SURVEY OF HIGHWAY CONSTRUCTION MATERIALS

IN THE TOWN OF SEARSBURG, BENNINGTON COUNTY, VERMONT

prepared by

Engineering Geology Section, Materials Division

Vermont Department of Highways

in cooperation with

United States Department of Transportation

Federal Highway Administration

Montpelier, Vermont

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Acknowledgements

The work of this Project was greatly implemented by the cooperation and assistance of many groups and individuals. The following were particularly helpful in carrying out the Project's objectives.

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 elimate 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.

Inclosures

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

The granular materials map depicts areas covered by various types of glacial deposits (outwash, moraines, kames, kame terraces, eskers, etc.) by which potential sources of gravel and sand may be recognized. This information was obtained primarily from a survey 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 Agricultrue, 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.

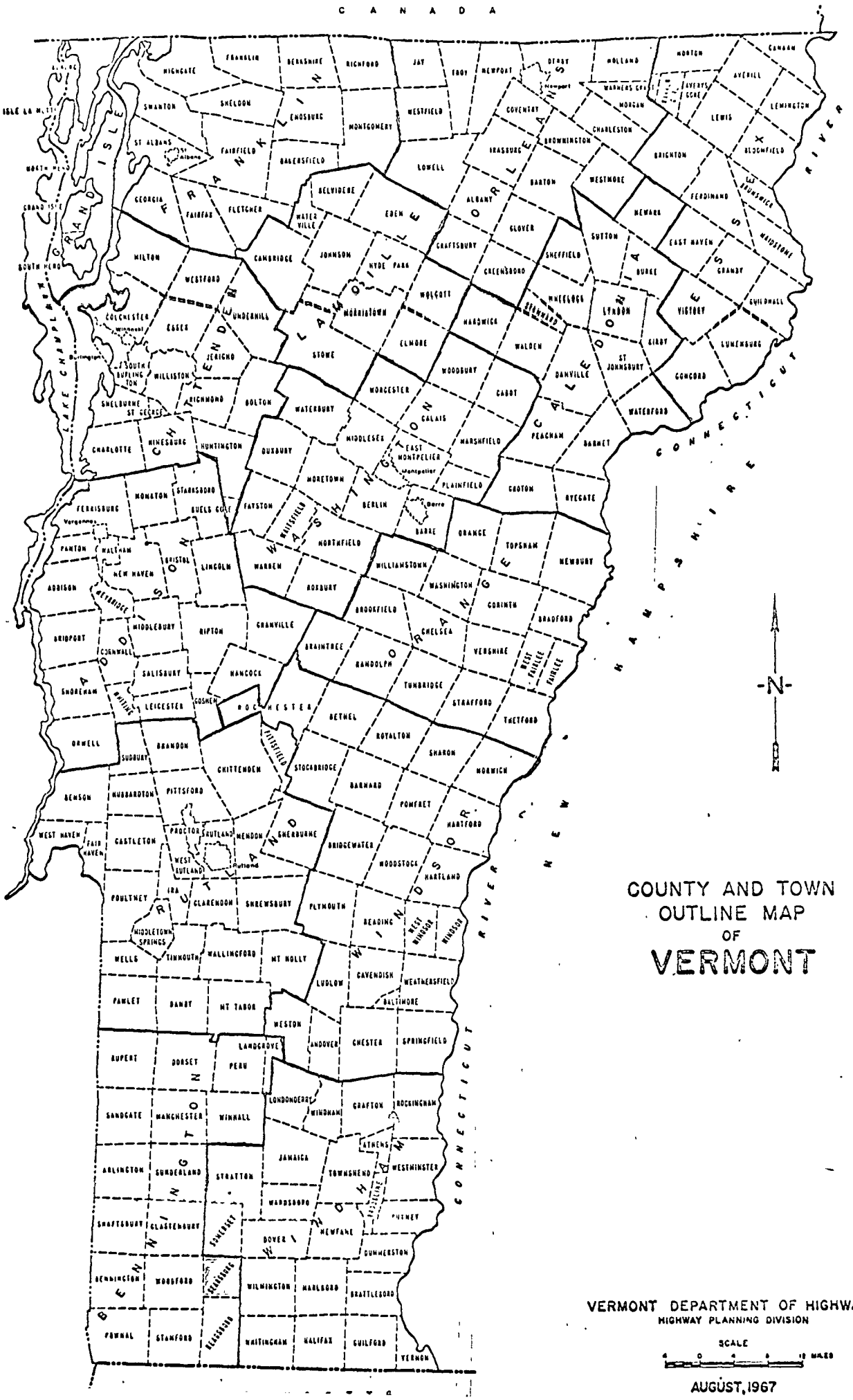
Work sheets contain more detailed information on each test and a detailed sketch of each identification Number Area. The work sheets and laboratory reports are on file in the office headquarters of this Project.

LOCATION

The town of Searsburg is situated in the southeast corner of Bennington County. It is bounded on the north by Somerset, on the east by Wilmington, on the south by Readsboro, and on the west by Woodford. (See County and Town Outline Map of Vermont on the following page).

Searsburg lies within the Green Mountains Subdivision of the New England Physiographic Province. Topography is characterized by north-south trending mountains with sharp crests and steep slopes. Elevations vary between 3,320 feet on Haystack Mountain at the Wilmington town line (about 4,500 feet south of Somerset) and less than 1,520 feet where the Deerfield River crosses the Wilmington town line.

Principal drainage is to the southeast via the Deerfield River. Notable bodies of water in the town are the Searsburg Reservoir and Billings Pond which lies on the Woodford town line.



COUNTY AND TOWN OUTLINE MAP OF VERMONT

VERMONT DEPARTMENT OF HIGHWAYS
HIGHWAY PLANNING DIVISION

SCALE

AUGUST, 1967

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 primarilty 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 obsolescense of a number of reports. In addition, the results of samples taken by other individuals are analyzed, and the location at which these samples were taken is mapped when possible. In other words, as complete a correlation as possible is made of all the information available concerning the geology of the area under consideration.

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

Discussion of Rock and Rock Sources

It should be noted that information on the Rock Materials Map is somewhat simplified. (For a more detailed description of the respective rock formations, see the Summary included in this report). In the Summary, it is apparent that complex metamorphic rocks comprise almost all of the lithology within the town of Searsburg.

Occasionally, rocks belonging to the same formation and exhibiting similar characteristics (i.e. color, texture, etc.) may produce different abrasion results owing to different physical and chemical properties. Therefore, in no case should satisfactory test results of an 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.

Bedrock in Searsburg is best exposed along the Deerfield River. Two areas in the vicinity of the Searsburg Reservoir where plagioclase gneiss of the Mount Holly complex occurs were tested with positive results. Elsewhere, the favorable Mount Holly gneisses are largely overlain by glacial till.

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 (AASHO T-4), and the Los Angeles Method (AASHO T-96).

Discussion of Sand and Gravel Deposits

According to Stewart and MacClintock the glaciofluvial depositional feature within the town of Searsburg is a spillway gravel or valley train. This feature occurs in the narrow flood plain adjacent to the Deerfield River and its East Branch. The narrow valley acted as a spillway for melt-water containing rubble as the Pleistocene continental glacier receeded. The gradient of the valley was such that many of the fines were washed downstream from the area, leaving sands, gravels and coarser materials behind.

Only locations within the spillway are qualified sources of either Gravel for Subbase (see Map Ident. Nos. 9 and 10), or Sand Borrow and Cushion (see Map Ident. No. 2). However, there is little doubt that the Searsburg Reservoir has inundated some of the lowlands where granular materials might be found. In addition, it is believed that a more extensive, detailed survey would discover more sources within the lowlands, particularly west of Map Ident. No. 9 and below 1,600 feet in elevation.

Of the five areas sampled that are not within the glaciofluvial spillway, only one had material acceptable for Granular Borrow (see Map Ident. No. 8) and the material tested could be described as pebbly silt at best.

SUMMARY OF ROCK FORMATION IN THE TOWN OF SEARSBURG

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

Mount Holly complex: 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 complex: Calcite and dolomite marbles, locally coarse-grained; commonly contain phlogopite, actinolite and diopside, and are interbedded with medium- to coarse-grained calc-silicate granulite.

Readsboro member of Cavendish formation: Quarts muscovite schist containing biotite or chlorite; less commonly quartz-muscovite-paragonite schist containing chlorite, garnet, or chloritoid.

Sherman marble member of Cavendish formation: Buff dolomite; minor white to pink calcite marble.

GLOSSARY OF SELECTED GEOLOGIC TERMS

Bedrock - The more or less solid, undisturbed rock in place either at the surface or beneath superficial deposits of gravel, sand, or soil.

Cement - The material that binds the particles of a consolidated sedimentary rock together. Various substances may act as cement, the most common being silica, calcium carbonate, and various iron oxides.

Complex - An assemblage of rocks of any age or origin that has been folded together or intricately mixed, involved, or otherwise complicated.

Drainage - The manner in which the water of an area passes off by surface streams and rivers, or by subsurface channels.

Ferruginous - Of, containing, or pertaining to iron.

Flood Plain - A strip of relatively smooth land bordering a stream, built of sediment carried by the stream and dropped in the slack water beyond the influence of the swiftest current.

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.

Physiographic - Pertaining to the physical divisions of the earth's surface.

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

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

Water Table - The upper limit of the portion of the ground wholly saturated with water.

BIBLIOGRAPHY

A survey of the glacial geology of Vermont being conducted by D. P. Stewart; the partial results of which are published in Vermont Geological Survey Bulletin No. 19; 1961

Soil Survey (Reconnaissance) of Vermont, W. J. Latimer; 1930; Bureau of Chemistry and Soils, United States Department of Agriculture.

Soil Exploration and Mapping; 1950; Highway Research Board, Bulletin 28.

Survey of Highway Aggregate Materials in West Virginia; December, 1959; Engineering Station, West Virginia University, Morgantown, West Virginia.

Materials Inventory, Bangor Quadrangle, South Half; September, 1959; University of Maine.

Glacial Geology and the Pleistocene Epoch, R. F. Flint; 1947; John Wiley and Sons, Inc.

Rock and Rock Minerals, L. V. Pirsson; June, 1949; John Wiley and Sons, Inc.

Glossary of Selected Geologic Terms, W. L. Stokes and D. J. Varnes; 1955; Colorado Scientific Proceedings, Vol. 16.

Centennial Geologic Map of Vermont, C. G. Doll; 1961.

The Green Mountain Anticlinorium in the Vicinity of Wilmington and Woodford, Vermont, James William Skehan, S. J.; Vermont Geological Survey Bulletin No. 17; 1961.

The Surficial Geology and Pleistocene History of Vermont; David P. Stewart and Paul MacClintock; Vermont Geological Survey Bulletin No. 31; 1969.

Bennington Quadrangle, Vermont; Geological Survey, United States Department of the Interior; 1954.

Wilmington Quadrangle, Vermont; Geological Survey, United States Department of the Interior; 1954.

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 AASHO T 4, or more than 40 when tested in accordance with AASHO 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 AASHO T 3, or the crushed stone a percent of wear of not more than 40 when tested in accordance with AASHO 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
	4"	100	
Coarse	No. 4	25- 50	100
	No. 100		0- 20
	No. 200		0- 12
	2"	100	
	1½"	90-100	
Fine	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 AASHO T 4, or the crushed gravel a percent of wear of not more than 35 when tested in accordance with AASHO 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
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 AASHO T 3, or the crushed stone a percent of wear of not more than 40 when tested in accordance with AASHO 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

SEARSBURG GRANULAR DATA SHEET NO. 1

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"	½"	#4	#100	#200			
1	1	1973	1-4	0-1	Yes	84	75	59	38	15	11	15.9%	Gran. Borrow (Grav)	Owner: New England Power Co. Area is an inactive pit in the woods west of T.H. No. 4, 3.23 miles north of its junction with Vermont Route 9. Test No. 1 was in a low ramp west of the pit. Material is a bouldery gravel with 25% stones estimated larger than 6".
	2	1973	3-8	0-3	No	66	54	35	20	33	29	15.0%	---	Test No. 2 was in a field 60' south of access road to possible extention and 90' from T.H. No. 4. Material was: 0.3', sod and silt; 3'- 8', medium gravel (water table at 8'); bottom, gravel.
	3	1973	2-8	0-2	No	79	68	59	44	16	11	21.2%	Gran. Borrow (Grav)	Test No. 3 was on small knoll 11' above, and 160' N. 30°W. of Test No. 2 Material was: 0-2'. sod and silt; 2' - 5', hard-packed brown gravel; 5' - 8', gray-brown gravel; bottom, boulders.
	4	1973	1-5	0-1	No	75	61	49	37	17	13	----	Gran. Borrow (Grav)	Test No. 4 was in field 450' S. 52°W of Test No. 3. Material was: 0-1', sod; 1'- 2'. gravel; 2'- 5', very hardpacked angular fragments in silt to clay.
	5	1973	2-4	0-2	No	69	65	44	28	31	22	24.6%	---	Test No. 5 was in field 240' N. 15°W. of Test No. 4. Material is: 0-2', sod and silt; 2' - 4', poorly sorted gravel or till
2	1	1973	Stockpile		Yes	92	85	59	40	27	21	17.2%	---	Owner: New England Power Co. Area is an inactive pit in the woods

SEARSBURG GRANULAR DATA SHEET NO. 2

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Exist-ing Pit	Sieve Analysis % Passing 2"	1½"	½"	#4	#100	#200	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
														west of T.H. No. 4, 4.15 miles north of its junction with Vermont Route 9. Test No. 1 was in a stockpile south of access road near T.H. No. 4. Material was crushed gravel.
	2	1973	1-7	0-1	Yes	79	75	64	49	21	16	19.3%	---	Test No. 2 was in north face of pit near a ramp. Material was: silt-coated boulder gravel.
	3	1973	1-5	0-1	Yes	85	81	64	49	18	14	16.2%	Gran. Borrow (Grav)	Test No. 3 was in west face of pit near ramp 90' S. 15°E of Test No. 2. Material was: silty bouldery gravel; bottom, boulders.
	4	1973	1-5	0-1	Yes	100	94	78	61	12	9	---	Sand	Test No. 4 was in north face 70' east of Test No. 2. Material is: Gravelly sand.
	5	1973	0.5-4	0-0.5	Yes	66	66	49	36	31	22	21.2%	---	Test No. 5 was in stripped area of a field, 60' west of ramp to pit. Material was: very coarse bouldery gravel that bottomed in boulders.
	6	1973	2-6	0-2	No	71	70	55	41	21	17	19.8%	---	Test No. 6 was at corner of field, 150' S. 75°W. of Test No. 5. Material was: 0-2', sod and silt; 2' - 6', very hardpacked gravel; bottom, boulders.
3	1	1973	1-6	0-1	Yes	?	88.6	76.2	69.5	17.2	10.3	---	Gran. Borrow (Sand)	Owner: Jolivette. Area is a depleted pit east of T.H. No. 4, 2.25 miles north of its junction with Vermont Route 9. Test No. 1 was in upper east face of

SEARSBURG

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 2"	1½"	½"	#4	#100	#200	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
														pit. Material was: silt with stones. Test is questionably in place.
4	1	1973	1-5	0-1	Yes	--	100	78.7	70.4	47.4	34.1	---	---	Owner: Allan Read and Leonard Hattan Area is a depleted pit south of the west junction of T.H. No.6 with Vermont Route 9. Test No. 1 was in south face of pit. Material was: Angular stones (not included with samples) and silt.
5	1	1973	1-10	0-1	Yes	?	89.9	70.8	63.6	48.5	33.4	---	---	Owner: Allan Read and Leonard Hattan Area is a depleted borrow pit 0.1 mil south of T.H. No. 6. Test No. 1 was in east face of pit. Material was: angular stones and silt.
6		No		S A M P L E S			T A K E N							Owner: Allan Read and Leonard Hattan Area is a smoothed-over pit south of Vermont Route 9, 0.05 mile east of T.H. No. 6.
7	1	1973	0.5-3	0-0.5	Yes	100	89	73	50	35	26	---	---	Owner: Henry F. Harris. Area is a smoothed-over pit west of the junction of T.H. No. 3 (Sleepy Hollow Road) with Vermont Route 8. Test No. 1 was on small knoll above floor near old Haul Road. Material was silt with angular stones that bottomed on boulder clay at 3.0',

SEARSBURG

GRANULAR DATA SHEET NO. 4

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"	½"	#4	#100	#200			
8	1	1973	1.5-4.5	0-1.5	Yes	81.7	81.7	66.0	57.4	14.7	12.7	---	Gran. Borrow	Owner: Henry F. Harris. Area has some small diggings west of Vermont Route 8 about 0.6 mile north of its junction with T.H. No. 3 Test No. 1 was in west face of pit. Material was hard-packed pebbly silt.
9	1	1973	0.5-7.5	0-0.5	No	77	70	49	39	7	4	9.6%	Gravel	Owner: Peter Guille, Jr. Area is a small clearing in woods north of Vermont Route 9 about 0.19 mile west of Wilmington town line. Test No. 1 was in midst of junked cars. Material was cobbly coarse gravel with boulders (water table at 7.5').
	2	1973	1.5-5	0-1.5	No	68	63	44	31	23	17	15.5%	---	Test No. 2 was located west of Haul Road about 150' south of Test No. 1. Material was: 0-1.5', roots and silt; 1.5'- 5', hard-packed coarse gravel ferruginous cement; bottom, boulders.

SEARSBURG GRANULAR DATA SHEET NO. 5

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Exist-ing Pit	Sieve Analysis % Passing 2"	1½"	½"	#4	#100	#200	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
10	1A	1973	1.5-10	0-1.5	yes	94	80	57	45	10	6	8.4%	Gravel	Owner: Peter Guille, Jr. Area is a small pit that truncates south side of wooded knoll north of Vermont Route 9 about 0.11 mile west of the Wilmington town line. Test No. 1A was in 16' high north face. Material was: 1.5'-10', loosely consolidated bouldery coarse gravel with about 50% of the stones more than 6" in diameter.
	1B	1973	10-14	-	yes	-- N	O T	T E	S T	E D	----	----	----	Test No. 1B was below Test No. 1A in north face. Material was a coarse gravel with random boulders.
	2	1973	1-7	0-1	yes	86	80	62	44	6	4	16.5%	Gravel	Test No. 2 was in the floor about 25' southeast of Test No. 1B. Floor has boulder piles and trees. Material was: 1'-4.5', gravel; 4.5'-5.5', sandy gravel; 5.5'-7', gravel. Water table was encountered at bottom of testhole.

TABLE I
Supplement

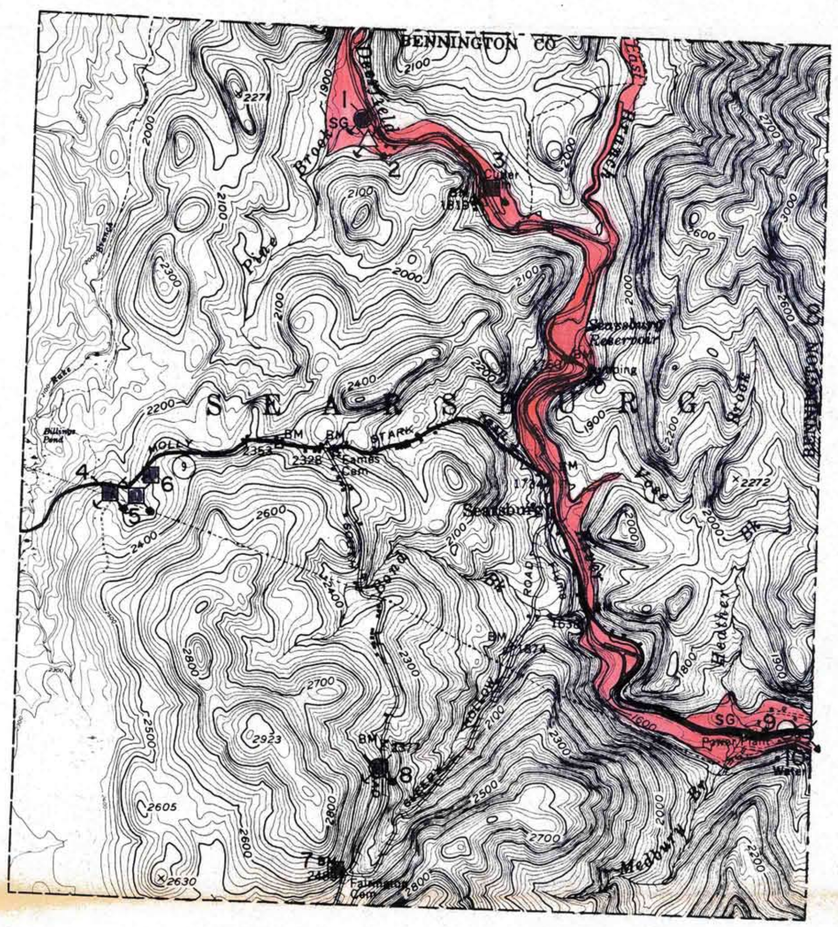
SEARSBURG PROPERTY OWNERS - GRANULAR	Map Ident. No.
Guille, Peter J.	9, 10
Harris, Henry F.	7, 8
Hattan, Leonard	4, 5, 6
Jolivette	3
New England Power Co.	1, 2
Read, Allan	4, 5, 6

TABLE II SEARSBURG ROCK DATA SHEET NO. 1

Ident. No.	Field Test No.	Year Field Tested	Rock Type	Existing Quarry	Method of Sampling	Abrasion AASHO T-3	Abrasion AASHO T-96	Remarks
1	1A	1973	Gneiss	No	Chip	0.5	34.5%	Owner: New England Power Company. Area is a steep, formerly quarried slope west of Town Highway No. 4 about 0.45 mile north of its junction with Vermont Route 9. Top of slope is heavily wooded. Steep face along which samples were taken is brush covered. A coarsely crystalline, plagioclase gneiss of the Mount Holly complex with north-northeast to south-southwest trending lineatio was tested. Outcrops of this rock type were traced to the area at Map Ident. No. 2. Test No. 1A was of random blocks along the base of the slope from 0-75'. Note that the rock tested was extremely hard and somewhat brittle.
	1B	1973	Gneiss	No	Chip	5.8	32.5%	Test No. 1B was a continuation of random blocks from 75'- 150'. Both tests meet the abrasion requirements for Subbase of Crushed Stone, Item 704.06
2	1A	1973	Gneiss	No.	Chip	2.5%	43.3%	Owner: New England Power Company. Area is a long outcrop northwest of the Searsburg Reservoir pumping station about 8.0 mile north of Vermont Route 9. It is also adjacent to Town Highway No. 4 and southwest of the road. The outcrop varies from 10 to 30 feet in height. Fairly flat woodland extends back toward Map Ident. No. 1. The plagioclase gneiss of the Mount Holly complex is similar in texture and lineation to that at Map Ident. No. 1. Test No. 1A was at random from the northwest end of the outcrop from 0-150'. Beds strike N. 60°E. with an apparent dip toward the northwest of 70°.
	1B	1973	Gneiss	No	Chip	3.6%	33.3%	Test No. 1B was from 150'- 300'.

TABLE II
Supplement

SEARSBURG PROPERTY OWNERS - ROCK	Map Ident. No.
New England Power Co.	1, 2



N

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, 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
- IDENTIFICATION NUMBER (refer to data sheets)

SEARSBURG

SCALE 1:31,250

1 0.5 0 1 MILE

CONTOUR INTERVAL 20 FEET

1973

GRANULAR MATERIALS MAP

BY

VERMONT DEPARTMENT OF HIGHWAYS

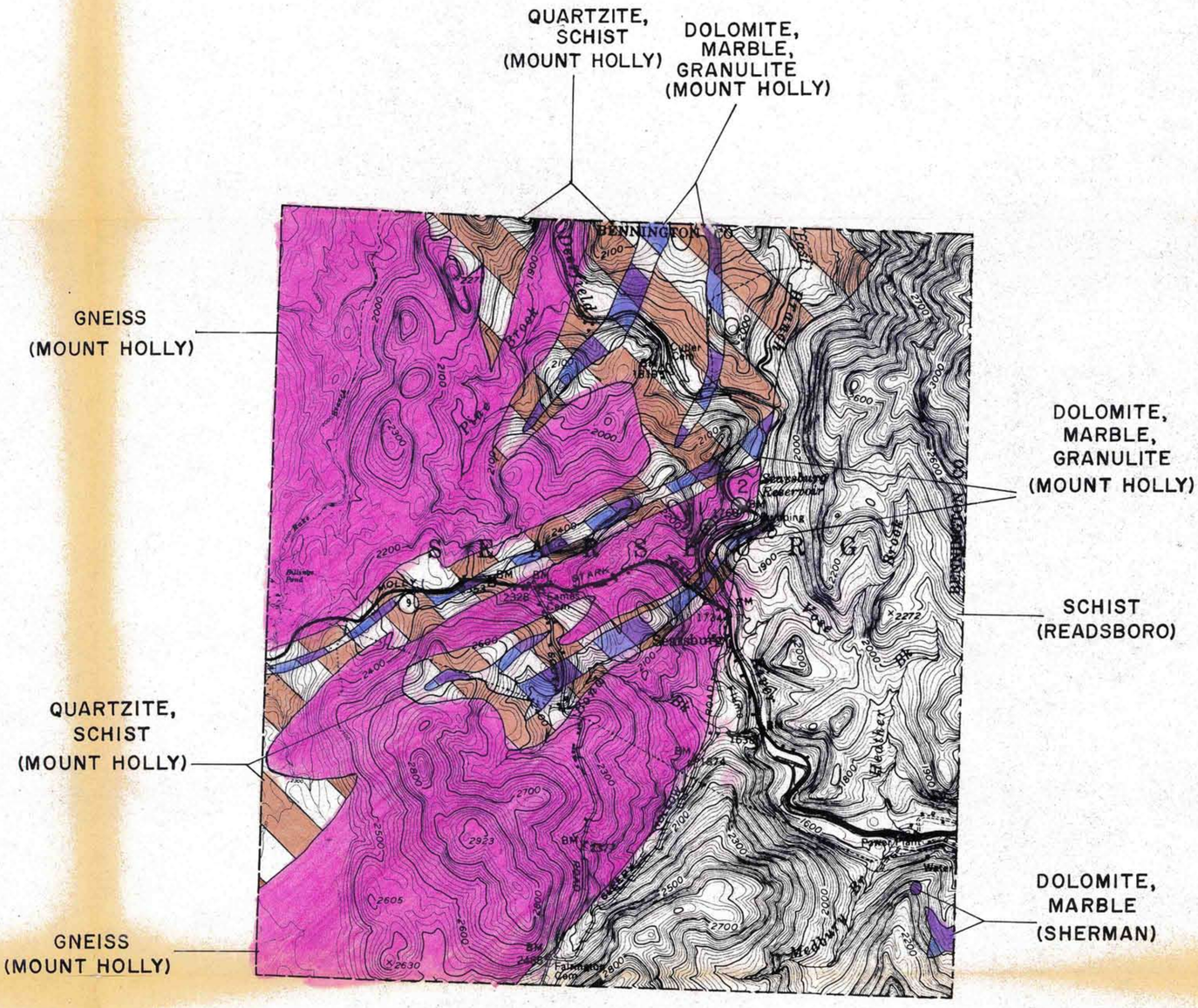
IN COOPERATION WITH

U.S. BUREAU OF PUBLIC ROADS

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

PLATE I

GRANULAR



N

LEGEND

- ROCK, ACCEPTABLE FOR ITEM 704.06 (crushed stone for sub-base)
- ROCK, NOT ACCEPTABLE FOR ITEM 704.06
- EXISTING QUARRY
- GRANITE TO DIORITE (light to intermediate igneous rocks)
- AMPHIBOLITE, GABBRO, DIABASE, METADIABASE, GREENSTONE, TRAP DIKES (basic or dark igneous rocks)
- PERIDOTITE, PYROXENITE, SERPENTINITE (ultra-basic igneous rocks)
- GNEISS
- QUARTZITE
- DOLOMITE
- MARBLE, LIMESTONE
- SCHISTS, SLATES, PHYLLITES, SHALES, CONGLOMERATES
- 3 IDENTIFICATION NUMBER (refer to data sheets)

SEARSBURG

SCALE 1:31,250

0.5 0 1 MILE

CONTOUR INTERVAL 20 FEET

1973

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

PLATE II

ROCK

BENNINGTON COUNTY VT. HWY. DISTRICT NO. 1

REVISIONS

DATE						
BY						