand; 2'-5', dark brown silt with clay and stones.  Test #6 was 30' N75°E of Test #1, also represented southeast extension. Material is: 0-0.5', fine sand; 0.5'-3.5', sandy silt; 3.5'-7', silty sand.
	7	1971	4.5-9	0-4.5	Yes	75	61	36	26	30	19	37.0	----	Test #7 was 12' east of east face and 117' N25°E of Test # 6. Material is: 0-0.5', mossy fine sand; 0.5'-4.5', sandy silt; 4.5-9', coarse gravel.
	8A	1971	0.5-5.5	0-0.5	Yes	67	60	38	28	15	10	21.6	Gran. Borrow (Grav.)	Test #8A was located 60' east of Test #2 and represented east extension of north face. Material is: 0-0.5', sod; 0.5'-5.5', coarse sandy gravel.
	8B	1971	5.5-8.5		Yes	57	47	31	25	6	5	24.2	Gravel	Test #8B was below Test #8A. Material is: 5.5-8.5', sandy gravel as above.
	9	1971	0.5-7	0-0.5	Yes	68	45	31	23	18	12	24.8	Gran. Borrow (Grav)	Test #9 was located 60' south-east of Test #8A. Material is: 0-0.5', sod; 0.5'-7', coarse sandy gravel; bottom gravel.
21	1A	1971	2-16	0-2	Yes	82	71	46	34	10	7	21.6	Gravel	Owner: Govert Van Schalk Area is pit north of bend in Vermont Route No. 131 at point

CAVENDISH GRANULAR DATA SHEET NO. 15

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	¾"	#4	#100	#200			
	1B	1971	16-19		Yes				100	19	4	-----	Sand	1.15 mile east of its intersection with Town Highway No. 29  Test #1A was in upper pit face Material is: 0-1', sod; 1'-2', silt and stones; 2'-16', coarse gravel.
	2	1971	40-46		Yes	100	77	73	70	41	15	-----	Gran Borrow (Sand)	Test #1B was in central pit face below Test #1A. Material is: 16'-19', medium to fine sand.  Test #2 was in lower pit face. Material is 40'-46', fine sand with an occasional stone. Floor silt-clay.
	3	1971	1-5	0-1	Yes	----- <u>D I D N O T T E S T</u> -----						-----		Test #3 was 90' northeast of pit and represents northeast extension. Material is: 0-1', sod; 1'-5', cobbly gravel with boulders.
	4	1971	4.5-8.5	0-4.5	Yes	47	41	30	25	13	8	20.6	Gravel	Test #4 was located 40' north of pit. Material is: 0-1', sod; 1'-4.5', cobbly gravel with boulders; 4.5-8.5', cobbly gravel.
22	1	1971	3-7	0-3	Yes				100	7	6	-----	Sand	Owner: John Egan. Area is a field with small pit west of Black River and south east of Town Highway No. 29.  Test #1 was in upper north face of pit. Material is: 0-3', sod and silt-clay; 3'-7', fine to medium sand.

CAVENDISH 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						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	½"	#4	#100	#200			
	2	1971	7-12		Yes	100	91	73	66	9	7	-----	Sand	Test #2 was below Test #1 in north face. Material is: 7-9', sandy cobbles, 9'-12', fine to medium orange sand; bottom, clay.
	3	1971	1-7	0-1	Yes	79	69	47	39	20	14	28.5	Gran Borrow (Grav)	Test #3 was located 80' N40°E of northeast pit face. Material is: 0-1', sod and silt; 1'-7', silty coarse gravel.
	4	1971	1-6	0-1	No	67	62	39	32	11	9	21.3	Gran. Borrow (Grav.)	Test #4 was located 675'S.10°E of Test #3 in field. Material is: 1'-4', silt with gravel; 4'-6', sand with gravel.
	5	1971	1.5-6	0-1.5	No				100	66	38	-----	-----	Test #5 was in field 300' S15°E of Test #4. Material is: 1.5'-6', silty sand.
23	1	1971	0.5-7.5	0-0.5	Yes	100	100	97	94	4	2	-----	Sand	Owner: Eric Wallin. Area is a small pit in rolling field east of Town Highway No. 29. This material was not available at time of survey.  Test #1 was in north pit face. Material is: 0-0.5', sod; 0.5'-7.5' fine to medium sand; Bottom same.
24	1	1971	0.5-6	0-0.5	No	80	61	35	24	18	7	22.3	Gravel	Owner: Govert Van Schaik. Area is a small clearing in the woods above and east of Vermont Route No. 131 at point 0.33 mile south of junction with Town Highway No. 29.

CAVENDISH GRANULAR DATA SHEET NO. 17

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						2"	1½"	¾"	#4	#100	#200			
														Test #1 was at south end of stripped clearing. Material is: 0-0.5', stony silt; 0.5-6', sandy gravel with boulders; 6'-9', silt-clay. Water was encountered at 6'.
25	1	1971	1-4	0-1	No	63	55	42	35	20	11	27.4	Gran. Borrow (Grav)	<p>Owner: Govert Van Schaik.</p> <p>Area is in woods above and east of Vermont Route No. 131 at point 0.23 mile south of junction with Town Highway No. 29.</p> <p>Test #1 was on east side of slight ridge at point 600' north of Map Ident. No. 24. Material is: 0-1', sod and silt; 1'-2', silty sand; 2'-4', cobbly sand with pebbles; bottom, boulders.</p>
26	1	1971	2-13	0-2	Yes	87	77	67	59	23	10	-----	Gran Borrow (Grav)	<p>Owner; Lepp and Gueron.</p> <p>Area is an inactive pit in woods at point about 1/4 mile from Vermont Route No. 131 on State Aid No. 2.</p> <p>Test #1 was in face above middle of pit. Material is: 0-1', sod; 1'-2', silt and cobbles; 2'-13', medium to fine sand with gravel lenses; 13'-14', clay with cobbles.</p> <p>Property owners of this area did not respond to request to test.</p>

CAVENDISH GRANULAR DATA SHEET NO. 18

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing						Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks			
						2"	1 1/2"	1/2"	#4	#100	#200						
27	1	1971	1-6	0-1	No	---	N	O	T	T	E	S	T	E	D	-----	Owner: Mary M. Van Schaik Area is a large field south of State Aid Highway No.2 and east of Town Highway No. 28.  Test #1 was located 50' south of S,A. Highway and 135' east of building foundations. Material is: 0-1', sod; 1'-6', silt-clay.
	2	1971	0.5-3	0-0.5	No	72	58	37	27	24	16	31.6	-----	Test #2 was in field 330'S30°E of Test#1. Material is: 0-0.5', sod; 0.5-3', silty coarse gravel.			
28	1	1971	1-6	0-1	No	---	N	O	T	T	E	S	T	E	D	-----	Owner: Mary M. Van Schaik. Area is a field with small pit at west end north of State Aid Highway No. 2 at point 0.15 mile east of junction with Town Highway No. 28.  Test #1 was at east end of field. Material is: 0-1', sod; 1'-6', stony silt-clay.
	2	1971	2-7	0-2	Yes	68	60	45	38	16	8	28.8	Gran. Borrow (Grav.)	Test #2 was in southwest face of pit. Material is: 0-2', sod and silt; 2'-7', coarse gravel with sand; bottom, boulder clay.			
	3	1971	0.5-5	0-0.5	Yes	58	47	39	33	24	15	28.3	Gran Borrow (Grav)	Test #3 was in northwest floor of pit. Material is: 0-0.5', sod; 0.5'-5' coarse gravel; bottom bed-rock and water.			

Table I  
Supplement

CAVENDISH PROPERTY OWNERS - GRANULAR

Map Ident. No.

Blais, Andrew	9
Cavendish, Town of	18
Cavendish, Superintendant of Schools	8
Central Vermont Public Service	17
Dimmock, Edward J.	15
Egan, John	22
Gilcris, Richard	3, 5
Grief, Lucien R.	20
Gueron, Henri	26
Kelley, Laurance	2
Lepp, Stephen	26
Manner, Vaino	11
Norri, Lanfair	14
Sheldon, Md. E.M.	4
Stillwell, Mrs. Bertha	1
Tiemann Estate	12, 13
Tucker Construction Corporation	19
Tyrell, Don	10
Van Schaik, Govert	16, 21, 24, 25
Van Schaik, Mary M.	27, 28
Wallin, Eric	23
Weidman, Harold	2
Williams, George	7
Worth, Earl	6

## CAVENDISH ROCK DATA SHEET NO. 1

Ident. No.	Field Test No.	Year Field Tested	Rock Type	Existing Quarry	Method of Sampling	Abrasion AASHO T-3	
1	1	1971	Serpentine	Yes	Chip	-----	Owner: Vermont Marble Company Area contains an inactive flooded verde antique quarry south of electrical utility transmission line right-of-way near the Ludlow Town Line. Quarry is 0.67 mile west of State Aid Highway No. 3 via Town Highway No. 41. Four tests were taken in grout piles east of the quarry because floor and walls are inaccessible. Rock sampled is mapped as ultramafics and similar rock outcroppings occur north of Vermont Route 103 at the first bend east of the Ludlow Town Line. Test #1 was sampled at north edge of grout piles about 60' east of derrick. This sample was lost in transit.
	2	1971	serpentine	Yes	chip	4.0%	Test #2 was sampled at north center part of grout piles about 75' southeast of Test #1. Material is acceptable for Crushed Stone for Sub-base.
	3	1971	serpentine	Yes	Chip	-----	Test #3 was sampled at south center part of grout piles about 50' south of Test #2. This sample was lost in transit.
	4	1971	serpentine	Yes	Chip	1.5%	Test #4 was sampled at south edge of grout piles about 60' west-southwest of Test #3. Material is acceptable for Crushed Stone for Sub-base.
2	1	1971	limestone	Yes	Chip	see Test 2	Owner: Woodell and Walasewicz. Area is an old limekiln site west of Town Highway No. 32 and the railroad tracks at a point about 0.2 mile south of junction with Town Highway No. 33. Face of the quarry and first 50 feet of extension are in the Cavendish

CAVENDISH ROCK DATA SHEET NO. 2

Map Ident. No.	Field Test No.	Year Field Tested	Rock Type	Existing Quarry	Method of Sampling	Abrasion AASHO T-3	Results
	2	1971	limestone	yes	chip	8.6%	limestone. This interval was tested in combination as Tests #1 and #2. The material is not acceptable for Crushed Stone for Sub-base.
	3	1971	limestone and gneiss	No	chip	4.7%	Test #3 was on slope above limekiln site for interval from 75'-113'. This test included contact between the Cavendish limestone and Mount Holly gneiss. Material is acceptable for Crushed Stone for Sub-base.
	4	1971	schist	No	chip	4.9%	Test #4 was continuation west and above Test #3 across strike of the bedding. This material is a schistose facies of the Mount Holly gneiss. It is acceptable for Crushed Stone for Sub-base.

Table II  
Supplement

CAVENDISH PROPERTY OWNERS - ROCK

Map Ident. No.

Vermont Marble Company

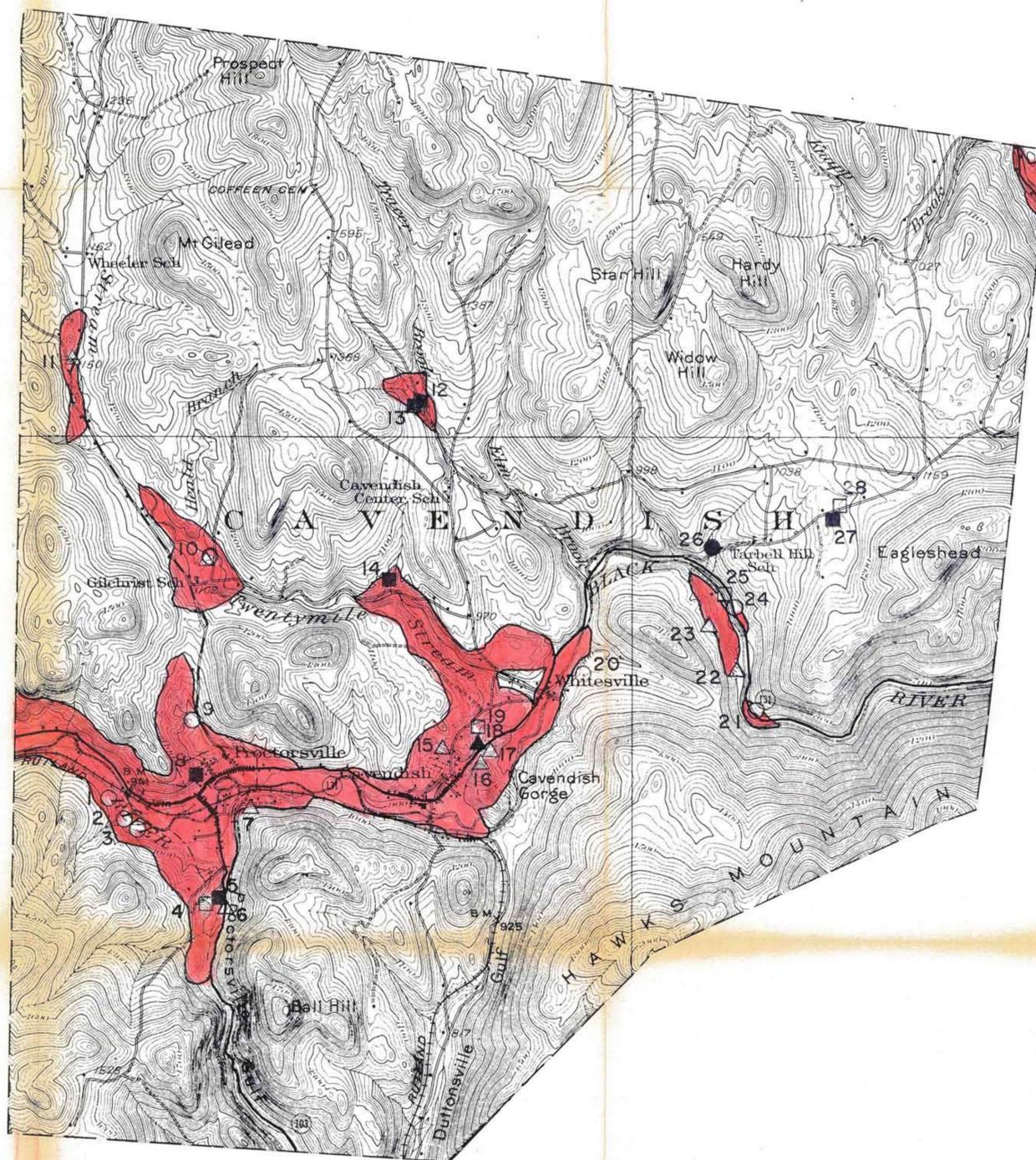
1

Walasewicz, Stanley

2

Woodell, Rodney

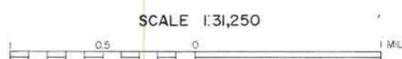
2



LEGEND

- GRAVEL, ACCEPTABLE FOR ITEM 704.05 (gravel for sub-base)
- GRAVEL, DEPLETED OR NOT ACCEPTABLE FOR ITEM 704.05
- △ SAND, ACCEPTABLE FOR ITEM 703.03 (sand borrow and cushion)
- ▲ SAND, DEPLETED OR NOT ACCEPTABLE FOR ITEM 703.03
- GRANULAR BORROW, ITEM 703.05
- MATERIAL NOT ACCEPTABLE FOR ITEM 703.05
- ✕ EXISTING PIT
- SG SAND & GRAVEL DEPOSIT
- S SAND DEPOSIT
- 3 IDENTIFICATION NUMBER (refer to data sheets)

CAVENDISH



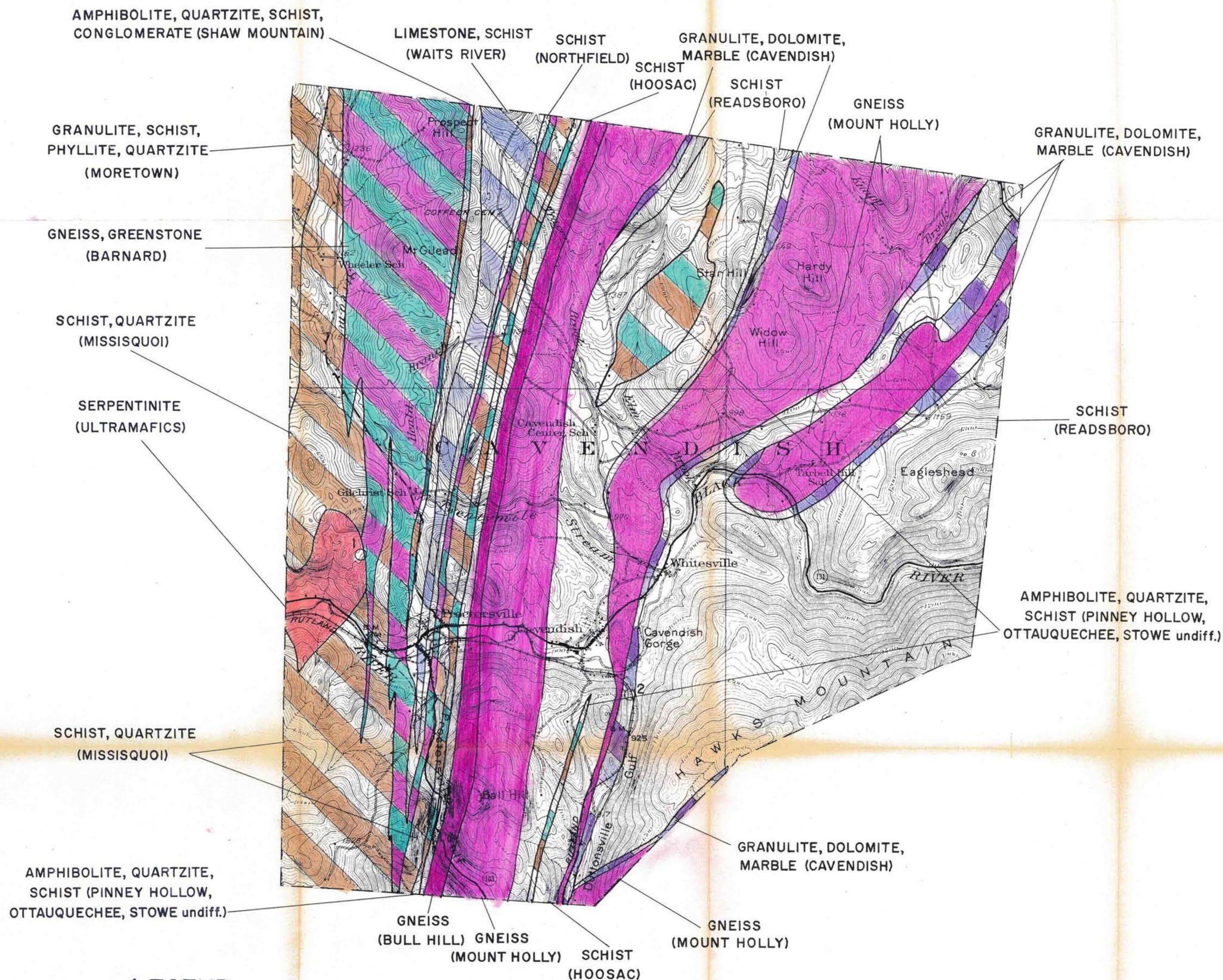
CONTOUR INTERVAL 20 FEET  
1971

GRANULAR  
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

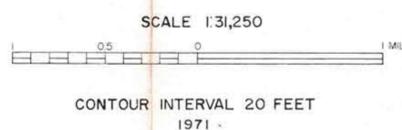
DATE				
BY				



LEGEND

- ROCK, ACCEPTABLE FOR ITEM 704.06 (crushed stone for sub-base)
- ROCK, NOT ACCEPTABLE FOR ITEM 704.06
- ✕ 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 blue box QUARTZITE
- Dark blue box DOLOMITE
- Light purple box MARBLE, LIMESTONE
- White box SCHISTS, SLATES, PHYLLITES, SHALES, CONGLOMERATES
- 3 IDENTIFICATION NUMBER (refer to data sheets)

CAVENDISH



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					