

SURVEY OF HIGHWAY CONSTRUCTION MATERIALS
IN THE TOWN OF MENDON, RUTLAND COUNTY, VERMONT

Prepared by

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION
ENGINEERING GEOLOGY SUBDIVISION

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Acknowledgments

This project acknowledges the surficial geological information obtained from Professor D. P. Stewart of Miami University, Oxford, Ohio and the bed-rock information from the Centennial Geologic Map of Vermont, C. G. Doll.

History

The Materials Survey Project was initiated in 1957 by the Vermont Department of Highways with the assistance of the Bureau of Public Roads to compile an inventory of highway construction materials in the State of Vermont. Previously, investigations for highway construction materials were conducted only as the immediate situation required and only limited areas were surveyed. Since no overall picture of material resources was available, highway contractors or resident engineers were required to locate the materials for their respective projects and the samples were tested by the Materials & Research Division. The additional expense of exploration for construction materials resulted in higher construction costs being paid by the State. The Materials Survey Project was formed to minimize this factor by enabling the State and the contractors to use available information on material resources and to project cost estimates. Knowledge of locations of suitable materials is an important factor in planning 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 furnish information of particular use to contractors and construction personnel, and should be studied together for maximum benefit.

Enclosures

Included in this report are two surface-geology maps, one defining the location of tests on bedrock, the other defining the location of tests on

granular materials. These maps are based on 15-minute or 7- $\frac{1}{2}$ -minute quadrangles of the United States Geological Survey enlarged or reduced to 1:31250 or 1" = 2604'. The various rock formations and types are delineated on the Bedrock Map of the township. This information is obtained from: Vermont Geological Survey Bulletins, Vermont State Geologist Reports, United States Geological Survey Bedrock Maps, Centennial Geologic Map of Vermont, the Surficial Geologic Map of Vermont and other references.

The granular materials map shows areas of various types of glacial deposits (outwash, moraines, kames, kame terraces, eskers, etc.) which are potential sources of gravel and sand. This information was obtained primarily from a survey conducted by Professor D. P. Stewart of Miami University, Oxford, Ohio, who mapped the glacial features of the State of Vermont during the summer months from 1956 to 1966. Further information is obtained from the Soil Survey (Reconnaissance) of Vermont (conducted by the Bureau of Chemistry and Soils of the United States Department of Agriculture), available Soil Surveys of individual counties (by the Soil Conservation Service of the United States Department of Agriculture), Vermont Geological Survey Bulletins, United States Geological Survey Quadrangles, aerial photographs and other sources. The location of each test area is represented by a Map Identification Number.

This report contains data sheets with detailed information on each test taken in the Granular and Bedrock areas. Data is also used from an active card file compiled by the Materials & Research Division over a period of years. Some cards are not used because they are incomplete or have unusable information on the location of the deposit.

Work sheets containing more detailed information and a field sketch of the area, and laboratory test results are on file in the Materials & Research Division of the Agency of Transportation, State of Vermont.

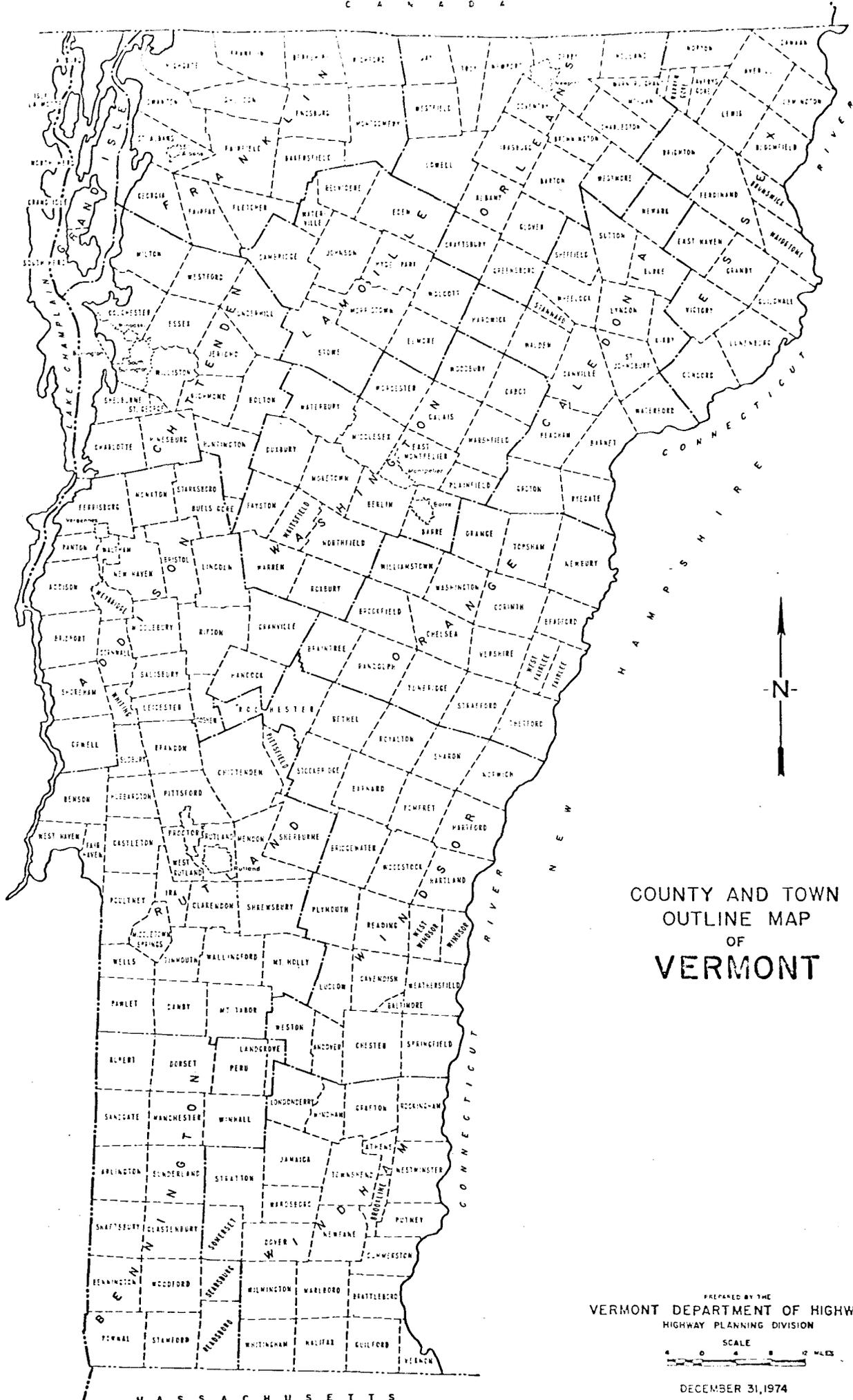
LOCATION

The town of Mendon is in the east-central part of Rutland County in west-central Vermont. It is bounded on the north by Chittenden, the north-east and east by Sherburne, the southeast by Plymouth, the south by Shrewsbury, the southwest by Clarendon, the west by Rutland, and the north-west by Pittsford; (see County and Town Outline Map of Vermont on the following page).

Mendon lies in the Green Mountain Physiographic Subdivision of the New England Upland which is characterized by steep-sided mountains in the southeast corner of town. The rest of Mendon has many low heavily wooded hills most of which are inaccessible. Elevations range from 4,220 feet along the south edge of the summit of Killington Peak to 810 feet where an unnamed tributary of Tenney Brook crosses the Rutland Town Line. Five other peaks range between 3,100 feet and 3,939 feet in elevation.

Major drainage is west and northwest via Mendon and Brewers Brooks, and west and southwest via Eddy Brook which is a tributary of the North Branch of Cold River. Moon Brook rises near Town Line Road and flows westward into Rutland.

Beaver Pond, which is just west of Sherburne and north of U. S. Route 4, is the only named pond in Mendon.



COUNTY AND TOWN
OUTLINE MAP
OF
VERMONT

PREPARED BY THE
VERMONT DEPARTMENT OF HIGHWAYS
HIGHWAY PLANNING DIVISION
SCALE
0 2 4 6 8 10 MILES

DECEMBER 31, 1974

M A S S A C H U S E T T S

SURVEY OF ROCK SOURCES

Procedure for Rock Survey

The method 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 during the winter months and comprises the mapping and description of rock types perused from many reference sources, as acknowledged in the bibliography. These references differ considerably in dependability due to subsequent developments and studies that have contributed to the obsolescence of a number of reports. The results of samples taken by other individuals are analyzed, and their location is mapped when possible. As complete a correlation as possible is made of the available geological information concerning the area under consideration.

The field investigation is begun by making a cursory survey of the entire town. The information obtained from the preliminary survey, and that from the office investigation, is used to determine where sampling will be concentrated. When a promising source has been determined by rock type, volume of material, accessibility, adequate exposure and relief, chip samples are taken with a hammer across the strike or trend of the rock, and are submitted to the Materials & Research Division for abrasion testing by the Deval Method (AASHTO T-3) and the Los Angeles Method (AASHTO T-96). Samples taken by the chip method are often within the weathered zone of the outcrop and thus may give a less satisfactory test result than fresh material from unweathered rock. When the rock is uniform, and the chip samples yield acceptable abrasion test results, the material source is listed in this report as being satisfactory.

Discussion of Rock and Rock Sources

The information on the Rock Materials Map (Plate II) is a cartographic generalization. For a more detailed description of the respective rock formations, see the Summary of Rock Formations included in this report.

Occasionally, rocks belonging to the same formation and exhibiting similar characteristics (i.e., color and texture) produce different abrasion test results owing to differing physical properties or chemical compositions. Therefore, in no case should satisfactory test results obtained in one area be construed to mean that the same formation, even in the same area, will not later produce unsatisfactory material; this is especially true of metamorphic rocks.

Mendon is mapped as being underlain entirely by metamorphic rocks, but most of the town is heavily forested. The only areas which have enough relief are integral parts of the ski industry or are very remote and inaccessible. The formations mapped in Mendon from west-to-east are: Cheshire quartzite, Dalton Formation, Mount Holly gneiss, Mount Holly quartzite and schist, Cavendish Formation (Readsboro member), Cavendish Formation (Bull Hill gneiss), Mount Holly schist and quartzite, Mount Holly gneiss, Mount Holly marble and limesilicates, and Tyson Formation.

SURVEY OF SAND AND GRAVEL SOURCES

Procedure for Sand and Gravel Survey

The method used for conducting the 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 during the winter months and comprises the mapping of potentially productive areas from various references. Of these references, the survey of glacial deposits mapped by Professor Stewart is particularly helpful when used with 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. The locations of existing pits are mapped, as are the locations in which samples were taken by other individuals.

The field investigation is begun by making a cursory survey of the entire town. All pits, and any areas that show evidence of glacial or fluvial deposition are noted, and later investigated by obtaining samples from pit faces and other exposed surfaces. Test holes in pit floors and extensions are later dug with a backhoe to a depth of approximately 11 feet to obtain material which is submitted to the Materials & Research Division for gradation, sieve analysis and AASHTO T-4 Method stone abrasion test.

Discussion of Sand and Gravel Deposits

Results of this survey show that granular deposition in Mendon is confined to the east-central zone between 1,450' and 1,750' elevation and the extreme west edge of town between 850' and 1,100' elevation. There are several large pits which are virtually depleted and others that are in various stages of residential development. Overall, there is a very limited amount of granular material in town. Pits at Map Identification No. 7 and 8 are likely the most promising sources of Gravel for Sub-base, Item 704.05. Pits at Map Identification Nos. 13, 8, 1, and 9 are likely the most promising sources of Sand Borrow and Cushion Item 703.03.

SUMMARY OF ROCK FORMATIONS IN THE TOWN OF MENDON

Vermont Valley Sequence

Cheshire Quartzite and dolomite - Very massive, white to faintly pink or buff vitreous quartzite near the top in west-central and southwestern Vermont; predominantly a less massive appearing mottled gray, somewhat phyllitic quartzite; dolomitic sandstone and conglomerate near the base of the formation in west-central Vermont apparently grades southward into the Dalton formation.

Champlain Valley Sequence

Dalton Formation - Schistose quartzite containing pebbles of feldspar and blue quartz; impure dolomite containing pebbles of quartz and feldspar occurs locally; conglomerate common near base. Occurs in southwestern Vermont.

Green Mountain Sequence

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

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

Green Mountain SequenceCamels Hump Group

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.

Mount Holly Complex

Mount Holly Gneiss - 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.

Mount Holly Quartzite and schist - Quartzite, 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 - Calcite and dolomite marbles, locally coarse-grained; commonly contain phlogopite, actinolite, and diopside, and are interbedded with medium-to coarse-grained calc-silicate granulite; includes minor amounts of other types of Precambrian rock.

GLOSSARY OF SELECTED GEOLOGIC TERMS

Actinolite - A greenish variety of amphibole occurring as bladed crystals or in masses.

Amphibolite - A green to black metamorphic rock consisting mostly of amphibole (i.e., tremolite, actinolite, hornblende, or arfvedsonite), and having a somewhat schistose structure.

Augen - The German word for eyes; used as a prefix before various rock names, especially gneiss, to describe larger minerals or aggregates of minerals in contrast with the rest of the rock. In the gneisses, feldspars commonly form the augen and are lenticular with the laminations in a way that strongly suggests an eye.

Biotite - A silicate mineral commonly known as black mica.

Carbonaceous - Containing carbon.

Chlorite - A general designation for a group of hydrous silicates of magnesium and iron, with or without aluminum, so named because of their green color. They are in many respects closely related to the micas but differ in lacking alkalis and in the cleavage flakes being comparatively inelastic. Chlorites are widely distributed in nature, often occurring as secondary minerals resulting from the alteration of pyroxene, amphibole, biotite, garnet, or olivine.

Chloritoid - A brittle member of the mica mineral group.

Diopside - A mineral of the pyroxene group. It is especially characteristic of contact metamorphic zones and occurs also in some gneisses and schists.

Dolomite - A rock formed from the mineral Dolomite; it occurs in great masses especially in older sedimentary rocks. Most dolomites were probably originally limestones that were altered by reaction with magnesium-bearing solutions. The color of the rock may be white, gray, brown, or sometimes pinkish.

Feldspar - Any of an important group of rock-forming minerals. They are essentially silicates of alumina and some other base: potash, soda, or lime. Orthoclase and microcline are both potash feldspars; albite is a sodic feldspar; and anorthite is a lime feldspar. The lime-soda members are collectively called plagioclase. Feldspars make up from 40 to 50 percent of the earth's crust and are the most common rock-forming minerals.

Garnet - An important group of silicate minerals of widespread occurrence, they are accessory constituents of metamorphic rocks and less commonly of igneous rocks. They are commonly deep red, brown, or black.

Gneiss - A foliated metamorphic rock with no specific composition implied, but having layers that are mineralogically unlike and consisting of interlocking mineral particles that are mostly large enough to be visible to the eye. Gneisses usually display an alternation of granular minerals and tabular or schistose minerals with the rock tending to split along the planes where tabular or schistose minerals predominate. The foliation may be even and continuous or highly contorted and discontinuous.

Gneisses grade directly into schists, but schists generally are finer-grained and show more uniformity of mineral composition and foliation. A somewhat arbitrary distinction between schist and gneiss is that based on the presence of feldspar in gneiss and its absence from schist. Gneiss may originate from either igneous or sedimentary rocks and the various kinds comprise the largest group of metamorphic rocks. The foliation of true gneiss results from metamorphism; similar rocks of igneous origin in which the banding is due to magmatic flow before the rock completely crystallized are distinguished as primary gneisses.

Granitoid - Those igneous rocks having the characteristic texture of granite. The mineral grains may be fine or coarse but are nearly uniform in size. Individual crystals have interfered with one another during growth and are therefore seldom bounded by well-marked crystal faces.

Granulite - A quartz-feldspar rock of high metamorphic grade, poor or lacking in mica, and characterized structurally by a single regular plane of schistosity, which is easily visible to the eye. The schistosity is determined mainly by parallel orientation of flat lenses of coarse-grained quartz set in a quartzose matrix of smaller equidimensional grains.

Hornblende - A common member of the amphibole group of minerals, it is usually black, dark-green, or brown. It commonly occurs in prismatic masses in both igneous and metamorphic rocks. The term is commonly combined with other mineral or rock names when hornblende is an important or diagnostic constituent.

Marble - The metamorphic form of limestone. Marble deposits are usually found in regions of intense metamorphism, and associated with gneiss, schist, etc.

Metamorphic - Metamorphic rocks are formed from pre-existing rocks through alterations produced by pressure, heat, or the infiltration of other materials at depths below the surface zones of weathering and cementation. Metamorphic rocks are more or less reconstructed in place while remaining essentially solid. New minerals and textures come into being which are stable under the conditions that produce the change.

Microcline - Potash feldspar, similar to orthoclase but triclinic, and distinguished from it by optical characters. It is the common feldspar of granitic pegmatites.

Muscovite - An important member of the mica group of minerals, known also as white mica, potash mica, or isinglass.

Paragonite - A mica similar in appearance and composition to muscovite but containing sodium instead of potassium.

Pegmatite - A variety of crystalline igneous rocks characterized by large average grain size, interlocking texture, and especially by unusually great range in grain size. Pegmatites are commonly associated with large bodies of plutonic igneous rock of somewhat similar composition.

Phlogopite - A yellowish-brown or more rarely reddish-brown mica.

Phyllite - A fine-grained foliated metamorphic rock intermediate between the mica schists and slates into which it may grade. The cleavage is made possible by the development of a large amount of the potash mica, sericite, which also gives the rock a distinctive silvery appearance. Phyllite is usually light in color but various darker shades, even black, are found. Practically all phyllites are derived from fine-grained sedimentary rocks by mechanical deformation and recrystallization. The fracture is intermediate between the smooth, even cleavage of slate and the rather splintery fissility of schist; the rock is not as tough as slate.

Physiographic - Pertaining to the physical divisions of the earth.

Plagioclase - The group of common rock-forming feldspar minerals of the albite-anorthite isomorphous series.

Porphyroblasts - Large crystals which have grown in place within the fine-grained groundmass of a metamorphic rock. They have been formed by heat, pressure, and solutions infiltrating later than the rocks in which they form.

Pseudomorphs - Minerals having the outward form of another species or of some object, as a shell, (as a piece of quartz having the cubic form of fluor spar). Pseudomorphs are formed from the original crystals (whose form alone they retain) by a process of substitution, incrustation, infiltration, or alteration.

Quartz - Anhydrous crystalline silica (SiO_2); it is the most common mineral in igneous, sedimentary, and metamorphic rocks, and is the chief constituent of sand and sandstone.

Quartzite - A common siliceous rock composed of quartz grains so firmly cemented that fracture occurs with equal ease across the grains and the cementing material; the metamorphic equivalent of sandstone.

Schist - A crystalline metamorphic rock that has closely spaced foliation and tends to split readily into thin flakes or slabs. There is complete gradation between slates and schists on the one hand, and schists and gneisses on the other. In general, schists show a coarser texture and a more evident crystallization than slates, and they have a higher proportion of secondary minerals and a more regular and closely spaced lamination than gneisses. The thin layers are commonly but not necessarily of the same composition throughout the rock. Usually the rock splits along the planes in which the readily cleavable minerals are concentrated. The foliation surfaces are uneven and more or less rough, and it may be impossible to split the rock along well-defined planes. Varieties are named chiefly based on the mineral responsible for the foliation; as biotite schist, muscovite schist, hornblende schist, talc schist, graphite schist, and chlorite schist. Feldspar is less common than in the gneisses.

BIBLIOGRAPHY

- Flint, Richard F. Glacial Geology and the Pleistocene Epoch. New York: John Wiley and Sons, Inc., 1947.
- Heinrich, E. W. Microscopic Petrography. New York: McGraw-Hill Co., Inc., 1956.
- Kemp, James F. A Handbook of Rocks. New York: D. Van Nostrand Co., Inc., 1949.
- National Academy of Sciences. National Research Council. Highway Research Board. Soil Exploration and Mapping, Highway Research Board Bulletin 28. Washington, D.C.: National Academy of Sciences-National Research Board, 1950.
- Pirsson, L. V. Rock and Rock Minerals. New York: John Wiley and Sons, Inc., 1949.
- Stokes, William L. and Varnes, David J. Glossary of Selected Geologic Terms, Colorado Scientific Society Proceedings, Vol. 16. Denver, Colorado: Colorado Scientific Society, 1955.
- U. S. Department of Agriculture. Bureau of Chemistry and Soils. Soil Survey (Reconnaissance) of Vermont, by K. V. Goodman, W. J. Latimer, F. R. Lesh, S. O. Perkins, and L. R. Smith (1930).
- U. S. Department of Interior. Geological Survey. Chittenden Quadrangle, Vermont, 7.5-Minute Series (Topographic)(1961).
- U. S. Department of Interior. Geological Survey. Killington Quadrangle, Vermont, 7.5-Minute Series (Topographic)(1961).
- U. S. Department of Interior. Geological Survey. Pico Peak Quadrangle, Vermont, 7.5-Minute Series (Topographic)(1961).
- U. S. Department of Interior. Geological Survey. Rutland Quadrangle, Vermont, 7.5-Minute Series (Topographic)(1961).
- Vermont. Department of Water Resources. Geological Survey. Surficial Geologic Map of Vermont, edited by Charles G. Doll (1970).
- Vermont. Department of Water Resources. Geological Survey. The Surficial Geology and Pleistocene History of Vermont, by David P. Stewart and Paul MacClintock, Bulletin No. 31 (1969).
- Vermont. Development Commission. Geological Survey. The Geology of the Rutland Area, Vermont, by William F. Brace, Bulletin No. 6 (1953).
- Vermont. Development Department. Geological Survey. Centennial Geologic Map of Vermont, edited by Charles G. Doll (1961).
- Vermont. Development Department. Geological Survey. The Glacial Geology of Vermont, by David P. Stewart, Bulletin No. 19 (1961).

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, March, 1976.

DIVISION 700 - 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 - SAND BORROW AND CUSHION

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, or organic material.

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

TABLE 703.05A - GRANULAR BORROW

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.

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 - GRAVEL FOR SUB-BASE

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 - CRUSHED STONE FOR SUB-BASE

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 pieces 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 - LEVELING MATERIAL

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves	
	TOTAL SAMPLE	
3/4"	100	
1/2"	70-100	
No. 4	50- 90	
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 - CRUSHED GRAVEL FOR SUB-BASE

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 - DENSE GRADED CRUSHED STONE FOR SUB-BASE

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves TOTAL SAMPLE
3½"	100
3"	90-100
2"	75-100
1"	50- 80
½"	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 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 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 - GRAVEL BACKFILL FOR SLOPE STABILIZATION

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 - GRANULAR BACKFILL FOR STRUCTURES

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

STATE OF VERMONT
 AGENCY OF TRANSPORTATION
 MATERIALS & RESEARCH DIVISION - GEOLOGY SECTION

TABLE I •

MENDON GRANULAR DATA SHEET No. 1

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VIII Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
1	1	1977	0-12	-	Yes	100	100	100	100	39	20	-	-	<p>Owner: State of Vermont. Area is large sprawling pit complex which contains the State Highway District #3 salt shed and garage on the northeast side of U.S. Route 4. The pit is close to the property lines, and future exploitation would be limited to the floor.</p> <p>Test No. 1 was in lowest northeast face in center of pit. Material is: 0'-3', sand; 3'-5', silty sand; 5'-8', fine sand; 8'-11', silty sand; 11'-12', pebbly sand; bottom, sloughed material.</p>
	2	1977	1-17	0-1	Yes	100	100	100	82	26	15	-	Granular Borrow (Sand)	<p>Test No. 2 was in the eastern corner of upper northeast face of pit. Material is: 0'-1', overburden; 1'-5', gravel; 5'-7', pebbly sand; 7'-17', intermixed layers of sand, fine sand, and gravelly sand; bottom, sloughed material. The material on top seems to have been dumped in and smoothed over.</p>
	3	1977	3-15	0-0.5	Yes	100	100	100	52	3	1	-	Granular Borrow (Sand)	<p>Test No. 3 was in upper northern face of pit. Material is: 0'-0.5', overburden; 0.5'-3', gravel which was not sampled because it drops off abruptly in extension and would give false results to the sample; 3'-5', gravel; 5'-10', pebbly sand; 10'-11', fine gravel; 11'-13', pebbly sand; 13'-15', sand; bottom, fine sand and</p>

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MENDON GRANULAR DATA SHEET NO. 2

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VIID Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
	4	1977	0-8	-	Yes	100	100	94	87	11	3	-	Sand	sloughed material. Screening would yield good Sand Borrow and Cushion, Item 703.03. Test No. 4 was in lower northern face of pit. Material is: 0'-8', pebbly sand; bottom, moist silt and large boulders.
	5	1977	1-16	0-1	Yes	100	100	92	82	5	2	-	Sand	Test No. 5 was in southwest face of pit southeast of and below the salt shed. Material is: 0'-1', overburden; 1'-16', pebbly sand and fine gravel; bottom, fine sand and sloughed material.
	6	1977	0-10	-	Yes	100	100	100	97	19	7	-	Sand	Test No. 6 was in pit floor near dump on northeast edge of upper level. Material is: 0'-7', silty sand and fine sand; 7'-10', sand with some pebbles; bottom, sand.
	7	1977	0.5-11	0-0.5	Yes	100	100	100	80	65	44	-	-	Test No. 7 was in floor of northeast corner of pit. Materials is: 0'-0.5', overburden; 0.5'-3', fine sand; 3'-4', sand with stones; 4'-6', fine sand and silty sand; 6'-9', sand with stones; 9'-11', fine sand; bottom, fine sand.
	8	1977	0-8	-	Yes	100	100	86	73	17	11	-	Sand	Test No. 8 was in southwest end of gully south of winter sand pile. Material is: 0'-8', stoney sand and fine sand with silt seams; bottom, gravelly sand and water.

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MENDON GRANULAR DATA SHEET NO. 3

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VIII Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
	9	1977	0-9	-	Yes	100	100	100	95	21	11	-	Sand	Test No. 9 was in gully 150' northeast of Test No. 8. Material is: 0'-9', Layers of sand and fine sand with silt seam; bottom, fine sand and water.
	10	1977	3-8	0-3	Yes	100	100	100	55	35	25	-	-	Test No. 10 was in floor of middle level, 100' northeast of Test No. 1. Material is: 0'-3', overburden; 3'-8', gap-graded gravel; bottom, ledge or large boulder.
2	1	1977	1-9	0-1	No	100	100	100	55	46	27	-	-	Owner: City of Rutland. Area is the City of Rutland watershed. Access is south along woods road southwest of District Garage. Sampling was only allowed in small clearings. Test No. 1 was in woods on northwest side of access road 0.59 mile from U.S. Route 4. Material is: 0'-1', overburden; 1'-9', gravelly fine sand; bottom, gravelly fine sand and water.
	2	1977	1-9	0-1	No	89	82	69	59	11	7	17.3%	Gravel	Test No. 2 was in a small clearing in woods southeast of access road, 0.42 mile from U.S. Route 4. Material is: 0'-1', overburden; 1'-4', fine sand; 4'-9', bouldery gravel; bottom, bouldery gravel and water. Gravel seems to be a localized deposit with 5' of gravel on west edge and 1' on east edge. The stones (2" to 25") are angular and sharp.

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MENDON GRANULAR DATA SHEET NO. 4

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VIID Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
	3	1977	1-10	0-1	No	100	100	100	97	70	52	-	-	Test No. 3 was in woods on northwest side of access road, 0.2 mile southeast of property line. Material is: 0'-1', overburden; 1'-6', fine sand with silt seams; 6'-10', silty gravel; bottom, silty gravel and water.
3	1	1977	1-12	0-1	Yes	100	88	78	57	3	1	19.6%	Gravel	<p>Owner: Peter Hadeka (Former owner Jerome N. Zirn). Area is large overgrown pit with trash on the floor and has a wooded ridge extending northward from it. The pit is north of the junction of Mendon Town Highway No. 12 (Class 3) and Mendon Town Highway No. 1 (Class 2). Owner plans to build a house in the pit eventually, so did not permit backhoe sampling.</p> <p>Test No. 1 was in north face of pit. Material is: 0'-1', overburden; 1'-3', boulder layer; 3'-12', gravel and fine gravel; bottom, sloughed material.</p>
4	1	1977	1-12	0-1	Yes	94	87	64	40	16	11	18.9%	Granular Borrow (Gravel)	Owner: Richard Goddard. Area is a two-level pit with a wooded extension to the southeast. The owner was planning to smooth-over the area for house lots. The pit is referred to as the old Barker Pit.

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MENDON GRANULAR DATA SHEET NO. 5

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VMD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
														Test No. 1 was on southeast face of upper pit level. Material is: 0'-1', overburden; 1'-3', layer of boulders; 3'-7', gravel; 7'-9', gravelly sand; 9'-12', gravel; bottom, sloughed material.
5	1	1977	0-7	-	Yes	100	100	100	61	23	17	-	-	<p>Owner: Ernest Bowen. Pit is 0.13 mile northwest of U.S. Route 4 and borders Map Identification Numbers 4 and 6. Area is a large, multi-level, sprawling pit with many small rivulets flowing on the floor. Many large boulders are on the faces and floor. There is almost no extension left. This area may become part of a housing development, "Mendon West", to the south.</p> <p>Test No. 1 was in small clearing southwest of woods atop pit faces. Material is: 0'-7', bouldery gravel; bottom, large boulders (4" to 50").</p>
	2	1977	0-7	-	Yes	100	100	100	74	47	36	-	-	Test No. 2 was in floor of lower central level northeast of tree-line. Material is: 0'-3', silty gravel; 3'-7', coarse gravel with silt; bottom, gravel and water.

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MENDON GRANULAR DATA SHEET NO. 6

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VIII Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
	3	1977	0-10	-	Yes	100	100	91	81	54	39	-	-	Test No. 3 was in northeast floor of upper level of pit. Material is: 0'-10', sand with stones and silt; bottom, sand, stones and water.
	4	1977	0.5-10	0-0.5	No	100	100	100	55	36	22	-	-	Test No. 4 was in overgrown field near tree line and access road. Material is: 0'-0.5', overburden; 0.5'-10', silty coarse gravel; bottom, silty coarse gravel and water.
	5	1977	0.5-8	0-0.5	No	83	81	52	33	11	8	17.2%	Gravel	Test No. 5 was near tree and property line, 250' southeast of Test No. 4. Material is: 0'-0.5', overburden; 0.5'-8', bouldery gravel; bottom, bouldery gravel.
6				NOT	SAMPLED									Owner: Earl Spencer (Formerly the Keith Pit). Area is a large, sprawling pit which is now the site of "Mendon West"(a housing development). Area is listed because it shows on air photos and quadrangle maps. There were quite a few small brooks flowing through the pit. Owner did not allow any sampling.
				(R	ESIDE	N	TIAL	D	EVELO	P	M	E	N	T)

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TABLE I

MENDON GRANULAR DATA SHEET NO. 7

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VIII Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
7	1	1977	1-12	0-1	Yes	87	83	75	61	10	4	19.7%	Granular Borrow (Gravel)	Owner: Crossman Sand and Gravel, Inc. Area is very large, sprawling pit southeast of U.S. Route 4 and east of Mendon Town Highway No. 2 (Class 2). The company maintains a crushing operation in the pit. A wooded extension lies to the east. Test No. 1 was in south-central face of uppermost level. Material is: 0'-1', overburden; 1'-5', coarse gravel; 5'-8', sand; 8'-12', gravel; bottom, sloughed material.
	2	1977	2-11	0-2	Yes	95	76	50	35	14	10	18.9%	Granular Borrow (Gravel)	Test No. 2 was in southeast face of uppermost level of pit. Material is: 0'-2', overburden; 2'-3.5', layer of 4"-stones; 3.5'-11', gravel; bottom, sloughed material.
	3	1977	2-10	0-2	Yes	81	81	65	52	10	6	12.9%	Gravel	Test No. 3 was in northeast face of pit lobe near apple orchard. Test represents extension into orchard. There were many trees, stumps, and boulders on the faces and floors. Material is: 0'-2', overburden; 2'-9', coarse gravel; 9'-10', fine sandy gravel; bottom, sloughed material.
	4	1977	1-8	0-1	Yes	89	82	51	32	16	10	21.3%	Granular Borrow (Gravel)	Test No. 4 was in southeast face of pit lobe near crusher. Material was being crushed (10/24/77). Material is: 0'-1', overburden; 1'-3', coarse gravel, 3'-4', sand and silt; 4'-8', gravel; bottom, moist gravel.

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TABLE I

MENDON GRANULAR DATA SHEET NO. 8

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VMD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
	5	1977	1-16	0-1	Yes	88	88	88	81	50	18	-	-	Test No. 5 was in west face of bowl-shaped lobe in wooded ridge. Material is: 0'-1', overburden; 1'-10', layers of gravel, fine gravel, and sand; 10'-16', sand, fine sand, and some gravel seams; bottom, fine sand and silty sand.
	6	1977	3-9	0-3	Yes	93	87	73	63	5	3	19.7%	Granular Borrow (Sand)	Test No. 6 was in east face of southeastern part of pit. Material is: 0'-3', overburden; 3'-4', gravel; 4'-9', fine gravel and pebbly sand; bottom, fine sandy till.
	7	1977	0-15	-	Yes	96	84	65	49	8	5	22.4%	Gravel	Test No. 7 was in north face of gravel island in south-central part of pit. Material is: 0'-15', bouldery gravel; bottom, sloughed material.
	8	1978	0.5-10	0-0.5	No	90	82	71	56	10	6	22.3%	Gravel	Test No. 8 was in small excavation north of logging road in woods at edge of pit. Material is: 0'-0.5', overburden; 0.5'-5', gravel; 5'-7', pebbly sand; 7'-10', gravel; bottom, gravel.
	9	1978	0.5-10	0-0.5	No	93	93	72	54	16	11	14.5%	Granular Borrow (Gravel)	Test No. 9 was in small clearing in woods, 0.08 mile north of main access road and 0.13 mile east of pit. Material is: 0'-0.5', overburden; 0.5'-5', bouldery gravel; 5'-10', gravel; bottom, gravel. The stones are either small (1") or large (over 4") with not many in between.

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TABLE I

MENDON GRANULAR DATA SHEET NO. 9

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VMD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
	10	1978	1-6	0-1	NO	80	70	55	45	15	10	21.2%	Granular Borrow (Gravel)	Test No. 10 was in small clearing 235' N12°E of Test No. 9. Material is: 0'-1', overburden; 1'-3', coarse gravel; 3'-6', bouldery gravel; bottom, large boulders.
	11	1978	1.5-10	0-1.5	No	85	79	61	50	17	8	23.9%	Gravel	Test No. 11 was in woods, 350' N20°E of Test No. 10. Material is: 0'-1.5', overburden; 1.5'-6', bouldery gravel; 6'-10', gravel; bottom, very large boulder.
	12	1978	1-6	0-1	Yes	100	92	86	73	56	41	-	-	Test No. 12 was in floor of the southeast lobe at south end of pit. Material is: 0'-1', overburden; 1'-6', till. Material has a high silt content with angular stones and many large boulders.
	13	1978	1-6	0-1	Yes	100	93	90	83	71	51	-	-	Test No. 13 was in floor, 10' east of Test No. 5. Material is: 0'-1', overburden; 1'-2.5', silty fine sand; 2.5'-4', silt-clay; 4'-6', till; bottom, silt-clay with angular rock fragments and water.
	14	1978	1-10	0-1	Yes	100	100	90	80	58	39	-	-	Test No. 14 was in southeast floor of pit north of access road to woods. Material is: 0'-1', overburden; 1'-6', silty fine sand; bottom, till (silt-clay with angular fragments) and water.

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MENDON GRANULAR DATA SHEET NO. 10

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
	15	1978	1-5	0-1	Yes	100	90	87	77	58	41	-	-	Test No. 15 was in floor, 510' N35°E of, and 15' above Test No. 14. Material is: 0'-1', overburden; 1'-5', till (silt-clay with angular rock fragments) and water.
	16	1978	1-7	0-1	Yes	92	82	74	67	54	39	-	-	Test No. 16 was in floor of southeast lobe of west-central part of pit. Material is: 0'-1', overburden; 1'-2', gravel (may not be "inplace"); 2'-7', till (silt-clay with angular rock fragments and a lot of water); bottom, till and water.
	17	1978	1-10	0-1	Yes	100	100	100	78	58	43	-	-	Test No. 17 was in upper floor of northeast part of pit, just south of property line. Material is: 0'-1', overburden; 1'-6', silty fine sand; 6'-10', till (silt-clay with angular stone fragments).
8	1	1977	0-25	-	Yes	100	100	100	100	46	6	-	Granular Borrow (Sand)	<p>Owner: John Bowen. Area is a large, overgrown, sprawling, partly depleted pit strewn with junk and trash. Pit is 0.26 mile east of Mendon Town Highway No. 2 (Class 2) and 0.41 mile south of its junction with U.S. Route 7. Area was formerly the Seward and Crossman properties.</p> <p>Test No. 1 was in northern face of northwestern pit area. Material is: 0'-20', sand and fine sand; 20'-25', layers of gravel and sand; bottom, sand and gravel.</p>

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TABLE I

MENDON 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 AASHTO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
	2-A	1977	1-20	0-1	Yes	96	84	52	32	9	5	15.4%	Gravel	Test No. 2-A was in southern face of upper pit area. Material is: 0'-1', overburden; 1'-8', coarse (2"-40" stones) gravel; 8'-20', gravel with lenses of sand.
	2-B	1977	20-36	-	Yes	100	100	100	90	24	9	-	Sand	Test No. 2-B was below Test NO. 2-A. Material is: 20'-36', sand with some gravel lenses; bottom, sloughed materials.
	3-A	1977	1.5-16	0-1.5	Yes	84	76	46	28	11	7	15.8%	Gravel	Test No. 3-A was in central eastern face of upper pit area. Material is: 0'-1.5', 1.5'-16', coarse gravel.
	3-B	1977	16-35	-	Yes	96	94	66	50	7	4	17.6%	Gravel	Test No. 3-B was below Test No. 3-A. Material is: 16'-35', layers of gravel and sand with silt traces; bottom, sloughed material.
	4	1977	Crushed Stockpile	-	Yes	100	100	100	40	25	13	AASHTO T96: 37.1%	-	Test No. 4 was taken from stockpile in south part of upper pit area.
	5-A	1977	1.5-16	0-1.5	Yes	86	82	53	36	7	4	16.4%	Gravel	Test No. 5-A was in northeastern face of upper pit area. Material is: 0'-1.5', overburden; 1.5'-16', bouldery gravel.
	5-B	1977	16-31	-	Yes	94	89	61	39	8	4	12.1%	Gravel	Test No. 5-B was below Test No. 5-A. Material is: 16'-31', mixed layers of bouldery and sandy gravel; bottom, sloughed material.

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MENDON GRANULAR DATA SHEET NO. 12

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VIID Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
	6	1977	0-10	-	Yes	100	100	100	72	58	44	-	-	Test No. 6 was in floor of southwestern pit area. Material is: 0'-10', stoney silt; bottom, stoney silt.
	7	1977	1-8	0-1	Yes	97	91	68	40	28	24	16.7%	-	Test No. 7 was in pit floor of northwestern pit area. Material is: 0'-1', overburden; 1'-8', coarse gravel with a few cobbles up to 12"; bottom, gravel and water.
	8	1977	1-9	0-1	No	100	100	100	76	49	33	-	-	Test No. 8 was in southern end of small pasture southwest of main pit area. Material is: 0'-1', overburden; 1'-9', layers of gravelly sand, stoney fine sand, and silt seams; bottom, sandy silt.
	9	1977	0.5-6	0-0.5	No	100	100	100	61	41	33	-	-	Test No. 9 was in central pasture near wood piles. Material is: 0'-0.5', overburden; 0.5'-6', wet silt-clay with stones (till); bottom, wet silt-clay with stones.
	10	1977	0-10	-	Yes	100	100	100	74	49	33	-	-	Test No. 10 was in southern end of eastern pit floor. Material is: 0'-10', stones and silt with traces of sand; bottom, silt and stones.
	11	1977	0-8	-	Yes	100	100	100	84	33	20	-	-	Test No. 11 was in northern end of eastern pit floor. Material is: 0'-4', stoney fine sand; 4'-5', silt; 5'-7', sand and stoney sand; 7'-8', gravel; bottom, gravel and water.

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MENDON GRANULAR DATA SHEET NO. 13

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
	12	1977	2.5-9	0-2.5	No	83	67	50	30	30	23	22.5%	-	Test No. 12 was at foot of wooded ridge on far eastern side of pit. Material is: 0'-2.5', overburden; 2.5'-9', silty bouldery gravel; bottom, silty bouldery gravel and water.
9	1-A	1977	1-27	0-1	Yes	84	84	78	71	67	33	-	-	<p>Owner: James Abatiell, Sr. Area is a large, multi-levelled pit with some overgrown areas. Pit is 0.15 mile east of Mendon Town Highway No. 2 (Class 2), 0.51 mile south of its junction with U. S. Route 4. There are several large, wooded terraces northeast and east of the pit, which may contain granular material. Owner will sell material. No back-hoe sampling was allowed.</p> <p>Test No. 1-A was in southeast face of lowest northern pit level. Material is: 0'-1', overburden; 1'-5', gravel; 5'-11', silty fine sand; 11'-14', silt-clay; 14'-27', fine sand.</p>
	1-B	1977	27-40	-	Yes	100	100	100	94	88	55	-	-	Test No. 1-B was below Test No. 1-A. Material is: 27'-32', silty fine sand; 32'-33', angular stones; 33'-40', silty fine sand with interbedded silt-clay; bottom, silty fine sand.
	2-A	1977	0.5-10	0-0.5	Yes	96	85	67	53	5	3	16.9%	Gravel	Test No. 2-A was in northeast face of lowest central pit level. Material is: 0'-0.5', overburden; 0.5'-10', sandy gravel.

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TABLE I

MENDON GRANULAR DATA SHEET NO. 14

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
	2-B	1977	10-28	-	Yes	100	100	100	100	88	43	-	-	Test No. 2-B was below Test NO. 2-A. Material is: 10'-28', fine sand with silt seams; bottom, fine sand with silt seams.
	3	1977	0.5-35	0-0.5	Yes	100	100	100	100	70	35	-	-	Test No. 3 was in eastern face of lowest southern pit level. Material is: 0'-0.5', overburden; 0.5'-35', fine sand with silt seams; bottom, sloughed material.
	4	1977	0.5-35	0-0.5	Yes	100	100	100	85	44	20	-	-	Test No. 4 was in southern face of lowest southern pit level. Material is: 0'-0.5', overburden; 0.5'-2', pebbly sand; 2'-4', fine sand, 4'-10', sand; 10'-12', fine sand; 12'-18', sand; 18'-35', fine sand; bottom, sloughed material.
	5	1977	1-14	0-1	Yes	100	100	100	86	6	3	-	Sand	Test No. 5 was in northeast face of middle pit level. Material is: 0'-1', overburden; 1'-14', sand with some stones; bottom, moist fine sand and sloughed material.
	6	1977	0.5-10	0-0.5	Yes	96	92	60	35	15	10	18.2%	Granular Borrow (Gravel)	Test No. 6 was in eastern face of upper pit level. Material is: 0'-0.5', overburden; 0.5'-6', coarse gravel; 6'-10', gravel; bottom, sloughed material.

STATE OF VERMONT
AGENCY OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION - GEOLOGY SECTION

TABLE I

MENDON GRANULAR DATA SHEET NO. 15

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
10	1	1977	1-17	0-1	Yes	100	85	71	53	8	4	11.8%	Gravel	Owner: John D. Hansen. Area contains wooded, overgrown, inactive pit areas; lower northwestern pit has sidehill extension to the east and southeast, and upper pit has scant extension east and south-east. The area is northeast of the Brookwood residential area and the owner wants to extend his housing development into the granular area but would sell any excess material. Area is 0.43 mile east of Mendon Town Highway No.2 (Class 2), 1.54 miles south of its junction with U.S. Route 4. Test No. 1 was in eastern face of lower northern pit level. Material is: 0'-1', overburden; 1'-4', gravel; 4'-6', pebbly sand; 6'-17', gravel; bottom, sloughed materials. There were 30" boulders on the floor.
	2	1977	1-6	0-1	Yes	96	79	60	48	6	4	19.6%	Gravel	Test No. 2 was in eastern face of upper pit area. Material is: 0'-1', overburden; 1'-2', sand; 2'-6', gravel; bottom, sloughed material.
	3	1978	0.5-10	0-0.5	No	100	92	84	73	6	3	-	Sand	Test No. 3 was along west edge of logging area, 100' N20°E of large log in road. Material is: 0'-0.5', overburden; 0.5'-2.5', gravelly sand; 2.5'-5', pebbly sand; 5'-10', sand; bottom, sand.

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TABLE I

MENDON GRANULAR DATA SHEET NO. 16

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VMD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
	4	1978	1-4	0-1	No	95	90	78	68	14	10	-	Granular Borrow (Sand)	Test No. 4 was in small clearing south of woods road. Material is: 0'-1', overburden; 1'-4', sand with cobbles; bottom, sand with a large flow of water.
11	1	1977	0-6	-	Yes	78	75	43	26	5	3	21.8%	Gravel	Owner: John D. Hansen. Area is a sprawling, shallow, overgrown, wet pit with wooded extensions, southeast of the Brookwood residential development. Area is 0.4 mile east of Mendon Town Highway No. 2 (Class 2), 1.54 miles south of its junction with U.S. Route 4. Area can be expected to be converted to house lots, but owner may sell excess material. Test No. 1 was near access clearing in eastern face of pit. Material is: 0'-6', gravel; bottom, fine sand.
	2	1977	1-5	0-1	Yes	95	93	73	60	4	2	19.8%	Gravel	Test No. 2 was in northeast face of pit. Material is: 0'-1', overburden; 1'-2.5', silty gravel; 2.5'-5', clean gravel; bottom, sloughed material.
	3	1978	0.5-7	0-0.5	Yes	100	88	74	65	66	44	-	-	Test No. 3 was in floor of pit. Material is: 0'-0.5', overburden; 0.5'-2.5', gravel and silt; 2.5'-7', silt-clay with a slow water seep at 4'.

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TABLE 'I'

MENDON GRANULAR DATA SHEET NO. 17

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
12	1	1977	1-12	0-1	Yes	100	100	100	82	74	61	-	-	<p>Owner: Stuart Marceau. Area is small, irregularly-shaped pit with slash and sloughed material on faces. Owner is going to smooth-over the pit.</p> <p>Test No. 1 was in northeast face. Material is: 0'-1', overburden; 1'-3', gravel; 3'-12', silty sand; bottom, silty sand.</p>
13	1-A	1978	1-16	0-1	Yes	100	100	100	100	28	6	-	Sand	<p>Owner: Charles D. Belfore. Area contains pits with extension eastward into narrow wooded knolls. The pit faces were heavily sloughed from much trail-bike use. Area is 0.1 mile east of Mendon Town Highway No. 2 (Class 2), 2.25 miles south of its junction with U.S. Route 4.</p> <p>Test No. 1-A was on spur in middle of southern pit. Material is: 0'-1', overburden; 1'-16', sand with layers of fine sand, silt or silt-clay, and random angular 1" pebbles.</p>
	1-B	1978	16-29	-	Yes	100	100	100	94	37	14	-	Granular Borrow (Sand)	<p>Test No. 1-B was below Test No. 1-A. Material is: 16'-24', silty fine sand with random angular pebbles; 24'-29', sand.</p>
	1-C	1978	29-39	-	Yes	100	100	100	96	40	29	-	-	<p>Test No. 1-C was below Test No. 1-B. Material is: 29'-39', fine sand with a few random 1" angular pebbles; bottom, sand.</p>

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TABLE I

MENDON GRANULAR DATA SHEET NO. 18

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
	2-A	1978	0.5-5	0-0.5	Yes	96	86	64	51	9	6	12.8%	Gravel	Test No. 2-A was in south face of northern pit. Material is: 0'-0.5', overburden; 0.5'-5', cobbly gravel; bottom, sand.
	2-B	1978	5-14	-	Yes	100	100	93	89	26	23	-	-	Test 2-B was below Test No. 2-A. Material is: 5'-8', sand; 8'-9', silt-clay layer; 9'-14', sand with a few pebbles; bottom, sloughed material.
	2-C	1978	14-17	-	Yes	100	100	100	99	52	35	-	-	Test 2-C was below Test No. 2-B. Material is: 14'-16', fine silty sand; 16'-17', coarse sand layer; bottom, coarse sand.
	3	1978	0-4	-	Yes	100	100	93	80	64	27	-	-	Test No. 3 was in floor of south pit, 30' northwest of Test No. 1-C. Material is: 0'-4', sand and silty sand; bottom, silt-clay, sand and water.
	4	1978	0-9	-	Yes	100	100	100	100	86	80	-	-	Test No. 4 was in floor of upper (north) pit, 55' N40°W of Test No. 2-B. Material is: 0'-1', pebbly sand or fine gravel; 1'-7', silty fine sand; 7'-9', silt-clay with a water seep.
	5	1978	0.5-9	0-0.5	No	100	100	100	100	17	5	-	Sand	Test No. 5 was near tree line at south end of narrow field, east and above pits. Material is: 0'-0.5', overburden; 0.5'-2.5', pebbly sand, 2.5'-9', sand; bottom, sand.

MENDON PROPERTY OWNERS - GRANULAR

TABLE I
SUPPLEMENT

	Map Identification No.
Abatiell, James, Sr.	9
Belfore, Charles D.	13
Bowen, Ernest	5
Bowen, John	8
Crossman Sand and Gravel Co., Inc.	7
Goddard, Richard	4
Hadeka, Peter	3
Hansen, John D.	10, 11
Marceau, Stuart	12
Rutland, City of	2
Spencer, Earl	6
Vermont, State of	1

MENDON PROPERTY OWNERS - ROCK

TABLE II
SUPPLEMENT

Map Identification No.

Rock resources exist in the Town of Mendon but are not exploitable in the foreseeable future because they are part of the Ski Areas or are physically inaccessible.