

SURVEY OF HIGHWAY CONSTRUCTION MATERIALS
IN THE TOWN OF DERBY, ORLEANS COUNTY, VERMONT

prepared by

Engineering Geology Section, Materials Division
Vermont Department of Highways

in cooperation with .

United States Department of Commerce
Bureau of Public Roads

Montpelier, Vermont

November, 1966

TABLE OF CONTENTS

Introduction	
Acknowledgements	1
History	1
Inclosures	2
Location	4
County and Town Outline Map of Vermont	
Survey of Rock Sources	
Procedure of Rock Survey	5
Discussion of Rock and Rock Sources	6
Survey of Sand and Gravel Sources	
Procedure for Sand and Gravel Survey	8
Discussion of Sand and Gravel Deposits	9
Glossary of Selected Geologic Terms	10
Bibliography	12
Partial Specifications for Highway Construction Materials	Appendix I
Derby Granular Data Sheets	Table I
Derby Property Owners - Granular	Supplement
Derby Rock Data Sheets	Table II
Derby Property Owners - Rock	Supplement
Granular Materials Map	Plate I
Rock Materials Map	Plate II

Acknowledgments

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 were surveyed, and no overall picture of material resources was available. Highway contractors or resident engineers are usually required to locate the materials for their respective projects and have samples tested by the Highway Testing Laboratory. The additional cost of exploration for construction materials is passed onto the State in the form of higher construction costs. The Materials Survey Project was established to minimize or eliminate this factor by enabling the State and its contractors to proceed with information

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

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

Incllosures

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

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

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

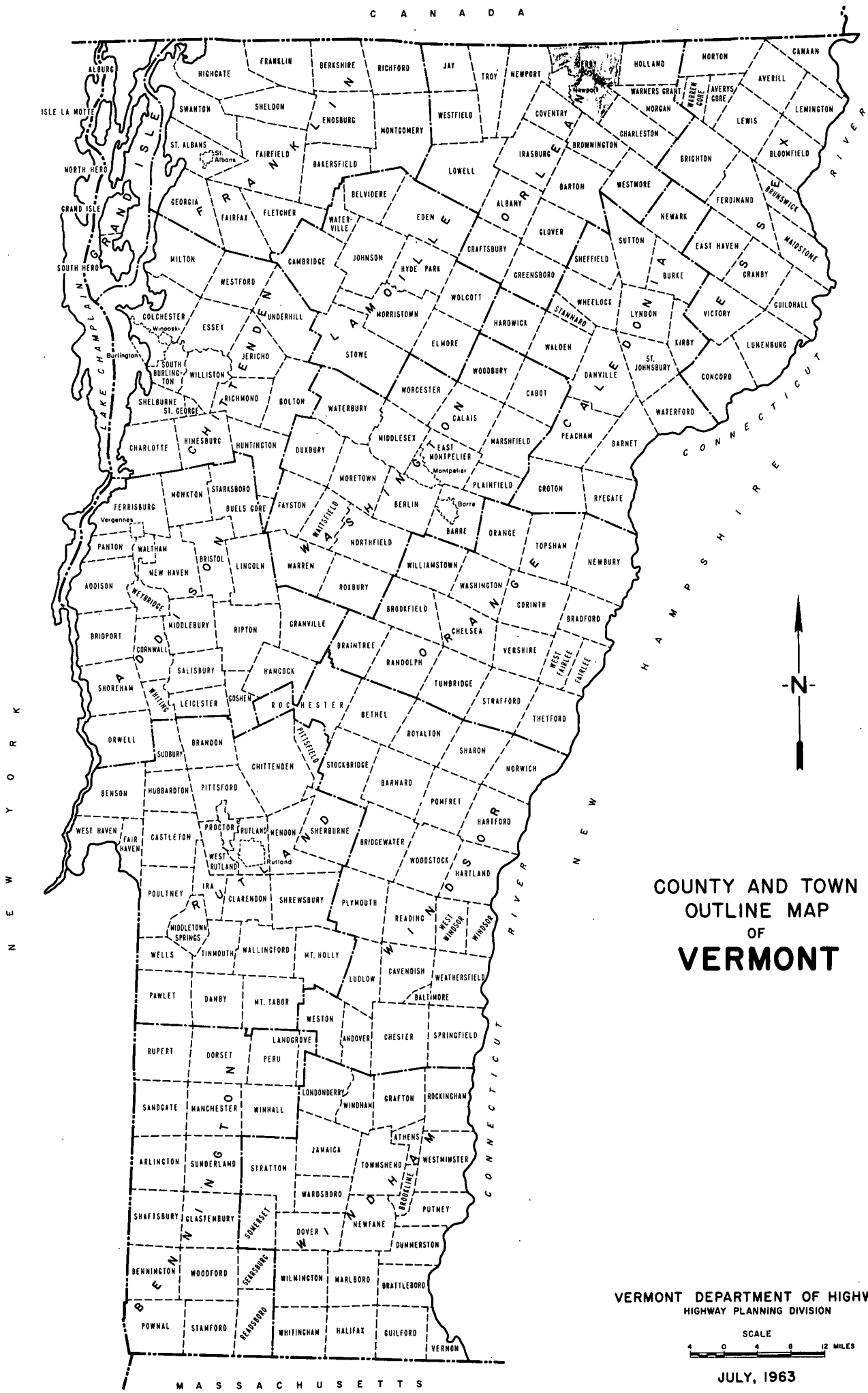
Also included in this folder are data sheets for both the Bedrock and Granular Materials Survey, which contain detailed information for each test conducted by the Project as well as information obtained from other sources, and including an active card file compiled by the Highway Testing Laboratory.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

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

LOCATION

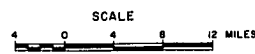
The town of Derby is located in Orleans County on the north-central boundary of the state. According to the "Soil Survey of Vermont" by the Bureau of Chemistry and Soils, the town is in the "Central Plateau Region", a broad plateau characterized by broad valley and rounded hills. Elevated terraces are evident north and east of the city of Newport along Lake Memphremagog. Drainage is generally northerly or westerly into Lake Memphremagog, which, in turn drains into the St. Lawrence River.

The town of Derby is bounded on the north by Canada, on the east and southeast by the towns of Holland, Morgan, and Charleston, on the south and southwest by the towns of Brownington and Coventry, and on the west by the town of Newport. (See County and Town Outline Map of Vermont on the following page).



COUNTY AND TOWN
OUTLINE MAP
OF
VERMONT

VERMONT DEPARTMENT OF HIGHWAYS
HIGHWAY PLANNING DIVISION



JULY, 1963

SURVEY OF ROCK SOURCES

Procedure for Rock Survey

The routine employed by the project in the survey of possible sources of rock for highway construction is divided into two main stages: office investigation and field investigation. The first is conducted primarily during the winter months and comprises the mapping of rock types as indicated in various reference sources. Many different sources of information were utilized, as indicated in the bibliography. These references differ considerably in dependability due to new developments and studies contributing to the obsolescence of a number of reports. In addition, the results of samples taken by other individuals are analyzed, and the location in 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 second stage of the investigation is begun in the field by making a cursory preliminary survey over the entire area. The information obtained in this survey, together with the information assimilated in the first stage of the investigation, is employed to determine the areas in which the testing and sampling will be concentrated. When a promising source is encountered as determined not only by rock type but also by volume, accessibility, and the existence of a good working face, chip samples are taken with a hammer and submitted to the Highway Testing Laboratory for testing by the Deval Method (AASHO T-3). It is kept in mind that samples taken by the chip method are often in the weathered zone of the outcrop and consequently may show a less satisfactory test result than the fresh material deeper in the body of the rock structure. When deemed necessary, further samples are taken by drilling to a depth of approximately 3 feet and blasting across the strike or trend of the outcrop. When the material is uniform and satisfactory tests result from the chip samples, no further drilling, blasting, or sampling is done, and the material source is included as being satisfactory.

Discussion of Rock and Rock Sources

In general, the area included in this report is comprised chiefly of thin beds of slates and schist and occasional quartzites (Barton River Formation). A large granite intrusion located in the south-central portion of the town is the predominant feature of the area. This structure is nearly circular in shape with a diameter of approximately 5 miles. The material ranges from medium to coarse-grained and is light to dark gray in color. Numerous small abandoned quarries are scattered throughout this granite area. The sampling of this large intrusion is indicated by Identification Numbers 3-6. The material in Identification Number 4 was coarser than that in the three other Identification Numbers and had a wear of 7.4% while the wear of the other three ranged from 6.2% to 6.6%.

A very small granite body is noted approximately 1.5 miles north of the large structure. The material in this small intrusion is generally medium grained and of a light gray color. A large quarry, known as the Willey Quarry, is located in this area; however, it is not in operation at the present time. This quarry was sampled as Identification Number 2 and had a wear of 5.6%-6.0%, indicating that it would meet the Vermont Department of Highways' specifications for both Item 204 (Sub-base of Crushed Rock) and Item 211 (Crushed Stone Base Course).

Another small granite area is noted at Eagle Point at the extreme northwest corner of the town bordering Lake Memphremagog. Apparently this area is the southern extension of a larger body located in Canada. The area was sampled as Identification Number 1 and indicated a wear of 6.0%, representing material suitable for both Item 204 (Sub-base of Crushed Rock) and Item 211 (Crushed Stone Base Course).

The volume of granite in the town of Derby is very large and the material is relatively uniform, while the slates and schists are thin-bedded and somewhat foliated, indicating poor material for highway construction. For this reason, sampling was restricted to the granite area. It should also be noted that, due to the uniformity of the granite, the sampling was restricted to chip samples.

SURVEY OF SAND AND GRAVEL SOURCES

Procedure for Sand and Gravel Survey

The method employed by the project in the survey of possible sources of sand and gravel for highway construction is divided into two main stages: office investigation and field investigation. 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 recognizing and locating physiographic features indicating glacial deposits and in studying drainage patterns. In addition, the location of existing pits are mapped when known. The locations in which samples were taken by other individuals are noted and mapped when possible.

The second stage of the investigation is begun in the field by making a cursory preliminary survey over the entire area noting areas which show physiographic features giving evidence of glacial or fluvial deposits. These locations are later examined by digging test pits with a backhoe to a depth of approximately 11 feet and then sampling the material. The samples are submitted to the Highway Testing Laboratory where they are tested for gradation and stone wear, the latter by the Deval Method (AASHO T-4-35).

Discussion of Sand and Gravel Deposits

Satisfactory sand and gravel in the town of Derby is found primarily between Salem and Derby Ponds and north along US Route 5, south and southwest of Clyde Pond, and in the northwest part of the township. Apparently the location of satisfactory material is restricted below an elevation of 1300 feet above sea level, the higher land to the east and south being devoid of such deposits.

The general appearance of the topography along US Route 5 from Identification Number 6 south to Identification Number 18 indicates a promising area for sampling. However, only three sources of satisfactory gravel were located - Identification Numbers 10, 14, and 16. Identification Numbers 21 and 22, although containing a fairly good gravel, are greatly restricted in area. Identification Numbers 23 and 24 also contain acceptable gravels, although the material in the latter is somewhat limited in quantity.

The materials on the terrace north of Clyde River represented by Identification Number 19 consists of a very fine silty sand. The material southwest of Clyde Pond, in which Identification Numbers 29, 32, and 33 are located, is a fairly fine sand covering a large area and apparently of some depth. In addition, Identification Number 34 has an acceptable fine gravel. The region just east of Lake Memphremagog denoted by Identification Numbers 35-42 is very rich in satisfactory material, five gravel sources and four sand sources being identified in this area. To be noted particularly is Identification Number 36 in which an extension of acceptable gravels is to be found in a large pit area.

GLOSSARY OF SELECTED GEOLOGIC TERMS

Drift - Rock material of any sort deposited in one place after having been moved from another; as river drift. Specif., a deposit of earth, sand, gravel, and boulders, transported by glaciers (glacial drift) or by running water emanating from glaciers (fluvio-glacial drift) and distributed chiefly over large portions of North American and Europe, especially in the higher latitudes.

Fluvial - Pertaining to streams.

Gneiss - A term originally applied to a more or less banded metamorphic rock with the mineral composition of granite. As now employed it designates 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. Usually gneiss displays 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.

Kame - A conical hill or stratified drift, deposited at a glacial terminus by glacial streams flowing in or on the ice.

Kame Terrace - An accumulation of stratified drift laid down chiefly by streams between a glacier and an adjacent valley wall.

Lacustrine - Pertaining to lakes.

Megascopic - Characters of a material that can be perceived by the unaided eye.

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

Moraine - An accumulation of drift with an initial topographic expression of its own built within a glaciated region chiefly by the direct action of glacier ice.

Outwash - Stratified drift that is stream built beyond the glacier; laid down by meltwater streams issuing from the face of the glacier ice.

Quartzite - A firm, compact rock composed of grains of quartz so firmly united that fracture takes place across the grains instead of around them. A metamorphosed sandstone.

Schist - A crystalline rock with 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.

Schistosity - The property of a foliated rock by which it can be split into thin layers or flakes. The property of splitting may be due to alternating layers of differing mineral composition or to preferred orientation and parallelism of cleavage planes of the mineral.

Strike - The direction of a line formed by the intersection of a stratum with a horizontal plane.

Surface-geology Map - A map showing areas of outcrop of geologic formations, both consolidated rocks and the unconsolidated sediments. Its scale is large enough that pits and quarries can be accurately shown and indexed.

Terrace - A plain, natural or artificial, from which the surface descends on one side and ascends on the other. Terraces are commonly long and narrow, and they border seas, lakes, or interior valleys. A terrace may be built by deposition of sediment from water, it may be cut by the breaking of waves on a shore or the sweeping of currents, or it may be formed by the dislocation of rocks in crustal movements. The descent from river terraces toward the river may be very abrupt, especially in arid regions, the ascent on the other side may be only that of an extensive alluvial slope.

Till - Unsorted drift, or the mixture of rock fragments and fine materials left by melting glaciers.

BIBLIOGRAPHY

- United States Department of the Interior, Geological Survey, Memphremagog Quadrangle.
- United States Department of Agriculture, Bureau of Chemistry and Soils; Soil Survey (Reconnaissance) of Vermont, by W. J. Latimer; 1930.
- Soil Exploration and Mapping, Highway Research Board, Bulletin 28; 1950.
- Glossary, Pedologic and Landform Terminology, Highway Research Board; Special Report 25; 1957.
- Survey of Highway Aggregate Materials in West Virginia; Engineering Experiment Station, West Virginia University; Morgantown, West Virginia; December, 1959.
- Materials Inventory, Bangor Quadrangle, South Half; September, 1959; University of Maine.
- Glacial Geology and the Pleistocene Epoch, Richard F. Flint, John Wiley and Sons; 1947.
- Various Reports of the Vermont State Geologist.
- Geology of the Memphremagog Quadrangle and the Southwestern Portion of the Irasburg Quadrangle, Vermont, by Charles G. Doll, Vermont Geological Survey, Bulletin No. 3; 1951.
- Aerial Photos.
- A Handbook of Rocks, James F. Kemp, D. Van Nostrand Company, Inc.; June, 1946.
- Rocks and Minerals, Louis V. Pirsson, John Wiley and Sons, Inc.; June, 1959.
- Glossary of Selected Geologic Terms, W. L. Stokes and D. J. Varnes; Colorado Scientific Society Proceedings, Vol. 16; 1955.

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 complete list of specifications see "Standard Specifications for Highway and Bridge Construction" approved and adopted by the Vermont Department of Highways April, 1964.

Item 105, Granular Borrow:

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

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

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

Item 201, Sub-base of Gravel:

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

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

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

forty (40) when tested by AASHO Method T-96.

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

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

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

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

Item 202, Sub-base of Sand

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

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

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

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

Item 204, Sub-base of Crushed Rock

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

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

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

Square Openings	Percent Passing
4"	95-100
$1\frac{1}{2}$ "	25-50
No. 4	0-15

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

Item 205, Sub-base of Crushed Gravel

"Article 205.02 Materials.

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

a product uniformly graded from coarse to fine.

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

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

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

"The percent of wear shall not be more than twenty (20) when tested by laboratory methods, using Method AASHO T-4, or more than thirty-five (35), when tested by AASHO Method T-96.

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

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

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

TABLE I

DERBY GRANULAR DATA SHEET NO. 1

Map Ident No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks			
						1½"	5/8"	#4	#100	#270							
1	1	1959	0-10.0	0	Yes	N	O	T	S	A	M	P	L	E	D	Gran. Borrow (Grav.)	Owner: G. Smith. 1 mile east of Derby Line on south side of road. Coarse, dirty, poorly sorted material. Contains large stones and boulders. Depleted. Not sampled.
2	1	1959	0-20.0	--	Yes	N	O	T	S	A	M	P	L	E	D		Owner: R. Davis. In field south of road, west of Area #1. Coarse, dirty, poorly sorted material. Contains large stones and boulders. Not sampled.
3	1	19	0-30	--	Yes	N	O	T	S	A	M	P	L	E	D		Owner: Town of Derby. Pit is at northwest corner of recreation field. Material extension is limited by the field. Test #1 was not sampled.
	2	1966	4-60	0-4	Yes	76.0	61.5	46.8	3.0	1.5	1	18.6%	Gravel	Test #2 was a hand sample of 60' high face in northeast end of pit. Material is interbedded gravels, gravelly sands and pebbly sands, and meets requirements for Item 201. Material extends eastward under recreation field.			
4	1	1959	0.5-3.5	0-0.5	No	100	--	100	4.0	1.3	1		Sand	Owner: R. Patnaude. 0.4 mile west of US 5 in Derby Line. Possible source Item 202(Sand). Test #1 taken east end of knoll on side. Sand and gravel in pockets.			
	2	1959	0-12.0	0	No	100	--	100	4.0	1.0	1		Sand	Test #2 north of #1 on north slope.			
	3	1959	0-7.5	0-1.5	No	N	O	T	S	A	M	P	L	E	D	Test #3 on west end of top of knoll. Contains small	

TABLE 1

DERBY GRANULAR DATA SHEET NO. 2

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks		
						% Passing										
						1½"	5/8"	#4	#100	#270						
	4	1959	0-9.0	0	No	100	--	95.8	4.2	1.0	1	---	Sand	stones. Not sampled. Test #4 was taken north of Test #2 on lower slope.		
	5	1959	1-8.0	0-1	No	100	--	98.2	24.5	4.6	2	---	Gran. Borrow (Sand)	Test #5 taken north of Test #4 at foot of slope. Too much fines.		
5	1	1959	2-10	0-2	No	100	--	97.8	4.8	1.9	1	---	Sand	Owner: C. B. Kelley. Test #1 located 0.45 mile west on private lane from US 5, northwest of large tree on right. Accepted for Item 202 (Sub-base of sand).		
	2	1959	0-4	0-2	No	N	O	T	S	A	M	P	L	E	D	Test #2 located northwest of Test #1 on northwest slope of knoll. Not sampled. Contains only 4.0' of gravel with fine sand bottom.
	3	1959	1.5-9	0-1.5	No	--	--	49.2	6.0	3.25	1	28.2%	Gran. Borrow (Grav.)	Test #3 located northeast of Test #2 south of gateway. Sand bottom.		
	4	1959	0-4	0	No	N	O	T	S	A	M	P	L	E	D	Test #4 located north of Test #3 on top of knoll. Fine sand. Not sampled.
	5	1959	1-9	0-1.0	No	100	---	99.6	6.0	2.0	1	---	Sand	Test #5 located southwest of Test #4 just north of fence. Possible source of Item 202 (sand). Sand bottom.		
	6	1959	0-7	0	No	N	O	T	S	A	M	P	L	E	D	Test #6 located northwest of Test #5 on top of knoll. Not sampled. Sandy gravel.
	7	1959	0-9	0-1.5	No	N	O	T	S	A	M	P	L	E	D	Test #7 located in southwest corner of field south of farm road and Test #1. Not sampled. Stony sand.
	8	1959	0-6	0	No	N	O	T	S	A	M	P	L	E	D	Test #8 located north to northeast of Test #4 on southeast

TABLE I

DERBY GRANULAR DATA SHEET NO. 3

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks			
						1½"	5/8"	#4	#100	#270							
	9	1959	0-8.5	0-3	No	N	O	T	S	A	M	P	L	E	D	--	slope of knoll. Not sampled. Fine sand.
	10	1959	0-3.0	0	No	N	O	T	S	A	M	P	L	E	D	--	Test #9 located west of Test #8 on same knoll. Not sampled. Fine sand.
	11	1959	0-3	0	No	N	O	T	S	A	M	P	L	E	D	--	Test #10 located west of Test #9 on same knoll. Not sampled. Fine sand, stones.
	12	1959	0-3	0	No	N	O	T	S	A	M	P	L	E	D	--	Test #11 located west of Test #10 on same knoll. Not sampled. Fine sand, stones.
																--	Test #12 located on far southwest edge of field; southwest of house. Not sampled. Fine sand.
																--	Other tests were made on knoll northeast of pit, but not sampled. Material unsatisfactory.
6	1	1959	0-4	0-1	Yes	N	O	T	S	A	M	P	L	E	D	--	Owner: C. B. Kelley. Tested east face of pit. Alternate layers of fine sand and gravelly material.
7	1	1959	0-12	0-1	Yes	N	O	T	S	A	M	P	L	E	D	--	Owner: C. B. Kelley. Same deposit as Ident. #6. Tested north face. Fine sand and gravel. Poor gradation.
8	1	1959	0-8	0-1	Yes	N	O	T	S	A	M	P	L	E	D	--	Owner: C. B. Kelley. Tested east face. Excessive flat, soft stones. Poor gradation. Right-of-way of Project I 91-3(1) will obliterate this pit.
9	1	1959	2.5-9	0-2.5	No	--	--	50.3	13.0	6.5	1	24.8%	Gran. Borrow (Grav.)			Owner: R. Provost. Test #1 location 300' right of Sta. 3188+50 of Project I 91-3(1). Excessive fines. Gravel bottom.	

TABLE I

DERBY GRANULAR DATA SHEET NO. 4

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks			
						1½"	5/8"	#4	#100	#270							
						N	O	T	S	A	M	P	L		E	D	
	2	1959	0-5	0-2	No	N	O	T	S	A	M	P	L	E	D		Test #2 taken on knoll south of Test #1. Unsorted material.
10	1	1959	7-15	0-7	Yes	--	--	37.8	4.0	2.5	1	12.0%	Gravel		Owner: R. Provost. Test #1 located in pit west of sawmill adjacent to power line. Accepted for Item 201, Gravel.		
	2	1959	0-5	0-2	No	N	O	T	S	A	M	P	L	E	D		Test #2 located south of pit and Test #1. Unsorted gravelly material.
	3	1959	0-4	0-2	No	N	O	T	S	A	M	P	L	E	D		Test #3 located southeast of Test #2. Unsorted material. Same deposit as Test #2.
	4	1959	0-13	0	Yes	--	--	36.3	11.0	6.0	1	24.6%	Gran. Borrow (Grav.)		Test #4 located south of Test #3 in large pit on top of hill. Unsatisfactory material, too much fines.		
	5	1959	0-8	0-2	No	N	O	T	S	A	M	P	L	E	D		Test #5 located west of Test #2 and west of power line. Sandy gravel.
	6	1959	0-8	0-2	No	N	O	T	S	A	M	P	L	E	D		Test #6 located west of Test #5. Same material as Test #5. Sandy gravel.
	7	1959	1.5-8	0-1.5	No	--	--	35.7	10.0	5.0	1	24.0%	Gravel		Test #7 located in southwest edge of field near Fish & Game Club property. Gravel with gravel bottom. Test #1 and Test #7 represent material acceptable for Item 201, Gravel.		
11	1	1959	1.5-9	0-1.5	No	--	--	50.5	8.0	3.5	2	26.8%	Gran. Borrow (Grav.)		Owner: Wm. Johnstone. Area Ident #12 adjoins on south. Test #1 taken on north slope of knoll southeast of barn. Gravel bottom. Contains soft stones.		
	2	1959	0-7	0-1	No	N	O	T	S	A	M	P	L	E	D		Test #2 located south of Test

TABLE I

DERBY GRANULAR DATA SHEET NO. 5

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks		
						% Passing										
						1½"	5/8"	#4	#100	#270						
													#1 on east slope of same knoll, 300' left of Sta. 3159+50 of Project I 91-3(1). Fine sand.			
12	1	1959	0-10	0-1	Yes	--	--	63.4	6.0	2.5	1½	---	Gran. Borrow (Grav.) Owner: Benoit. Limited by property line to north. Bounded on north by Ident. #11, near centerline of Project I 91-3(1) at Sta. 3148+00. Sand in layers. Failed on gradation. Not sufficient stone for Abrasion Test. Sampled by Callahan.			
13	1	1959	--	--	Yes	N	O	T	S	A	M	P	L	E	D	Owner: Derby Town. Ident. #10 adjoins on west. Ident. #14 on east side of US 5. Pit depleted. Material extends under US 5. Not sampled.
14	1	1959	3.5-18.5	0-3.5	Yes	--	--	47.7	3.0	1.5	1	16.4%	Gravel	Owner: Rowell. Large pit area adjoins on the east. Acceptable for Item 201, gravel. Gravel and sand in pockets.		
15	1	1959	0-3	0-1	No	N	O	T	S	A	M	P	L	E	D	Owner: Sanders. Test #1 located on knoll in southwest corner of field north of house. Unsorted gravelly material. Test #2 located on knoll northeast of Test #1. Same material as Test #1. Test #3 located northwest of Test #2 at east end of swampy area. Blue clay. Test #4 located north of Test #3 at edge of woods. Unsorted sandy gravel. Test #5 located east of Test
	2	1959	0-3	0-1	No	N	O	T	S	A	M	P	L	E	D	
	3	1959	0-3	0-1	No	N	O	T	S	A	M	P	L	E	D	
	4	1959	0-6	0-2	No	N	O	T	S	A	M	P	L	E	D	
	5	1959	0-3.5	0-1	No	N	O	T	S	A	M	P	L	E	D	

TABLE I

DERBY GRANULAR DATA SHEET NO. 6

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks		
						% Passing										
						1½"	5/8"	#4	#100	#270						
	6	1959	0-3	0-1.5	No	N	O	T	S	A	M	P	L	E	D	#4 at edge of woods. Unsorted gravel. Test #6 located southeast of Test #5 on knoll overlooking US 5. Unsorted sandy gravel. Test #7 located on knoll south of Test #6. Unsorted sandy gravel. Test #8 located in pit behind garage. Poorly graded sand and gravel. Shallow. Clay bottom.
	7	1959	0-3	0-1	No	N	O	T	S	A	M	P	L	E	D	
	8	1959	0-4	0-1	Yes	N	O	T	S	A	M	P	L	E	D	
16	1	1966	1-36	0-1	Yes	86.1	64.9	47.8	5.0	1.5	1	19.2%	Gravel	Owner: Richard Provost. This pit is northerly of two pit areas 0.15 mile east of US Rte. 5 north of Derby Post Office. Test #1 was a hand sample of northeast face below cedar knoll. Material is representative of a 75' to 90' extension to the east and northeast. Material is: 1'-5' silty gravel; 5'-25' fine gravel. Bottom 11' of face is pebbly gravel, pebbly sand, and lenses of fine sand. Test met requirements for Item 201.		
	2	1966	0-14	Stripped	Yes	85.2	80.6	60.4	2.0	1.3	1	--	Gran. Borrow (Grav.)	Test #2 was a hand sample of north face taken 70' west of Test #1. Material is a fine gravel, gravelly sand with pebbly sand lenses near top, and merges to the west with cross-bedded sands and pebbly sands. This test represents material in 110' long by 120' wide stripped area		

TABLE I

DERBY GRANULAR DATA SHEET NO. 7

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
													to the north. Sample had barely too few stones retained on the #4 sieve for the specification gravel, Item 201. Pit is source of a small volume of gravels meeting VHD specifications. Possibly those gravelly sands in the stripped area would contain sufficient stone, especially toward the east side, to meet gravel specifications.	
17	1	1966	0.5-24	0-0.5	Yes	80.7	65.7	42.8	10.0	5.0	1	16.4%	Gran. Borrow (Grav.) Owner: Richard Provost. Area is a long pit south of Area #16. Many large boulders and exposed bedrock in evidence. Probably a very thin ice-contact deposit about 120' wide. Gravels are probably very thin, and consist of many sub-angular and flat stones. Extension would be to east for length of pit, and possibly to south and east. Test #1 was a hand sample of two faces at the south end of the pit. Total section sampled was about 24'. Material is sandy gravel with occasional seams of gravel and silty gravel with a clean sand bed. Sample barely failed for Item 201, Sub-base of Gravel, because of excess silt. Possibly a source of modified gravel and certainly a granular borrow.	

TABLE I

DERBY GRANULAR DATA SHEET NO. 8

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks		
						1 1/2"	5/8"	#4	#100	#270						
18	1	1959	0-3	0-1	No	N	O	T	S	A	M	P	L	E	D	Owner: R. Patnaude. Test #1 located on knoll on east side of field adjacent to brook. Poorly graded material. Bedrock outcrops in vicinity.
19	1	1959	0-6	0-1	No	N	O	T	S	A	M	P	L	E	D	Owner: Hackett. Test #1 located in southwest corner of field, just right of centerline of Project I 91-3(1). Poorly graded gravel and fine silt.
	2	1959	0-7	0-1	No	N	O	T	S	A	M	P	L	E	D	
	3	1959	0-3	0-0.5	No	N	O	T	S	A	M	P	L	E	D	Test #3 located southwest of Test #2 south of fence on edge of plateau. Fine silt and sand.
	4	1966				N	O	T	S	A	M	P	L	E	D	The east edge of the terrace 250' southeast of US Rte. 5 was investigated. The material is silt-clay with stone fragments and cobbles, and was not sampled.
20	1	1959				N	O	T	S	A	M	P	L	E	D	Owner: Town of Derby. Pit within town property is depleted. Extension would be to east under meadow owned by Dale Conley, but probably north of swale. Steep slope to south limits pit in that direction. Test #1 was not taken. Test #2 was a hand sample of face 130' from north end. Material is a sandy fine gravel with a few sand beds.
	2	1966	2-19	0-2	Yes	94.8	73.1	51.9	15.0	6.0	1	23.0%	Gran. Borrow (Grav.)			

TABLE I

DERBY GRANULAR DATA SHEET NO. 9

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
														Some rotten stone noted. Material had excess silt for Item 201. Coarse silty gravels show at south end of face.
21	1	1959	3-18	0-3	Yes	--	--	45.3	8.0	3.5	1	24.6%	Gravel	Owner: Hackett. Material quantity limited by meadow to north. Meets requirements for Item 201, gravel. Sample taken in center of north face.
	2	1966	2-12	0-2	Yes	74.0	61.9	46.9	22.0	7.0	1	28.2%	Gran. Borrow (Grav.)	Test #2 dug on top of 23'-high face at east end. From 2'-7' is a silty gravel, poorly sorted and with soft stones. From 7'-11' gravel is fine and better sorted with little rotten stone. Bottom 12' of face is sand, and a lower level, probably on the sand, extends to the east. The sand appears pebbly on the surface of this level, but was not sampled. If upper 7' could be used for Granular Borrow, it is possible 4'-5' of gravel could be obtained in a northward extension under the meadow.
22	1	1966	2-16	0-2	Yes	49.1	39.1	30.5	6.0	3.0	1	15.2%	Gravel	Owner: Earl Hackett. This is a small pit about 500' east of Earl Hackett's pasture pit (area #21). The west portion of the pit appears to consist of pebbly to silty sands. Test #1 was a hand sample taken near the east end. The material is a coarse

TABLE I

DERBY GRANULAR DATA SHEET NO. 10

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
														cobbly gravel with some rotten stone and rock fragments. Some beds appear quite silty. Material met Item 201 specifications - extension would be into pasture to north.
23	1	1966	2.5-13.5	0-2.5	Yes	54.8	38.3	25.6	5.0	3.0	1	19.0%	Gravel	Owner: C. Hackett. This is a shallow 450'-long pit located in a delta gravel deposit 0.90 mile east of Derby Center. Extension of pit is to the west into a field with very low rolling topography. Also extension to south. Test #1 was a hand sample of south face. Material is a "dirty" looking gravel with many soft stones. Gravels are partially cemented at 12'-13.5'. A silt-clay binder in places. Material is very stoney, but only a few +6" cobbles and no boulders. Sample met requirements for Sub-base of Gravel.
	2	1966	1.5-11	0-1.5	Yes	66.9	52.1	33.8	5.0	3.0	1	12.5%	Gravel	Test #2 was a hand sample of 11'-high west face taken 95' from north end of pit. Water in floor in this part of pit, and gravels occur in the floor. Material in test was a sandy gravel with many flat and sub-angular stones which appear quite hard. Gravel is hard packed. Becomes a gravelly sand or fine gravel below 7'

TABLE I

DERBY GRANULAR DATA SHEET NO. 11

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks		
						1½"	5/8"	#4	#100	#270						
														and is moist below 10'.		
24	1	1959	0-15	0	Yes	--	--	37.4	11.0	4.5	1	20.8%	Gravel	Owner: Letourneau. Tested on east face. Material extends to south. Material acceptable for Item 201, Gravel.		
25	1	1959	--	--	Yes	N	O	T	S	A	M	P	L	E	D	Old abandoned pit, overgrown with small trees. Partially visible from the road.
26	1	1959	1-8	0-1	Yes	--	--	40.7	4.0	1.75	1	25.8%	Gran. Borrow (Grav.)	Owners: Ernest Musgrove and Bill Swift (Formerly Carleton Brainard). Test by F. Callahan barely failed to meet gravel specification for wear. Since then, pit to east has been closed to maintain an access into sugar orchard. West pit has been depleted.		
27	1	1966	2-13	0-2	Yes	48.4	39.2	32.2	15.0	5.0	1	23.6%	Gravel	Owner: Don Gage (A Montrealer has option to buy.) This is a small shallow pit located on the south side of Vt. Rte. 105 just east of Town Road 54. Gravels are in an 80'-long face on the south side of the pit. Pit floor and a low face on the west side shows pebbles, silts and sands with a few cobbles, and resembles alluvial material. Test #1 was taken on the upper so. face. (Above low face of alluvial material) and included ice-contact sandy gravel with many soft sub-angular stones, a few granitic boulders and many +6"		

TABLE I

DERBY GRANULAR DATA SHEET NO. 12

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks		
						1½"	5/8"	#4	#100	#270						
														cobbles and a few clean gravel pockets. Probably a limited extension to south where deposit will be unsorted glacial debris.		
28	1	1959	0-6	0-0.5	No	N	O	T	S	A	M	P	L	E	D	Owner: Hitchcock. Test #1 located on knoll to south of private road 500' from gateway. Fine sand to silt. Test #2 located on east end of knoll northeast of that on which Test #1 is located and overlooking swamp and Clyde Pond. Fine silty sand. Test #3 located west of Test #2 on same knoll. Fine silty sand.
	2	1959	0-5	0-1	No	N	O	T	S	A	M	P	L	E	D	
	3	1959	0-5	0-1	No	N	O	T	S	A	M	P	L	E	D	
29	1	1966	2-11.5	0-2	Yes	100	99.5	98.4	17.7	3.0*	1½	--	Sand	Owner: Keith Parker. Area is a small (70' x 25') pit and knoll to the west and southwest on the south side of Town Road No. 44 south of Clyde Pond. Test #1 was taken on west face of pit and comprised beds of coarse pebbly sand, fine sand with a few silty sand layers. Sample met requirements for Item 202, Sub-base of Sand.		
	2	1966	2-10.5	0-2	No	100	100	100	44.0	7.5*	---	--	Gran. Borrow (Sand)	Test #2 dug at top of steep south slope of knoll, 100' southwest of the pit and 125' south of top of bank along the town road. Coarse pebbly sands like Test #1 show along the road, but material in		

*Percentage of Total Sample

TABLE I

DERBY GRANULAR DATA SHEET NO. 13

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks		
						1½"	5/8"	#4	#100	#270						
														Test #2 is fine and silty laminated sands. Material below 6' is a fine to medium sand and appears to be coarse in the bottom. Sample had excess fines for Item 202. Probably a limited quantity of sand in this area would meet Item 202 specifications.		
30	1	1966	2-8.5	0-2	No	100	100	99.2	42.0	9.0*	1	--	Gran. Borrow (Sand)	Owner: Citizens Utilities Co. Area is rolling topography south-southwest of Clyde Pond and on north side of Town Road No. 44. Test #1 was dug on low knoll 135' north of road. Material is a very fine or silty sand with a few coarse grains and pebbles which adhere in places to a hard packed silty layer. Also silt laminae. Goes to a cobbly silt-clay with one boulder at 8.5'. Material had excess fines for Item 202. Probably a source of granular borrow occurring to shallow depths over till or granitic bedrock. Areas in this vicinity south and southwest of Clyde Pond encounter lacustrine deposits of varying grain size.		
31	1	1966				N	O	T	S	A	M	P	L	E	D	Owner: Hitchcock. This is a small meadow across Town Road No. 44 from Area #30. One test hole was dug to 6' in silt-clay and clay at 5'.

*Percentage of Total Sample

TABLE I

DERBY GRANULAR DATA SHEET NO. 14

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Over-burden (Ft)	Exist-ing Pit	Sieve Analysis					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						1½"	5/8"	#4	#100	#270				
														Material is laminated and is undoubtedly of lacustrine origin. Hole was not sampled.
32	1	1966	1.5-10	0-1.5	No	100	100	97.6	6.8	1.3*	1½	---	Sand	Owner: Keith Parker. Area is a field southeast of the junction of Town Roads No. 41 and No. 44. Test #1 was dug above field drive 360' east of barn. Material is a fine pebbly sand from beds of pebbly coarse sand, fine sand and very fine to silty sand laminae. Some cross-bedding seen. Fine sand in bottom of hole.
	2	1966	2-10.5	0-2	No	100	100	100	19.0	5.0*	1	---	Gran. Borrow (sand)	Test #2 dug 160' east-north-east of Test #1. Material comes from beds of fine to medium sands. From 1.5' - 3' are silty sand laminae and at 8' a partially cemented FeO-stained layer. Sample had excess passing the #100 and #270 mesh sieves for Item 202. These tests were on a terrace whose escarpment has been extensively flattened and rounded by erosion. To the east is a low rolling field.
	3	1966												Test #3 dug at edge of woods on north side of lower field about 450' east of Test #2 and about 350' south of Test #31-1. Material is silt-clay with stones and a boulder and is probably glacial till. Hole was not sampled.

*Percentage of Total Sample

TABLE I

DERBY GRANULAR DATA SHEET NO. 15

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks		
						1½"	5/8"	#4	#100	#270						
33	1	1959	2.5-15	0-2.5	Yes	100	--	98.0	1.9	0.7	1	---	Sand	Owner: Moeykens. Test #1 located on west face of pit. Preliminary sample. Material acceptable for Item 202, and. Test #2 located adjacent to Test #1. Material acceptable for Item 202, Sand. Test #3 located southwest of pit on south slope of same knoll. Fine sand.		
	2	1959	2.5-17	0-2.5	Yes	100	--	98.3	3.0	1.2	1	---	Sand			
	3	1959	0-4	0-1.5	No	N	O	T	S	A	M	P	L		E	D
34	1	1959	0-20	0-1	Yes	N	O	T	S	A	M	P	L	E	D	Owner: Hitchcock. Test #1 located on north face. Part of pit overgrown with brush. Poor gradation, too fine. Test #2 dug on face at southwest corner of new pit area which has been extended about 130' west of old pit where Test #1 was taken. This end of the pit shows pebbly and silty sands and face consisted of a series of stratified coarse pebbly to fine silty sands with a silt clay layer overlying a southward-dipping gravelly sand bed at 10.5' at the bottom of the face. Test #3 was sampled from face of pit 30' northwest of Test #2 and 70' northeast of the road. Log of face is as follows: 0-2'- overburden; 2'-4'- pebbly sand; 4'-6'-silty, very fine gravel; 6'-7'-pebbly sand; 7'-11'-gravelly sand with
	2	1966	2-10.5	0-2	Yes	100	100	92.6	20.4	7.0 6.5*	1	---	Gran. Borrow (Sand)			
	3	1966	2-11	0-2	Yes	85.1	74.9	57.3	7.0	2.5	1	11.6%	Gravel			

*Percentage of Total Sample

TABLE I

DERBY GRANULAR DATA SHEET NO. 16

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks	
						1½"	5/8"	#4	#100	#270					
	4	1966	2-10	0-2	Yes	91.6	78.1	55.8	21.0	6.0	1	---	Gran. Borrow (Grav.)	<p>silty sand laminae. The gravelly sand bed is concealed at 11'. The material met gravel specifications.</p> <p>Test #4 taken on face of pit 85' northeast of Test #3. Material is fine silty gravel coming from beds of gravel, pebbly sand, sandy silt and fine sand. Insufficient proper size stones were included for the wear test, and excess fines were present for specification gravel. The northeast end of the pit, 120' long, has been closed. The material at this end appears very silty with few stones. Extension of the pit would be northwest with specification gravels a hit or miss proposition. Appears to be a delta deposit. Much cross-bedding seen.</p>	
35	1	1959	2.5-12.5	0-2.5	Yes	100	--	100	5.0	1.75	1	---	Sand	Owner: Brown. Test #1 located on northwest face of pit. Preliminary sample. Acceptable for Item 202, Sand.	
	2	1959	2.5-12.5	0-2.5	Yes	100	--	100	5.0	0.75	1	---	Sand	Test #2 adjacent to Test #1. Material acceptable for Item 202, Sand.	
	3	1959	0-6	0-1	No	N O T S A M P L E D									<p>Test #3 located southwest of pit on top of knoll adjacent to road and just north of brook. Clay bottom. Silty sand. In 1966 owner covered pit and seeded it.</p>

TABLE I

DERBY GRANULAR DATA SHEET NO. 17

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
36	1	1959	--	0	Yes	--	--	21.1	10.0	3.75	2	17.0%	Gravel	Owner: Wood. This pit was used for Project S 0317(1) at which time 10,000 cu. yds. were used. The quantity remaining is limited. The first 2 tests listed represent samples taken by the R. E. on that project. Tests No's 3 through 7 were sampled from the more recently opened pit area east and north-east of the barn. There is still some extension of the south and central pit areas and it would be to the east. Test #3 was a hand sample of the 20'-high east face of north pit taken at the south end. Face shows ice-contact features such as abrupt changes in grain size, irregular bedding, lenses and pockets, silt-coating of pebbles, and much matrix silt-clay. Material is silty gravel from beds of cobbles, silty gravel layers, pebble layers, and sand lenses. The sample contained excess silt for Item 201. An Area 30' wide x 60' long at the top of the east face near the south end has been stripped. North of this any extension requires stripping of from 12' to 15' of
	2	1959	--	0	Yes	--	--	30.8	13.0	4.8	3½	16.1%	Gravel	
	3	1966	0-18	Stripped	Yes	60.8	41.3	14.8	15.0	8.0	1	12.4%	Gran. Borrow (Grav.)	

TABLE I

DERBY GRANULAR DATA SHEET NO. 18

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
						4	1966	0-9	Floor	Yes				
5	1966	0-11	Stripped	Yes	100	100	85.3	21.2	9.0 7.7*	1	---	Gran. Borrow (Sand)	Test #5 was sampled on west face of pit 90' southwest of Test #4. Face shows cross-bedding and inclined bedding and lateral grading of pebbly sand to gravel (south to north). About 5' of silty sands had been previously stripped from face. Log is as follows: 0-5'-pebbly sand; 5'-6.5'-fine gravel; 6.5'-8.5'-silty sand; 8.5'-11'-fine sand; 11'-15.5'-gravel; 15.5'-concealed-	

*Percentage of Total Sample

TABLE I

DERBY GRANULAR DATA SHEET NO. 19

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
	6A	1966	1.5-8	0-1.5	Yes	100	100	100	6.0	2.0*	1	---	Sand	silt-clay and small stones. The gravel bed from 5'-6.5' dips to north, and together with gravels below 11' and those of Test #4, would be encountered in the northwest corner of the pit. Test #6A was sampled from top 8' of east face of central pit, just north of haul road. It is representative of material overlying the east face gravels. Sand ranges from fine to coarse and appears silty in places both north and south of the test.
	6B	1966	8-24	0-1.5	Yes	74.0	53.0	31.4	11.0	5.0	1	9.8%	Gravel	Test #6B was taken below Test #6A. Material comes from beds of sandy gravels, a few +6" cobbles at large, one or two small boulders and minor sand size. Fines consist mainly of silt-coated ¼" - 1" pebbles. Sample is representative of 175'-long face with eastward extension.
	7	1966	0-19	Stripped	Yes	68.3	52.8	32.5	15.0	4.0	1	16.0%	Gravel	Test #7 was taken on east face in north part of old pit area, 175' south of the haul road and about 200' south of Test #6. Top 13' is gravel, underlain by 6' of lenses and beds of sand, silty sand and fine gravel. Sample met requirements for Item 201, Sub-base of Gravel.

*Percentage of Total Sample

TABLE I

DERBY GRANULAR DATA SHEET NO. 20

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
37	1	1966	0.5-13	0-0.5	Yes	84.3	61.4	34.8	7.0	4.5	1	16.4%	Gravel	Owner: A.C.Wood. This is a small pit in rolling topography, limited on the south and east by a low drainage area and swamp. Extension would be to northwest and possibly to west. Pit is pretty well depleted, but probably had a central portion of gravels, flanked by outward dipping silty sands. Test #1 was taken on face at north end of pit and represents small volume of material (50' wide x 50' long x 12' to 14' deep) left between end of pit and point where knoll drops off gradually to north. Sample was of fine, "sooty"-looking gravel with most stones under 3". Very few boulders seen in pit. A very small quantity of gravel remains between the north pit and the small pit to the south.
	2	1966	0-18	Stripped	Yes	100	100	90.4	1.8	1.3 1.0*	1	---	Sand	Test #2 was of coarse pebbly and fine sands on the southwest end of the south pit 70' southwest of the north pit. This part of pit is badly cut up. Has strippings on face and coarse sands are incompletely stripped. Extension of the sands would be north-northwest through clump of

*Percentage of Total Sample

TABLE I

DERBY GRANULAR DATA SHEET NO. 21

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis % Passing					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						1½"	5/8"	#4	#100	#270				
													cedars, and quantity is probably limited.	
38	1	1959	1.5-7.5	0-1.5	Yes	100	--	98.8	1.9	0.9	1	---	Sand	Owner: Chapdelaine. Test #1 located south face. Material acceptable for Item 202, Sand. Test #2 adjacent to Test #1. Sand bottom. Material acceptable for Item 204, Gravel. Test #3 located on west face. Fine sand bottom. Material acceptable for Item 202, sand. This pit contains both sand and gravel of acceptable quality.
	2	1959	3-16	0-3	Yes	--	--	51.9	4.0	1.5	1.5	16.0%	Gravel	
	3	1959	3-14.5	0-3	Yes	100	--	98.5	2.0	0.5	1	---	Sand	
39	1	1966	8-35	0-8	Yes	47.3	31.1	20.6	8.0	3.5	1	9.2%	Gravel	John and Angela Roberts. A pit on the east side of Town Road No. 7 on the west side of a high hill. Top of pit face is covered by 8'-15' of silts with cobbles and boulders. Test #1 taken at north end of 135'-long face. Gravels also show through the eroded silts about half-way along face. Material is very stony and is generally poorly sorted with minor sand and some silt. An estimate as to stone content of material is: Exceeding 6" -15%-20%; Exceeding 3" -50%. Extension would be north and northeast with much stripping necessary. There appeared to be more silt than what was present in Test #1, and may show up in other

TABLE I

DERBY GRANULAR DATA SHEET NO. 22

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks		
						% Passing										
						1½"	5/8"	#4	#100	#270						
														tests. Probably of ice-contact origin, possibly a kame terrace as indicated by D. P. Stewart.		
40	1	1959				N	O	T	S	A	M	P	L	E	D	Owner: John and Angela Roberts. A pit east of and above Town Road No. 7, east of Johns River. Two small old pits showing many boulders are located on the west slope below the present pit. Feature is of ice-contact origin with extension to northeast. Test #1 was not sampled.
	2	1959	1-20	0-1	Yes	62.3	48.8	30.7	7.0	2.75	1	12.4%	Gravel	Test #2 was a coarse gravel sampled from center of pit face by Mr. F. Callahan, and met requirements for Item 201.		
	3	1966	2-24	0-2	Yes	57.8	44.5	33.0	10.0	6.0	1	10.0%	Gran. Borrow (Grav)	Test #3 was sampled from south end of east face. Top 2' is overburden; from 2'-8' -sandy gravel; 8'-14' -boulders and detritus; 14'-24' silty gravels, and at 22' a stony silt clay. Bottom 12' of face concealed. 40% of material on face would exceed 6", while 15%-20% would exceed 12". Sample #3 had excess silt for Item 201.		
41	1	1959				N	O	T	S	A	M	P	L	E	D	Owner: Maurice Before. (Formerly Bennett) Fine sand to silt. Pit overgrown with brush, and stumps and roots have been dumped in. Olin Brooks owns atop pit to west

TABLE I

DERBY GRANULAR DATA SHEET NO.23

Map Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (Ft)	Overburden (Ft)	Existing Pit	Sieve Analysis					Color AASHO T-21	Abrasion AASHO T-4-35	Passes VHD Spec.	Remarks
						% Passing								
						1½"	5/8"	#4	#100	#270				
														and northwest. No samples taken.
42	1	1959	0-9	0-2	Yes	100	--	100	3.0	1.75	2	---	Sand	Owner: Laframboise. Material acceptable for Item 202, sand. Sampled on east face.

TABLE I
Supplement

DERBY PROPERTY OWNERS - GRANULAR	Map Ident. No.
Before, Maurice	41
Benoit	12
Brown	35
Chapdelaine	38
Citizens' Utilities	30
Davis, R.	2
Derby, Town of	3, 13, 20
Gage, Don	27
Hackett, C.	23
Hackett, Earl	19, 21, 22
Hitchcock	28, 31, 34
Johnstone, William	11
Kelley, C. B	5, 6, 7, 8
Laframboise	42
Letourneau	24
Moeykens	33
Musgrove, Ernest	26
Parker, Keith	29, 32
Patnaude	4, 18
Provost, Richard	9, 10, 16, 17
Roberts, John and Angela	39, 40
Rowell	14
Sanders	15
Smith	1
Swift, Bill	26
Unknown	25
Wood, A. C.	36, 37

TABLE II

DERBY ROCK DATA SHEET NO. 1

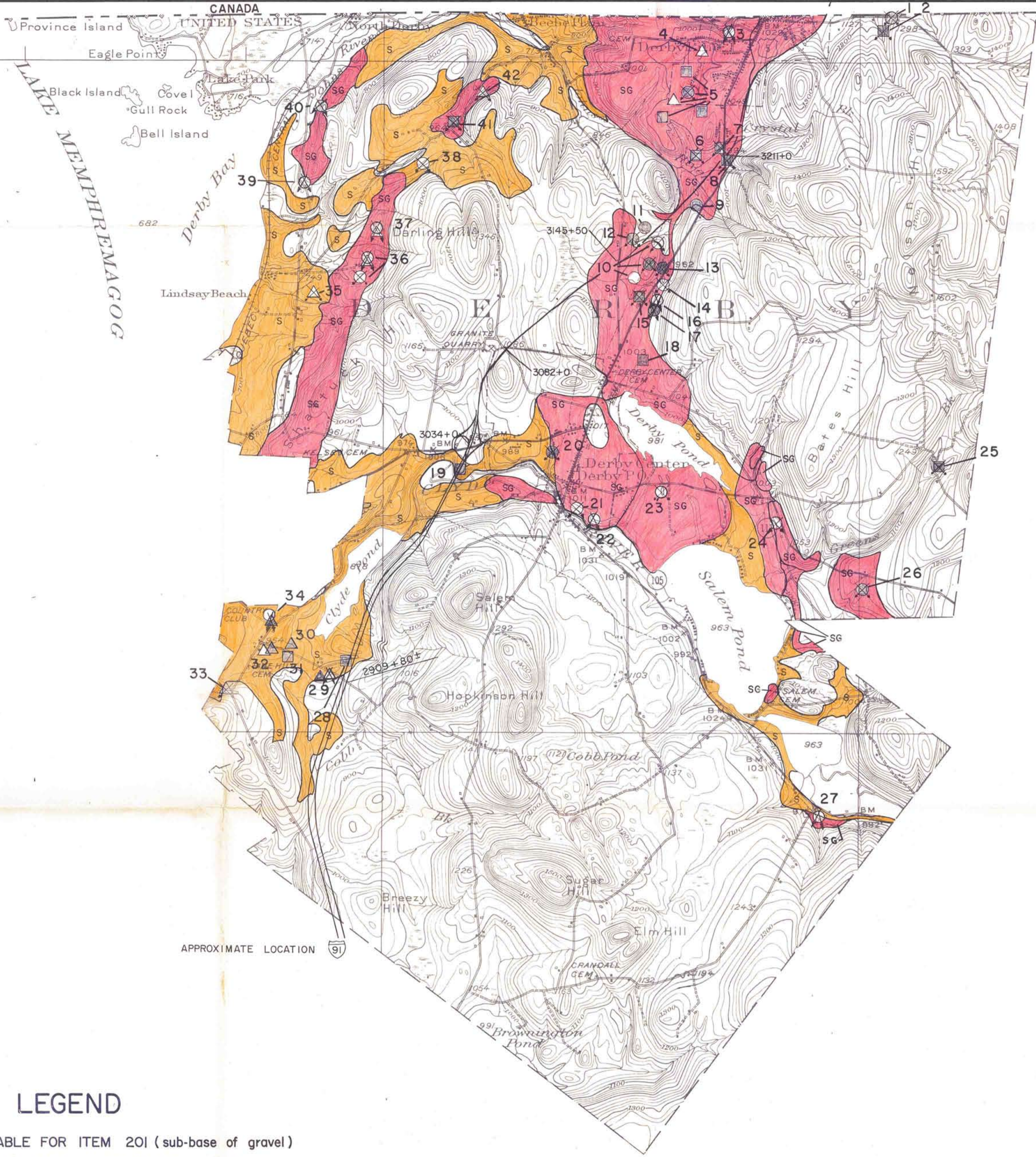
Map Ident. No.	Field Test No.	Year Field Tested	Rock Type	Exist- ing Quarry	Method of Sampling	Abrasion AASHO T-3	Remarks
1	1	1959	Granite	No	Chip	6.0%	Owner: William Dunn. Medium-grained gray granite. Due to the uniformity of the material, only one sample was taken. The sample was taken from the main outcrop about 200' north of its southern extremity. The outcrop is large indicating unlimited quantity. The availability of this material is questionable due to its location on good farmland. Material is acceptable for Item 204, Rock.
2	1 2	1958 1959	Granite Granite	Yes Yes	Chip Chip	6.0% 5.6%	Owner: Reed (formerly Willey). Large quarry with numerous grout piles. Medium-grained, light gray, binary granite. Both samples were taken from the grout pile. This is an excellent source of material for Project I 91-3(1) due to its proximity to the proposed centerline. Quantity is unlimited. Material acceptable for Item 204 (Sub-base of Crushed Rock).
3	1	1959	Granite	No	Chip	6.4%	Owner: Citizens' Utilities. Located 4700' north of Town Road on East Shore of Clyde Pond. A medium-grained gray granite. There is a very small abandoned quarry in the vicinity of this outcrop. Although this outcrop is small, the material underlies an extensive area, outcropping at Ident. Nos. 4, 5, and 6 and other locations. Material is acceptable for Item 204 (Sub-base of Crushed Rock).
4	1	1959	Granite	No	Chip	7.4%	Owner: Ivan Gray. Coarse-grained, gray granite. This material is much coarser and apparently softer than that in other outcrops of the same formation, i.e.: Ident. Nos. 3, 5, and 6. Quantity unlimited. Acceptable for Item 204 (Sub-base of Crushed Rock).
5	1	1959	Granite	Yes	Chip	6.2%	Owner: Hitchcock. A small abandoned quarry. Medium-to coarse grained gray granite. Access by rough wood trail. Sample taken from grout pile. Outcrop of same formation as Ident. Nos. 3, 4, and 6. Material is unlimited. Acceptable for Item 204 (Sub-base of Crushed Rock).
6	1	1959	Granite	Yes	Chip	6.6%	Owner: E. Before. Medium to coarse gray granite. This is a very small quarry; however, there are numerous small outcrops in this area indicating that this material underlies a large area. Acceptable for Item 204 (Rock). Access by foot; there is no road to quarry.

TABLE II
Supplement

DERBY PROPERTY OWNERS - ROCK

Before, E.	6
Citizens' Utilities	3
Dunn, William	1
Gray, Ivan	4
Hitchcock	5
Reed	2

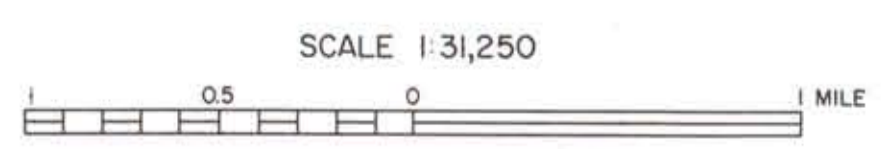
91 APPROXIMATE LOCATION



LEGEND

- GRAVEL, ACCEPTABLE FOR ITEM 201 (sub-base of gravel)
- GRAVEL, DEPLETED OR NOT ACCEPTABLE FOR ITEM 201
- △ SAND, ACCEPTABLE FOR ITEM 202 (sub-base of sand)
- ▲ SAND, DEPLETED OR NOT ACCEPTABLE FOR ITEM 202
- GRANULAR BORROW ITEM 105
- MATERIAL NOT ACCEPTABLE FOR ITEM 105
- ✕ EXISTING PIT
- SG SAND & GRAVEL DEPOSIT
- S SAND DEPOSIT
- 3 IDENTIFICATION NUMBER (refer to data sheet)

DERBY



CONTOUR INTERVAL 20 FEET

1960

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 1 GRANULAR

REVISIONS	DATE	1/16/68			
	BY	W.H.D.			