

**SURVEY OF HIGHWAY CONSTRUCTION MATERIALS
IN THE TOWN OF MONKTON, ADDISON COUNTY, VERMONT**

Prepared by

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Agency of Transportation
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Montpelier, Vermont

March, 1978

**Materials Division
Highway Department
Agency of Transportation
April 12, 1978**

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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 Geological 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; thus, 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 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 7-1/2-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 Geological 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 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 Division of the Agency of Transportation, State of Vermont.

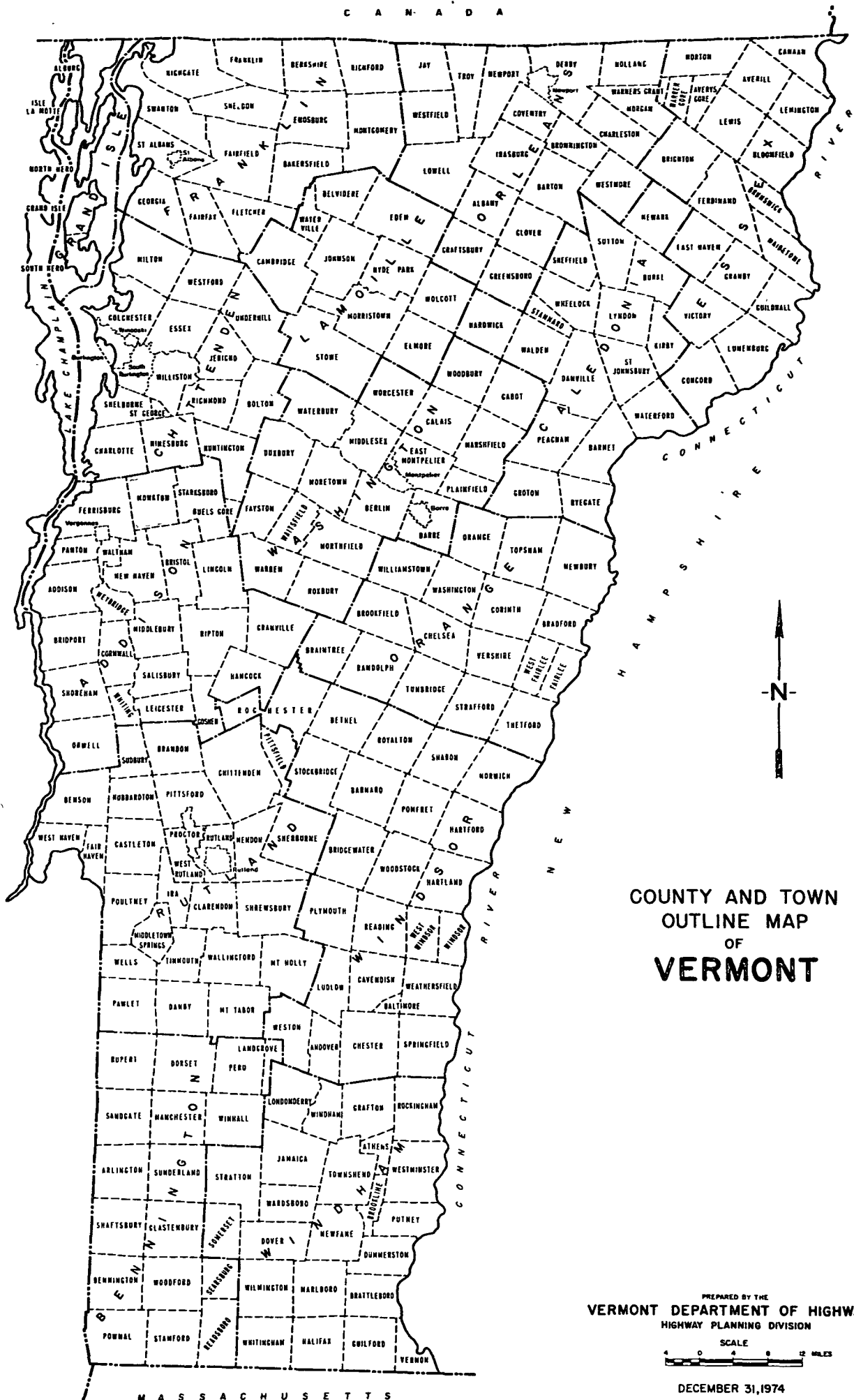
LOCATION

The town of Monkton is in the north part of Addison County in west-central Vermont. It is bounded on the north-northeast by Hinesburg, the east by Starksboro, the south by Bristol, the southwest by New Haven, the west by Ferrisburg and the north-northwest by Charlotte (See County and Town Outline Map of Vermont on the following page).

Monkton lies entirely with the Champlain Lowland Physiographic subdivision of the New England Upland. This lowland is basically flat with a few long, low rolling hills. Relief ranges from 500 to 600 feet in the hilly region near the central part of town, to 1,000 feet on the Hogback Mountains along its eastern border. Elevations vary from 1,663 feet atop an unnamed peak in the southeast corner of town, to less than 260 feet where Little Otter Creek crosses the Ferrisburg town line in the southwest corner.

Major drainage in the east is northward via Pond Brook and many unnamed tributaries. Little Otter Creek and its tributaries drain the southwest corner of town. The northwest corner is drained via several unnamed brooks flowing northerly into Lewis Creek in Hinesburg and Charlotte.

Cedar Lake in the north central part of town is the only body of water of significant size in Monkton.



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 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 simplified. 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 particularly true of metamorphic rocks.

Complex metamorphic rocks comprise the bedrock lithology in the town. All Map Identification Numbers yielded rock which passed specification requirements, but there are no quarries (1977). The formations mapped as underlying Monkton from west to east are: narrow bands of Stony Point shale and limestone; Hortonville-Glens Falls shale, phyllite and limestone; Crown Point limestone; Orwell limestone; Monkton quartzite (Map Identification Numbers 1 & 5); Winooski dolomite; Danby quartzite and dolomite; Dunham dolomite; Cheshire quartzite (Map Identification Numbers 2, 3 & 4). The Monkton, Winooski, Dunham and Cheshire formations were repeated several times. It should be noted that rock at Map Identification Number 4 was mapped as Dunham dolomite, but probably is the Cheshire quartzite.

The ridges in Monkton are quartzites; the valleys are underlain by dolomite and other less resistant rocks.

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 Division for gradation sieve analysis and AASHTO T-4 Method stone abrasion test.

Discussion of Sand and Gravel Deposits

Results of this survey showed that granular materials suitable for highway and related construction purposes are scarce in Monkton. There are six small areas mapped as being granular but were not confirmed by the survey. Much of the town is bedrock or lowlying marshlands. The granular areas are mostly shallow skims of usable material underlain by material having excessive fines, and are not for sale.

Four pits yielded satisfactory sand borrow and cushion; the most promising was at Map Identification No. 7, but material is not available. The only available specification gravel for sub-base was obtained from the pit at Map Identification No. 13.

SUMMARY OF ROCK FORMATIONS IN THE TOWN OF MONKTON

Champlain Valley Sequence

Danby Formation: The Danby is comprised of interbedded quartzite and dolomite; white quartzite beds, more than a foot thick, separated by 10 to 12 feet of dolomite in eastern areas, increase westward to continuous sections of white to pink weathered, massively bedded Potsdam quartzite, west of Orwell thrust.

Stony Point Formation: Predominantly calcareous black shale that grades upward into argillaceous limestone and rare dolomite beds, in northwestern Vermont.

Dunham Dolomite: Buff-weathered siliceous dolomite, pink- and cream-mottled, or buff to gray on fresh surface; lower part is massive and upper part is sandy and resembles the Winooski dolomite.

Monkton Quartzite: Distinctively red quartzite interbedded with lesser buff and white quartzite and relatively thick sections of dolomite like that of the Winooski; the quartzites thin to the east and they become gray and phyllitic to the east and south.

Orwell Limestone: Smooth-ledged, sublithographic and lithographic, dove-gray weathered limestone commonly cut by veins of white calcite; beds filled with fossil shell fragments are characteristic.

Winooski Dolomite: Buff-weathered, pink, buff and gray dolomite; beds 4 inches to 1 foot thick separated by thin, protruding, red, pink, green and black siliceous partings.

Vermont Valley Sequence

Hortonville-Glens Falls Formations (Undifferentiated): Black, carbonaceous and pyritic slate and phyllite, locally sandy; brown weathered limy beds are common near base. Occurs east of Highgate Springs, Champlain and Orwell thrusts (Hortonville); thin-bedded, dark blue-gray, rather coarsely granular and highly fossiliferous limestone (Glens Falls).

Middlebury Limestone: Dark blue-gray, somewhat nodular and granular limestone with buff dolomite and shaly interbeds a fraction of an inch thick and 2 to 4 inches apart.

Cheshire Quartzite: 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.

GLOSSARY OF SELECTED GEOLOGIC TERMS

Argillaceous: Containing or consisting of clay. The term is often used with rock names to indicate the presence of clay; as argillaceous limestone, argillaceous sandstone.

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

Calcareous: Pertaining to, or containing 10-to 50-percent calcium carbonate (CaCO_3).

Calcite: A common rock-forming carbonate mineral (CaCO_3) which is the major constituent of limestone, marble and chalk; and has many crystalline forms.

Carbonaceous: Of, like or containing carbon.

Conglomerate: The consolidated equivalent of gravel. There can be considerable range in size and composition of the constituent rock and mineral fragments. The matrix of finer material between the larger fragments may be sand, silt or any of the common natural cementing materials such as calcium carbonate, silica, clay or iron oxide.

Dolomite: A rock and its constituent mineral, $\text{CaMg}(\text{CO}_3)_2$. The rock is considered a favorable material for highway construction.

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

Interbedded: Occurring between beds, or lying adjacent and parallel to other beds of usually a different nature.

Ledge: A shelf-like ridge or projection of rock, usually horizontal and much longer than high.

Limestone: A bedded sedimentary deposit having from 40 to more than 98 percent calcium carbonate. Common impurities are clay and sand. It is the most important and widely distributed of the carbonate rocks.

Lithographic: A fine-grained, compact, homogeneous variety of limestone having a yellowish or grayish color and a conchoidal fracture. It was formerly much used for engraving.

Lithology: The study of stones or rocks.

Metamorphic Rocks: Rocks that owe their distinctive characteristics to the transformation of pre-existing rocks, either through intense heat, pressure and/or hot solutions.

Outcrop: A part of a body of rock appearing, bare and exposed, at the surface of the ground. In a general sense, the term applies also to areas where the rock formation just beneath the soil even though it is not exposed.

Parting: A fracture in rock which occurs along a plane determined by pressure, rather than along a cleavage plane.

Phyllite: A fine-grained, foliated metamorphic rock intermediate between the mica schists and slates, into which it may grade. Its cleavage is due to a large amount of the potash mica (sericite) which give the rock a distinctive silvery appearance.

Physiographic: Pertaining to the physical divisions of the earth.

Pyritic: Of, or pertaining to, pyrites, a common brass-yellow mineral with a metallic luster; iron disulfide (FeS_2).

Quartz: Anhydrous crystalline silica, SiO_2 ; it is the most common mineral, and is widely found in igneous, sedimentary and metamorphic rocks. It is the chief constituent of sand and sandstone.

Quartzite: A compact, 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.

Sandstone: A consolidated rock composed of sand grains cemented together; fracture takes place between, and not across, the sand grains. It grades from shales to conglomerates.

Schist: A crystalline metamorphic rock which has a secondary foliation or lamination based on parallelism of platy or needle-like grains. The name refers to the tendency to split along the foliation.

Seam: A thin bed, layer or stratum.

Sedimentary: Formed by the deposition of sediment, as certain rocks.

Sericite: A mineral very similar to muscovite mica. It occurs in small flakes and scales in metamorphic rocks such as sericite schists and sericite gneisses.

Shale: A rock formed by the consolidation of clay or argillaceous material; it has a fissile or laminated structure.

Siliceous: Containing, consisting of, or resembling silica.

Slate: The fine-grained, metamorphic equivalent of shale which is formed by the compression of clay, shale, etc. It tends to split along parallel cleavage planes, usually at an angle to the planes of stratification.

Talus: Rock fragments heaped at the base of a cliff or very steep slope where there is a projecting mass from which the fragments were derived.

Undifferentiated: The specific rock types within a formation are not distinguished.

Vein: A mineral mass having well-defined dimensions clearly distinguishable in mineral content and structure from the enclosing rock.

Vitreous: Having the luster of broken glass; also, possessing any of the other properties of glass such as composition and brittleness. Applied to igneous or metamorphic rocks, or the groundmass of such rocks when the material is of a glassy, non-crystalline nature.

Weathered: Showing the effects of exposure to the atmosphere.

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PARTIAL SPECIFICATIONS FOR HIGHWAY CONSTRUCTION MATERIALS

Listed below are partial specifications for Highway Construction Materials as they apply to this report at date of publication. For a complete list of specifications see Standard Specifications for Highway and Bridge Construction, approved and adopted by the Vermont Department of Highways, 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 $\frac{2}{3}$ 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
$4\frac{1}{2}$ "	100
4"	90-100
$1\frac{1}{2}$ "	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	
	1 1/2"	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 $\frac{2}{3}$ 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

TABLE I

MONKTON 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						Abrasion AASHTO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
1	1	1977	0.5-8	0-0.5	Yes	100	100	100	89	42	38	---	---	Owner: Eliza Cota. Area is bowl-shaped pit in pasture with floor presently used as a farm pond. There is a swampy drainage gully on southern and eastern edges. Possible extension lies to the north and west; however, even though elevated, there were still scattered wet spots. Pit is 0.29 mile north of State Aid Highway No. 4, 0.54 mile east of junction with State Aid Highway No. 1. Access road may need some repair.
	2	1977	2-12	0-2	Yes	100	100	91	76	10	6	---	Sand	Test No. 1 was in southwestern face of pit. Material was: 0'-0.5', overburden; 0.5'-4', silt-clay; 4'-7', sand and fine sand; 7'-8', silt-clay; bottom, silt-clay. Test No. 2 was in northwest face of pit. Material was: 0'-2', overburden; 2'-3', silty gravel; 3'-4.5', fine sand; 4.5'-6.5', sand; 6.5'-8', pebbly sand to fine gravel; 8'-12', fine gravel and gravel; bottom, sloughed material.
2	1	1977	0.5-6	0-0.5	Yes	76	65	56	44	11	6	16.9	Gravel	Owner: Bushey Brothers (Bill, Robert and Ralph). Area is narrow, shallow overgrown pit in woods, with feature extending south and east, and limited by ledge outcrops. Property is enclosed with high wire fence and used

TABLE I

MONKTON GRANULAR DATA SHEET NO. 2

[illegible]

TABLE I

MONKTON 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						Abrasion AASHTO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
4					Yes		NO	SAMPLE	TAKEN					Owner: Harry White. Area is small, multi-faced overgrown pit with ledge outcrops in extension. Fifty-foot access is north of Town Highway No. 24, 0.25 mile west of junction with State Aid Highway No. 3. Town Highway No. 24 was a Class 4 highway and in need of repairs. Material is not available.
5	1	1977	0-4	---	Yes	-	79.1	--	61.2	18.3	12.0	---	Granular Borrow (Gravel)	Owner: Roger Layn. Area is long, narrow, overgrown pit with wet spots on floor and some boulders and grass on faces and floor. There is no extension to south and east and a cornfield borders it on the west. Boulders in the area are mostly angular. The 0.14 mile access road is south of State Aid Highway No. 5, 0.51 mile west of junction with State Aid Highway No. 3. Test No. 1 was in northern face of pit. Material was: 0'-1', sandy silt; 1'-1.5', silty gravel; 1.5'-2.5', coarse gravel; 2.5'-4', gravelly sand; bottom, silt.
	2	1977	0.5-8	0-0.5	Yes	100	100	100	93	71	50	---	---	Test No. 2 was in the northwestern face of pit. Material was: 0'-0.5', overburden; 0.5'-8', sandy silt with traces of clay; bottom, moist sandy silt.

TABLE I

MONKTON 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						Abrasion AASHTO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
	3	1977	0.5-6	0-0.5	Yes	100	100	100	99.4	94.2	81.1	---	---	Test No. 3 was in southwestern face of pit. Material was: 0'-0.5', overburden; 0.5'-6', sandy silt; bottom, sandysilt with traces of clay.
6	1	1977	4-10	0-4	Yes	92	92	83	69	3	2	---	Granular Borrow (Sand)	Owner: Vern Norris. Area is small, bowl-shaped pit in southwest corner of meadow. A swampy gulley drains the southeast and southwest borders, and a low ridge runs along southeast edge of meadow to a cornfield. Field access road is 0.07 mile south of Town Highway No. 35, 0.1 mile east of junction with State Aid Highway No. 3. Test No. 1 was in southeast face of pit. Material was: 0'-4', overburden; 4'-6', gravel; 6'-10', fine gravel to stoney sand; bottom, sloughed material.
	2	1977	3-10	0-3	Yes	100	100	100	98	20	7	---	Sand	Test No. 2 was in northern face of pit. Material was: 0'-3', overburden; 3'-7', fine sand and silty sand; 7'-10', stoney fine sand; bottom, sloughed material.
7	1	1977	1-7	0-1	Yes	100	97	78	66	5	3	16.4	Sand	Owner: Roger Layn. Area is comprised of adjoining upper and lower pit levels in side hill pasture. Extensions

TABLE I

MONKTON GRANULAR SHEET DATA NO. 5

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing						Abrasion AASHTO T-4-35	Passes VHD Spec.	Remarks
						2"	1-1/2"	1/2"	#4	#100	#200			
	2	1977	1.5-9	0-1.5	Yes	100	100	93	72	17	11	---	Sand	<p>are covered with Juniper bushes and some angular and sub-angular rocks and boulders. The pit floors had swampy spots as did the northwest extension. The 0.17 mile access road west of State Aid Highway No. 3 is 0.59 south of junction with Town Highway No. 35.</p> <p>Test No. 1 was in northern face of upper pit. Material was: 0'-1', overburden; 1'-2', silty gravel; 2'-6', fine gravel and gravel; 6'-7', pebbly sand; bottom, sloughed material.</p> <p>Test No. 2 was in western face of lower pit. Material was: 0'-1.5', overburden; 1.5'-3', silty reddish gravel; 3'-6', gravel; 6'-8', pebbly sand; 8'-9', stoney fine sand; bottom, sloughed material.</p>
8	1	1977	1-14	0-1	Yes	100	100	-	74.4	43.3	37.4	---	---	<p>Owner: James Cyr.</p> <p>Area is large, overgrown, irregularly shaped pit with water and three branches on floor. Owner says pit was used years ago to make putty. The 0.13 mile access road is west of A. Johnson's private road and 0.22 mile south of junction with State Aid Highway No. 5; 0.24 mile southeast of State Aid Highway No. 5 junction with Town Highway No. 30.</p>

TABLE I

MONKTON GRANULAR DATA SHEET NO. 6

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing						Abrasion AASHTO T-4-35	Passes VHD Spec.	Remarks
						2"	1-1/2"	1/2"	#4	#100	#200			
														Test No. 1 was in western face of main pit. Material was: 0'-1', overburden; 1'-14', white silt-clay with angular flat stones; bottom, same.
9	1-A	1977	0-30	--	Yes	100	100	-	90.9	65.7	56.5	---	---	Owner: A. Johnson Lumber Co. Area is large, high-faced pit with small planted pines on faces and on floor. Access to pit faces is poor due to water on much of the floor. Pit was formerly the site of White Pigment plant; however present owner will not sell any material. Pit access is west of State Aid Highway No. 5 and 0.44 mile southeast of junction with Town Highway No. 30.
	1-B	1977	30-50	--	Yes	100	96.8	-	76.9	38.1	29.4	---	---	Test No. 1-A was in northwest face of large pit. Material was: 0'-30', white silt-clay with stones; bottom, Test No. 1-B. Test No. 1-B was below Test No. 1-A. Material was: 0'-30', stoney white silt-clay; bottom, same with water on floor
10	1	1977	1-12	0-1	Yes	100	100	100	77	51	38	---	---	Owner: A Johnson Lumber Co. Area is small L-shaped, overgrown pit with wet, spongy floor. Access road needs some work; however, material is not for sale. The 0.06 mile

TABLE I

MONKTON GRANULAR DATA SHEET NO. 7

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis						Abrasion AASHTO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						2"	1-1/2"	1/2"	#4	#100	#200			
														access road is west of State Aid High way No. 5, 0.55 mile southeast of junction with Town Highway No. 30. Test No. 1 was in northern face of pit. Material was: 0'-1', over-burden; 1'-12', stoney fine sandy silt; bottom, sloughed material and water.
11					Yes				NO	SAMPLE	TAKEN			Owner: Roger Layn. Area is long, narrow, multi-level, depleted pit, west of Town Highway No. 6. A long ledge outcrops along the west edge of pit. There is only a possible minor extension in floor. Access is west of Town Highway No. 6, 1.11 miles southeast of junction with Town Highway No. 35.
12	1	1977	2-14	0-2	Yes	100	100	91	83	58	30	---	---	Owner: William Hogg. Area is bowl-shaped pit in horse pasture with a north and northeast extension. The 0.09 mile access road is southeast of Town Highway No. 6, 0.33 mile northeast of junction with State Aid Highway No. 3. No backhoe testing was allowed in the rolling fields surrounding the pit. Test No. 1 was in east-northeast face of pit. Material was: 0'-2', over-burden; 2'-14', sand and fine sand with a few stones; bottom, sloughed

TABLE I

MONKTON GRANULAR DATA SHEET NO. 8

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over- burden (Ft)	Exist- ing Pit	Sieve Analysis % Passing						Abrasion AASHTO T-4-35	Passes VHD Spec.	Remarks
						2"	1-1/2"	1/2"	#4	#100	#200			
	2	1977	1-8'	0-1	Yes	100	100	100	65	29	16	---	---	material. Test No. 2 was in northwest face of pit. Material was: 0'-1', overburden; 1'-8', stoney silt; bottom, same.
13	1	1977	1-7	0-1	Yes	100	88	66	46	8	5	17.1	Gravel	Owner: Roger Layn. Area has two small shallow pits surrounded by woods, and a possible extension to the east. The 0.55 mile field and woods access road is east of Town Highway No. 6, 0.73 mile south of junction with Town Highway No. 35. Test No. 1 was in eastern face of northern pit. Material was: 0'-1', overburden; 1'-2'; silty gravel; 2'-6', gravel and sandy gravel; 6'-7', silty gravel; bottom, silty gravel.
	2	1977	0.5-4	0-0.5	Yes	100	100	96	84	26	11	---	Sand	Test No. 2 was in eastern face of pit. Material was: 0'-0.5', overburden; 0.5'-2', fine sand with traces of silty sand; 2'-3', gravelly sand or sandy gravel; 3'-4', silty sand and fine sand; bottom, silty sand.

TABLE I
Supplement

MONKTON PROPERTY OWNERS - GRANULAR

	Map Identification No.
Bushey Bros.	2, 3
Cota, Eliza	1
Cyr, James	8
Hogg, William	12
Johnson, A., Lumber Co..	9, 10
Layn, Roger	5, 7, 11, 13
Norris, Vernon	6
White, Harold.	4

TABLE II

MONKTON ROCK DATA SHEET NO. 1

Ident. No.	Field Test No.	Year Field Tested	Rock Type	Existing Quarry	Method of Sampling	Abrasion AASHTO		Remarks
						T-3	T-96	
1	1-A	1977	Quartzite (Monkton)	No	Chip	5.7	27.2	Owner: Bessie Rotax. Area is a terrace-like outcrop which rises in steps from south to north. There is no access road but one could easily be put through a sloping pasture for 0.2 mile south to Town Highway No. 11. There is a major reserve of rock, but a heavy demand for the location to be used as a house lot would have to be considered, as well as the presence of property lines. Test No. 1-A was from random blocks for 75 feet atop west end of ledge outcrop.
	1-B	1977	Quartzite (Monkton)	No	Chip	3.2	24.0	Test No. 1-B was continued eastward from random blocks for 75 feet, atop east end of ledge outcrop.
2	1-A	1977	Quartzite (Cheshire)	No	Chip	2.2	22.3	Owner: Henry Phillips. Area is a long wooded ridge with good access from State Aid Highway No. 4 via 0.21 mile long field drive. There is a great reserve of rock, and the relief is good enough to favor easy development of a major crushing operation. There are no nearby houses or power lines, and the owner is willing to sell. Test No. 1-A was taken for 75 feet eastward along the south end of outcrop.
	1-B	1977	Quartzite (Cheshire)	No	Chip	2.1	22.3	Test No. 1-B was continued for 75 feet eastward from Test No. 1-A.
	2-A	1977	Quartzite (Cheshire)	No	Chip	2.0	22.3	Test No. 2-A was taken northeasterly for 75 feet from 300 feet north of Test No. 1-A.
	2-B	1977	Quartzite (Cheshire)	No	Chip	2.7	22.9	Test No. 2-B was taken for an additional 75 feet northward from test No. 2-A.

TABLE II

MONKTON ROCK DATA SHEET NO. 2

Ident. No.	Field Test No.	Year Field Tested	Rock Type	Exist-ing Quarry	Method of Sampling	Abrasion AASHTO		Remarks
						T-3	T-96	
3	1-A	1977	Quartzite No (Cheshire)		Chip	4.4	21.6	Owner: Roger Layn. Area is a long, narrow outcrop in pasture 200 feet west of Town Highway No. 6, 0.55 mile south of its junction with Town Highway No. 35. The area is composed of a line of three narrow, slightly separated masses of ledge extending north-south. There are moderate to large reserves and an adequate relief of 15 to 40 feet. Access through the pasture is over silt or silt-clay and would need a base laid down for equipment. The owner mentioned that his land was in the Federal Soil Bank Plan, and this might influence any plans for development. Test No. 1-A was taken southward for 75 feet from field road at north end of middle outcrop.
	1-B	1977	Quartzite No (Cheshire)		Chip	4.1	18.4	Test No. 1-B was continued southward for 75 feet from the south end of Test No. 1-A.
4	1-A	1977	Quartzite No (Cheshire)		Chip	0.8	31.4	Owner: Roger Layn. Area is west of Town Highway No. 6 and adjacent to the southwest corner of pit at Granular Map Identification No. 11. Access would be easy either through meadow, or from Town Highway No. 6. There is a low, 8 to 10 foot scarp which indicates possible reserves in meadow 260 feet west of main exposure. There is a power line within 100 feet and buildings within 150 feet of the outcrop, so this may present a problem. The rock along the northern part of outcrop was not sampled because it was more weathered and softer than the main body of rock. Test No. 1-A was taken southward for 75 feet along ledge from a point 190 feet south of the north end.
	1-B	1977	Quartzite No (Cheshire)		Chip	1.8	26.0	Test No. 1-B was continued southward for 75 feet along ledge from south end of Test No. 1-A. There is adequate relief and reserves for small jobs;

TABLE II

MONKTON ROCK DATA SHEET NO. 3

Ident. No.	Field Test No.	Year Field Tested	Rock Type	Exist- ing Quarry	Method of Sampling	Abrasion AASHTO		Remarks
						T-3	T-96	
								however, there may be more rock exposed if the meadow is stripped.
5	1-A	1977	Quartzite (Monkton)	No	Chip	6.7	18.0	Owner: Herrick Hulburt. Area is a 400' x 400' x 40'± out-crop in pasture, 80 feet west of State Aid Highway No. 7. Access is very good, but there may be problems with power and phone lines. This area could be developed easily and would be a major source if the rock tests pass specification requirements.
	1-B	1977	Quartzite (Monkton)	No	Chip	2.5	17.8	Test No. 1-A was atop central (highest) portion of ledge knoll, and continued for 75 feet. Test No. 1-B was from random blocks and ledge face on north-east slope.

TABLE II
Supplement

MONKTON PROPERTY OWNERS - ROCK

	Map Identification No.
Hulburt, Herrick	5
Layn, Roger	3, 4
Phillips, Henry	2
Rotax, Bessie	1