M. Lawson - Soils Lab.

SURVEY OF HIGHWAY CONSTRUCTION MATERIALS IN THE TOWN OF ESSEX, CHITTENDEN COUNTY, VERMONT

prepared by

Geologic Section, Materials Division

Vermont Department of Highways

in cooperation with

United States Department of Commerce

Bureau of Public Roads

Montpelier, Vermont

January, 1962

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 Charles G. Doll, Vermont State Geologist, University of Vermont, Burlington, Vermont.

4. The United States Department of Commerce, Bureau of Public Roads.

History

The Material 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 object was to compile an inventory of highway construction materials in the State of Vermont. Prior to the efforts of the personnel of this survey as described in this and other reports, searches for highway construction material 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 material is passed on to the State in the form of higher construction costs. The Material 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 material 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, keeping in mind their intended use. These maps and data sheets were devised to furnish information of particular use to the contractor or construction man. For maximum benefit, the maps, data sheets and this report should be studied simultaneously.

Inclosures

Included in this folder are two surface-geology maps; one defining the location of tests conducted on bedrock sources, the other defining the location of tests conducted on granular materials. These maps are derived from 15-minute quadrangles of the United States Geological Survey enlarged 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; i.e., Vermont Geological Society Bulletins, Vermont State Geologist Reports, United States Geological Survey Bedrock Maps, Centennial Geologic 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, 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, since 1956, has been mapping the glacial features of the State of Vermont during the summer months. 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 Society 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 tested or by 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, including an active card file compiled by the Highway Testing Laboratory. It was readily apparent that 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 in the cards varied widely in completeness. Transfer of information from the cards to the Data Sheets was made without elaboration or verification. The locations of the deposits listed in the card files have also been plotted on the maps. However, caution should be exercised wherever this information appears incomplete. Some cards in the file were not used because the information on the location of the deposit was incomplete or unidentifiable. This project does not assume responsibility for the information taken from the card files.

Work Sheets containing more detailed information of each test including a detailed sketch of each Identification Number area are on file in the office headquarters of this project, together with the respective Laboratory Reports.

Location

The Town of Essex is located in Chittenden County in the northwest section of the state approximately 30 miles south of the northern border of the state. It is bounded on the north by Westford, on the east by Jericho, on the west by Colchester, and on the south by the Winooski River. It is in the "Champlain Valley" physiographic division, an area of relatively smooth relief broken by low hills and ridges most of which have smooth or gently sloping sides. The stream valleys are shallow and wide. The maximum elevation of approximately 1200 feet is located in the extreme northeast corner. With the exception of the Brown's River, drainage is southward into the Winooski River and thence into Lake Champlain. The Brown's River flows northward into the Lamoille River which, in turn, flows into Lake Champlain.

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; the 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 are 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 types 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 at intervals 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

It will be observed that the information on the surface-geology bedrock map in regard to rock type is simplified. For a more detailed description of the respective rock formations a summary is included in this report. It is apparent from this summary that each formation may not be composed of one distinct rock type, but may be a complex mixture of rock types blending into one another. For this reason, the data sheets may describe the rock tested as differing from the designation on the map.

In general, the area included in this report is comprised chiefly of schist and graywacke. A small area of dolomite, quartzite, slate, and marble occurs along the western edge of the town. Since visual inspection indicated that the schist was of unsatisfactory quality, sampling was confined to the more massive rock types along the western border. The area designated as Bascom Formation is not defined as to rock type because of the wide variety of types included in the formation. It is colored as a schist to indicate its thin laminae and phyllitic partings.

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 photos 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 locations of existing pits, when known, are mapped. 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 12 feet and 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 Gravel and Sand Deposits

The granular deposits of the Town of Essex are the result of glacial, fluvial and lacustrine deposition. During the recession of a glacial ice lobe northward at the end of the Pleistocene Period, a large delta was formed in the enlarged Lake Champlain. This delta now occupies the southern portion of the town and is evidenced by the large sand deposits in that area.

Several small fluvial and glacial deposits are noted in the northern half of the town. Of particular interest is a well-defined esker just northwest of Essex Center. The sampling of this feature is represented by Identification Numbers 2, 3, and 4.

Glossary of Selected Geologic Terms

Dip - The angle which a stratum, sheet, vein, fissure, fault, or similar geological feature makes with a horizontal plane, as measured in a plane normal to the strike.

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 America 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 alteration of granular minerals and tabular or schistose minerals with the rock, tending to split along the planes where tabular or schistose minerals predominate.

Granulite - According to current usage of the term in Europe, a granulite is a quartz-feldspar rock of high metamorphic grade, poor or lacking in mica, and characterized structurally by a single regular plane of schistosity, which is easily visible to the eye. The schistosity is determined mainly by parallel orientation of flat lenses of coarse-grained quartz set in a quartzose matrix of smaller equidimensional grains. The term has appeared in older literature with a variety of other meanings and should not be used without explanation.

Kame - A conical hill of 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.

Limestone - A bedded sedimentary deposit consisting chiefly of calcium carbonate which yields lime when burned. The strength of limestone as a rock varies very much with the texture; that of firm, compact varieties is very high, whereas loose porous ones are very weak. Limestone is a very durable rock in arid climates but deteriorates in humid climates.

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

Metamorphic Rocks - Rocks that owe their distinctive characters 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.

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

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.

Slate - A homogeneous, metamorphic rock, so fine-grained that no mineral grains can be seen. Slate splits with a foliation so perfect that it yields slabs having plane surfaces almost as smooth as the cleavage planes of minerals. Slate is on the average somewhat harder than shale. Its ability to be split into flat slabs makes it generally unsuitable for aggregate.

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 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, and 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.

Summary of Rock Formations in the Town of Essex

Bascom Formation - Interbedded dolomite, limestone, or marble, calcareous sandstone, quartzite, and limestone breccia; irregular dolomite layers, thin sandy laminae and slaty or phyllitic partings characterize the limestone and marble.

Cheshire Quartzite - Very massive white to faintly pink or buff vitreous quartzite.

Clarendon Springs Formation - Fairly uniform, massive smooth-weathered gray dolomite characterized by numerous geodes and knots of white quartz; quartz sandstone and irregular masses of chert are near the top.

Cutting Dolomite - A massive gray weathered, nondescript dolomite with a finely laminated calcareous sandstone at base.

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

Fairfield Pond Formation - Greenish quartzite schist, locally purple or red. Contains quartz sericite, albite chlorite, biotite.

Pinnacle Formation - Schistose graywacke, gray to buff, commonly striped, quartz-albite-sericite-biotite-chlorite rock predominates; quartz-cobble and boulder conglomerate is common, chiefly near base.

Rugg Brook Formation - Sandy gray dolomite, dolomite conglomerate, and interbeds of gray weathered sandstone.

Shelburne Formation - A white marble or gray limestone characterized by raised articulate lines of gray dolomite on the weathered surface.

Skeels Corners member of Sweetsburg Formation - Black slate; local dolomite, sandstone, dolomite conglomerate, limestone bioherms, limestone, and calcareous shale.

Underhill Formation - Silvery, gray-green schist.

Bibliography

1. United States Department of the Interior, Geological Survey, Milton, Vermont Quadrangle.

2. United States Department of the Interior, Geological Survey, Burlington, Vermont Quadrangle.

3. United States Department of the Interior, Geological Survey, Mt. Mansfield, Vermont Quadrangle.

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

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

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

7. "The Glacial Geology of Vermont", D. P. Stewart, (partially published), Vermont Geological Survey Bulletin No. 19, 1961.

8. "A Handbook of Rocks", J. F. Kemp, D. VanNostrand Company, Inc. June, 1946.

9. "Late Glacial and Post Glacial History of the Champlain Valley", D. H. Chapman. American Journal of Science, Vol. 24, pg. 89.

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

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

12. "Glacial Geology and the Pleistocene Epoch", Richard F. Flint, John Wiley and Sons, 1947.

13. "Report on the Geology of Chittenden County", G. H. Perkins, Vermont State Geologist Report, Volume 6, 1907-08.

14. "Cambrian Succession in Northwestern Vermont", Arthur Keith. Vermont State Geologist Report, Volume 14, 1923-24.

15. "Studies of the Geology of Western Vermont", C. E. Gordon, Vermont State Geologist Report, Volume 13, 1921-22.

16. "The Great Ice Age in Vermont", E. C. Jacobs, Vermont State Geologist Report, Volume 23, 1942.

17. "Centennial Geologic Map of Vermont", C. G. Doll, 1961.

18. "Surficial Geology of the Champlain Basin", C. H. Hitchcock, Report of the Vermont State Geologist, Volume 7, page 199, 1909-10.

19. "Some Late Wisconsin and Post-Wisconsin Shore Lines of Northwestern Vermont", H. E. Merwin. Report of the Vermont State Geologist, Volume 6, page 113, 1907-08.

20. "Post Glacial Marine Waters in Vermont", H. LeR. Fairchild, Report of the Vermont State Geologist, Volume 10, page 24, 1915-16.

X

ESSEX GRANULAR DATA SHEET NO. 1

ent. o.	Field Test No.	Year Field Tested	Depth of Sample or Test (ft.)	Over-Burden (ft.)	Existing Pit	Volume Estimate (cu. yds.)	Sieve Analysis % Passing 1½"	#4	#100	#270	Color AASHO T-21	Abrasion AASHO T-4-35	Passes V.H.D. Specs.	Remarks
	1	1960	1.5-9	0-1.5	Yes		—	62.8	12	2	1½	——	Gran. Bor. (Grav)	Owner: Town of Essex. (formerly King Pit). Small pit limited by roads and ledge rock. Contains poorly graded soft flat stones. Fails for Item 201, sub-base of gravel. Has only 37.2% stone. Acceptable for Item 102A, granular borrow.
	1	1960	1.5-8	0-1.5	No		—	40.6	8	3	5	27.6%	Gran. Bor. (Grav)	Owner: Cheney. Portion of a large esker which extends from Ident. #4. Test #1 taken 125' from north end and on crown of esker. Gravel with gravel and water in bottom. Many stones over 6". Fails on stone wear for Item 201, sub-base of gravel. Acceptable for Item 102A, granular borrow.
	2	1960	0.5-6	0-0.5	No		—	34.4	6	3	3½	20.2%	Gravel	Test #2 on crown of esker 200' south of Test #1. Gravel with gravel bottom. Acceptable for Item 201, sub-base of gravel.
	3	1960	0.5-6	0-0.5	No		—	37.1	4	2	3½	22.6%	Gravel	Test #3 on crown of esker 200' southeast of Test #2. Gravel with gravel bottom. Acceptable for Item 201, sub-base of gravel.

ESSEX GRANULAR DATA SHEET NO. 2

Ident. No.	Field Test No.	Year Field Tested	Depth of Sample or Test (ft)	Over-Burden (ft)	Exist-ing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing				Color AASHO T-21	Abrasion AASHO T-4-35	Passes V.H.D. Specs.	Remarks
							1½"	#4	#100	#270				
2	4	1960	0.5-7	0-0.5	No		—	23.8	5	3	3½	22.2%	Gravel	Test #4 on crown of ker, 200' southeast Test #3. Gravel wit gravel bottom. Acce able for Item 201, base of gravel.
	5	1960	0.5-6	0-0.5	No		—	37.1	3	2	3½	23.6%	Gravel	Test #5 on crown of ker 200' south of Te #4. Gravel with grav bottom. Acceptable f Item 201, sub-base o gravel.
	6	1960	0.5-9	0-0.5	No		—	40.8	4	2	3½	23.4%	Gravel	Test #6 on crown of ker 200' south of Te #5. Gravel with grave bottom. Acceptable f Item 201, sub-base of gravel.
	7	1960	0.5-9	0-0.5	No		—	59	4	2	4	—	Gran. Bor. (Grav)	Test #7 on crown of ker 200' southwest of Test #6. Gravel with gravel bottom. Fails color. Not enough ston in sample for abrasion test. Acceptable for Item 102A, granular b row.
	8	1960	1-3	0-1	No		—	Not	Sampled	—	—	—	—	Test #8 in drainage ditch which cuts acro esker 150' south of Te #7. Gravel with grave and water in bottom.

ESSEX GRANULAR DATA SHEET NO. 3

Ident. No.	Field Test No.	Year Field Tested	Depth of Sample or Test (ft)	Over-Burden (ft)	Existing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing 1½"	#4	#100	#270	Color AASHO T-21	Abrasion AASHO T-4-35	Passes W.H.D. Specs.	Remarks
2	9	1960	0.5-9	0-0.5	No		—	37.1	2	0.5	4	28.8%	Gran. Bor. (Grav)	Test #9 50' south of Test #8 on crown of esker. Fine gravel with fine gravel bottom. Fails on color and abrasion for Item 201, sub-base of gravel. Acceptable for Item 102A, granular borrow.
	10	1960	0.5-7.5	0-0.5	No		—	18.6	6	2.75	2½	19.4%	Gravel	Test #10 on crown of esker 160' south of Test #9. Gravel with gravel bottom. Acceptable for Item 201, sub-base of gravel.
	11	1960	0.5-6	0-0.5	No		—	Not	Sampled	—	—	—	—	Test #11 on crown of esker 200' south of Test #10. Fine gravel with many stones over 6" with fine gravel bottom.
	12	1960	0.5-3	0-0.5	No		—	Not	Sampled	—	—	—	—	Test #12 in field to west of esker opposite Test #10. Silt with silt bottom.
3	1	1960	1.5-7	0-1.5	Yes		—	24.4	22	8	1½	28%	Gran. Bor. (Grav)	Owner: Chapin. A pit in the same esker as Ident #4. Dirty gravel with stones over 6". Test #1 failed on gradation and stone wear for Item 201 sub-base of gravel. Acceptable for Item 102A granular borrow.

ESSEX GRANULAR DATA SHEET NO. 4

ent. No.	Field Test No.	Year Field Tested	Depth of Sample or Test (ft)	Over-Burden (ft)	Exist-ing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing				Color AASHO T-21	Abrasion AASHO T-4-35	Passes W.H.D. Specs.	Remarks
							1½"	#4	#100	#270				
4	1	1960	3-11.5	0-3	Yes		—	43.0	3 .	1.5	1½	15%	Gravel	Owner: Bixby. Pit in the southern portion of a long esker. Water standing in bottom of pit. Contains some large stones. Test #1 taken at south end of pit in 25' face. Acceptable for Item 201, sub-base of gravel.
5	1	1960	1-8	0-1	No		—	See	Remarks	—	—	—	Gran. Bor.	Owner: Rousselle. Test #1 in south face of terrace north of Vt Route 128. Fine sand with fine sand bottom. Sample run by Soils Lab. 100% passing #10 97.4 " #40 8.7 " #200 3.2 " #270 Soil type A-3. Acceptable for Item 102A, granular borrow.
	2	1960	1-10	0-1	No		100	99.5	62.7	18.1	5	—	—	Test #2 on top of terrace 10' from edge above Test #1. Fine sand with fine sand bottom.
	3	1960	0-2		No		100	66.9	2.0	0.2	2½	—	Gran. Bor. (Sand)	Test #3 in sand bar at east edge of river. Pebbly sand. Water and sand in bottom. Fails for Item 202, sub-base of sand. 66.9% passing #4 mesh. Acceptable for Item 102A, granular borrow.

ESSEX GRANULAR DATA SHEET NO. 5

dent. No.	Field Test No.	Year Field Tested	Depth of Sample (ft)	Over-Burden (ft)	Exist-ing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing				Color AASHO T-21	Abrasion AASHO T-4-35	Passes W.H.D. Spec.	Remarks
							1½"	#4	#100	#270				
6	1	1960	1-3	0-1	No		—	Not	Sampled	—	—	—	—	Owner: R. H. LaVigne. Test #1 on ridge north-west of house and 20' east of stone wall. Stony loam with ledge rock bottom.
	2	1960	1-8	0-1	No		—	33	10	4.3	3½	24.2%	Gravel	Test #2 135' north of Test #1 and 20' east of wall. Dirty gravel with dirty gravel bottom. Acceptable for Item 201 sub-base of gravel.
	3	1960	1-3	0-1	No		—	Not	Sampled	—	—	—	—	Test #3 50' south of stone pile north of house. Till with ledge bottom.
	4	1960	1-3	0-1	No		—	Not	Sampled	—	—	—	—	Test #4 in field 500' north of Test #3. Till with large stones. Ledge bottom.
	5	1960	1-4.5	0-1	No		—	Not	Sampled	—	—	—	—	Test #5 taken in field northeast of house. Till with sub-angular stones Till and water in bottom
7	1	1960	1-30	0-1	Yes		91.9	67.7	10.2	2	3	—	Gran. Bor. (Sand)	Owner: Town of Essex. Several pits are includ ed in this area. Test #1 in north face of western most pit. Pebbly sand. Fails for sand. Accept-able for Item 102A, gra nular borrow.

ESSEX GRANULAR DATA SHEET NO. 6

ent. io.	Field Test No.	Year Field Tested	Depth of Sample (ft)	Over-Burden (ft)	Exist-ing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing				Color AASHO T-21	Abrasion AASHO T-4-35	Passes W.H.D. Spec.	Remarks
							1½"	#4	#100	#270				
7	2	1960	2-13.5	0-2	Yes		100	97	25.2	3.7	1	——	Gran. Bor. (Sand)	Test #2 in west face of easternmost pit. Gravel overburden. Sand too fine for Item 202, sub-base of sand. Acceptabl for Item 102A, granular borrow.
	3	1960	2-4	0-2	No		—	Not	Sampled	—	——	——	——	Test #3 in brush north-east of Test #1. Dirty till with ledge bottom.
	4	1960	1-5	0-1	No		—	39.1	2	1	3½	14.2%	Gravel	Test #4 300' northeast of Test #3. Gravel with ledge bottom. Acceptabl for Item 201, sub-base of gravel.
	5	1960	1-8	0-1	No		—	38.6	2	.75	1½	22%	Gravel	Test #5 across logging road from Test #4. 0-1' overburden, 1-8' gravel with thin bands of silt 8-13' sandy silt. Acceptable for Item 201, sub-base of gravel. Ledge underlies most of the higher elevations with a thin veneer of silty gravel.
	6	1960	1-4	0-1	No		—	Not	Sampled	—	——	——	——	Test #6 north of Test #5 along logging road on same side of logging road. Fine sand and silt with ledge bottom.
	7	1960	1-6	0-1	No		—	Not	Sampled	—	——	——	——	Test #7 across logging road from Test #6. 0-1' overburden, 1-3' silt, 3-6' gravel, ledge bottom.

ESSEX GRANULAR DATA SHEET NO. 7

ent. o.	Field Test No.	Year Field Tested	Depth of Sample or Test (ft)	Over-Burden (ft)	Existing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing 1½"	#4	#100	#270	Color AASHO T-21	Abrasion AASHO T-4-35	Passes W.H.D. Spec.	Remarks
	8	1960	1-4	0-1	No		—	Not	Sampled	—	—	—	—	Test #8 across logging road from Test #5. Gravel, ledge bottom.
	9	1960	0-3		No		—	Not	Sampled	—	—	—	—	Test #9 at north side of logging road near bottom of hill. Taken in stripped area. Gravel ledge bottom.
	10	1960	1-10	0-1	Yes		100	100	79	28.0	1	—	—	Test #10 in old pit east of town road. Material too fine for Item 202, sub-base of sand, Item 102A, granular borrow, or Item 102, common borrow. 28% passing #270 mesh.
	11	1960	2-10	0-2	No		100	80.4	1	0.5	2	—	Gran. Bor. (Sand)	Test #11 150' northeast of Test #10. Acceptable for Item 102A, granular borrow.
8	1	1960	1-5	0-1	No		—	Not	Sampled	—	—	—	—	Owner: Raymond King. Test #1 on terrace near north line fence. Clay over stones and clay, unstratified, with boulders and water in botto
	2	1960	1-6	0-1	No		—	Not	Sampled	—	—	—	—	Test #2 200' south of Test #1. Fine sand and silt with ledge and water in bottom.
	3	1960	1-2	0-1	No		—	Not	Sampled	—	—	—	—	Test #3 at a higher elevation than Test #2, and behind house. Stony silt with ledge bottom.

ESSEX GRANULAR DATA SHEET NO. 8

Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (ft)	Over-Burden (ft)	Existing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing 1½"	#4	#100	#270	Color AASHO T-21	Abrasion AASHO T-4-35	Passes W.H.D. Spec.	Remarks
9	1	1960	0.5-2	0-0.5	Yes		—	Not	Sampled	—	—	—	—	Owner: Harold Davis. Area represents a shallow veneer of gravel deposited over and around the ledge. Material is dirty gravel of poor quality. Pit has not been used for many years.
10	1	1960	1-25	0-1	Yes		—	38.4	3	1.25	2	18.8%	Gravel	Owner: Kelsey. Test #1 in west face of pit. Gravel with gravel bottom. Acceptable for Item 201, sub-base of gravel.
11	1	1960	0-2	0-2	No		—	Not	Sampled	—	—	—	—	Owner: Shuppin. Test #1 halfway up slope and just south of stone wall north of house. Top soil and stone with ledge bottom.
	2	1960	1-9	0-1	No		—	48.8	25	13	2½	22.2	Borrow (Grav)	Test #2 on top of slope above Test #1. Sandy gravel with sandy gravel in bottom. Fails on gradation for Item 201, sub-base of gravel and Item 102A, granular borrow. Acceptable for Item 102, common borrow.
	3	1960	2-4	0-2	No		—	Not	Sampled	—	—	—	—	Test #3 150' south of Test #2. Dirty gravel with ledge bottom.
	4	1960	7-10	0-1	No			56.9	8	2	2½	29.6%	Gran. Bor. (Grav)	Test #4 east of Test #3 at edge of slope. Sandy gravel with sandy gr...

ESSEX GRANULAR DATA SHEET NO. 9

Ident. No.	Field Test No.	Year Field Tested	Depth of Sample or Test (ft)	Over-Burden (ft)	Existing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing 1½"	#4	#100	#270	Color AASHO T-21	Abrasion AASHO T-4-35	Passes W.H.D. Specs.	Remarks
														bottom. Fails on stone wear for Item 201, sub-base of gravel. Acceptable for Item 102A granular borrow.
	5	1960	0-2	0-2	No		—	Not	Sampled	—	—	—	—	Test #5 south of Test #1. Stony topsoil with ledge bottom.
	6	1960	2-4	0-2	No		—	Not	Sampled	—	—	—	—	Test #6 north of Test #1 and north of stone wall. Sand with ledge bottom.
12	1	1960	1-4	0-1	No		—	Not	Sampled	—	—	—	—	Owner: Harold Whitcomb, Jr. Test #1 east of logging road north of curve. Stony silt with ledge bottom.
	2	1960	1-8	0-1	No		—	Not	Sampled	—	—	—	—	Test #2 south of Test #1 and across logging road in corner of fence. Stony silt with clay bottom.
13	1	1960	1-12	0-1	Yes		—	31.9	8	2.5	3½	19.2%	Gravel	Owner: Burns. Dirty gravel. Water in bottom. Pit nearly depleted. Test #1 in south face. Acceptable for Item 201, sub-base of gravel.
14	1	1960	5-18	0-5	Yes		—	36.1	4	1.5	2	18%	Gravel	Owner: Harold Whitcomb. Test #1 in west face of pit east of road. Gravel with gravel bottom. Many stones over 6". Acceptable for Item 201 sub-base of gravel.

ESSEX GRANULAR DATA SHEET NO. 10

Ident. No.	Field Test No.	Year Field Tested	Depth of Sample or Test (ft)	Over-Burden (ft)	Exist-ing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing				Color AASHO T-21	Abrasion AASHO T-4-35	Passes W.H.D. Spec.	Remarks
							1½"	#4	#100	#270				
14	2	1960	0.5-8	0-0.5	No		—	24.2	10	4	3½	20.6%	Gravel	Test #2 on knoll across brook and northeast of pit. Gravel with gravel bottom. Acceptable for Item 201, sub-base of gravel.
15	1	1960	1-4	0-1	No		—	See	Remarks	—	—	—	Gran. Bor.	Owner: Whitcomb. Test #1 in bank at east side of town road. A pebbly sand becoming coarser with depth. Material might pass for Item 202 sub-base of sand, depending on #100 screen which was not used by Soils Lab. Sample run by Soils Lab. 100% passing 3/4" 97.1 " 3/8" 91.1 " #4 82.0 " #10 36.3 " #40 1.0 " #200 0.6 " #270 Soil type A-1-b. Acceptable for Item 102A, granular borrow.
16	1	1958			No	16,000	—	26.7	8	2.75	1	13.2%	Gravel	Owner: Bushey Bros. A small river bar of good material. When observed in 1959, this source was nearly depleted. Test #1 acceptable for Item 201, sub-base of gravel. Sampled by F. Callahan.

ESSEX GRANULAR DATA SHEET NO. 11

Ident. No.	Field Test No.	Year Field Tested	Depth of Sample (ft)	Over-Burden (ft)	Existing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing 1½"	#4	#100	#270	Color AASHO T-21	Abrasion AASHO T-4435	Passes W.H.D. Spec.	Remarks
16	2	1958			No	15,000	—	41.2	3	1	1	14%	Gravel	Test #2 acceptable for Item 201, sub-base of gravel.
17	1	1959			No		—	40.3	2	.5	3	10%	Gravel	Owner: Bushey Bros. A large river bar containing material of good quality. Acceptable for Item 201, sub-base of gravel.
18	1	1960	0.5-10	0-0.5	No		—	100	15	10.5	5	—	—	Owner: Seagrist. Test #1 100' north of river bank. Sand with silt bottom. Material too fine for Item 202, sub-base of sand and Item 102A, granular borrow. Has over 10% passing #270 mesh.
	2	1960	0-2	0	No		—	42.4	5	2	1½	15%	Gravel	Test #2 55' from river bank. 0-2' gravel, 2-6.5' sand. Acceptable for Item 201, sub-base of gravel.
19	1	1960	1-3	0-1	No		—	Not	Sampled	—	—	—	—	Owner: Seagrist. Test #1 on slope 250' north of Vt Route 117 and behind barn. 0-1' overburden, 1-2' sandy loan, 2-3' banded silt or clay. Silty clay bottom.
	2	1960	0-10.5	0	No		—	99.6	46	12	1½	—	—	Test #2 west of Test #1. Sand with clay bottom. Too fine for Item 202, sub-base of sand, and

ESSEX GRANULAR DATA SHEET NO. 12

ent. No.	Field Test No.	Year Field Tested	Depth of Sample or Test (ft)	Over-Burden (ft)	Existing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing 1½"	#4	#100	#270	Color AASHO T-21	Abrasion AASHO T-4-35	Passes W.H.D. Spec.	Remarks
														Item 102A, granular borrow. Has 12% passing #270 mesh.
20	1	1960	0-9	0	Yes		—	Not	Sampled	—	—	—	—	Owner: Seagrist. Test #1 in floor of pit. 0-2' sand, 2-9' varved clay. Clay bottom.
	2	1960	0-10.5	0	No		—	99.2	22	2.3	1½	—	Gran. Bor. (Sand)	Test #2 at junction of woods roads east of pit. Sand with sand bottom. Too fine for Item 202, sub-base of sand. Has 22% passing #100 mesh. Acceptable for Item 102A granular borrow.
21	1	1960	0-5		No		—	See	Remarks	—	—	—	Gran. Bor.	Owner: Essex Town. Sand with sand bottom. Acceptable for Item 102A, granular borrow. Sample run by Soils Lab. 100% passing #10 88.9 " #40 13.8 " #200 4.2 " #270 Soil Type A-2-4.
22	1	1960	2-5	0-2	No		—	68.8	2	.75	1½	—	Gran. Bor.	Owner: IBM Corp. Test #1 340' east of private road and north of railroad tracks. Gravelly sand with clay and water in bottom. Fails on gradation for Item 201, sub-base of gravel

ESSEX GRANULAR DATA SHEET NO. 13

lent. lo.	Field Test No.	Year Field Tested	Depth of Sample (ft)	Over-Burden (ft)	Exist-ing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing 1½"	#4	#100	#270	Color AASHO T-21	Abrasion AASHO T-4-35	Passes W.H.D. Spec.	Remarks
														Contains only 31.2% stone. Acceptable for Item 102A, granular borrow.
	2	1960	0.5-7	0-0.5	No		—	Not	Sampled	—	—	—	—	Test #2 5' east of private road and 85' north of railroad tracks. 0-0.5' overburden, 0.5-5' silt, 5-7' sand.
	3	1960	0.5-7.5	0-0.5	No		—	70.7	5	2.25	2½	—	Gran. Bor.	Test #3 20' north of river south of Test #1. Fails on gradation for Item 201, sub-base of gravel. Contains only 29.3% stone. Acceptable for Item 102A, granular borrow.
	4	1960	0.5-2	0-0.5	No		—	Not	Sampled	—	—	—	—	Test #4 on knoll west of private road and north of railroad. Silt.
23	1	1960	0.5-3	0-0.5	No		—	Not	Sampled	—	—	—	—	Owner: IBM Corp. Test #1 135' east of town road and south of woods. Dirty gravel with silty clay bottom.
	2	1960	1-5	0-1	No		—	Not	Sampled	—	—	—	—	Test #2 100' east of Test #1. Gravelly sand with clay bottom.
	3	1960	1-3.5	0-1	No		—	Not	Sampled	—	—	—	—	Test #3 150' east of town road at edge of birch grove. Gravel with clay bottom.
	4	1960	1.5-3.5	0-1.5	No		—	Not	Sampled	—	—	—	—	Test #4 150' southeast of Test #3 and 35' northwest of old test hole. Gravelly sand with clay bottom.

ESSEX GRANULAR DATA SHEET NO. 14

cnt. o.	Field Test No.	Year Field Tested	Depth of Sample (ft)	Over-Burden (ft)	Exist-ing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing 1½"	#4	#100	#270	Color AASHO T-21	Abrasion AASHO T-4-35	Passes W.H.D. Spec.	Remarks
24	1	1960	1-6.5	0-1	No		—	60.4	6	1.25	3	18.2%	Gran. Bor.	Owner: IBM Corp. A large terrace. Test #1 65' south of woods and at top of bank. Gravelly sand with clay bottom. Barely fails on gradation for Item 201, sub-base of gravel. Has only 39.6% stone. Acceptable for Item 102A, granular borrow.
	2	1960	1-7	0-1	No		—	59.7	3	1.5	2	22.6%	Gravel	Test #2 200' south of Test #1 on top of bank. Gravelly sand with clay bottom. Acceptable for Item 201, sub-base of gravel.
	3	1960	1-2.4	0-1	No		—	54.1	6	1.75	3	21.6%	Gravel	Test #3 200' south of Test #2 on top of bank. Gravelly sand with clay bottom. Acceptable for Item 201, sub-base of gravel.
	4	1960	1-4	0-1	No		—	51.6	3	1.75	3	18.4%	Gravel	Test #4 220' southeast of Test #3. Gravelly sand with clay bottom. Water at 4'. Acceptable for Item 201, sub-base of gravel.
	5	1960	1-4.5	0-1	No		—	63.7	6	1.5	2½	—	Gran. Bor.	Test #5 330' northeast of Test #4. Gravelly sand with clay bottom. Water at 4.5'. Fails on gradation for Item 201, sub-base of gravel. Contains only 36.3% stone. Acceptable for Item 102A, granular borrow.

ESSEX GRANULAR DATA SHEET NO. 15

lent. No.	Field Test No.	Year Field Tested	Depth of Sample (ft)	Over-Burden (ft)	Existing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing 1½"	#4	#100	#270	Color AASHO T-21	Abrasion AASHO T-4-35	Passes V.H.D. Spec.	Remarks
24	6	1960	1-5	0-1	No		97.1	79	8	2	1½	—	Gran. Bor.	Test #6 225' southeast of Test #5 and 200' west of railroad track. Pebbly sand with clay bottom. Acceptable for Item 102A, granular borrow.
	7	1960	1-2.5	0-1	No		—	Not	Sampled	—	—	—	—	Test #7 625' north of Test #6 and 200' from track. Sand with clay and water in bottom.
	8	1960	1-3	0-1	No		—	Not	Sampled	—	—	—	—	Test #8 225' north of Test #7 and 200' from track. Sand with clay bottom.
	9	1960	1-2	0-1	No		—	Not	Sampled	—	—	—	—	Test #9 245' north of Test #8 at edge of woods, and 435' east of Test #1. Sand with clay bottom.
25	1	1960	2-8	0-2	Yes		—	44	3	3	1	17.6%	Gravel	Owner: P. W. Holland. Test #1 in south face of pit. Gravel with fin sand bottom. Acceptabl for Item 201, sub-base of gravel.
	2	1960	0-7	0	Yes		—	See	Remarks	—	—	—	Gran. Bor.	Test #2 in bottom of pit. Sample run by Soil Lab. 100% passing #10 98.9 " #40 25.6 " #200 9.5 " #270 Soil type A-2-4. Accep able for Item 102A, granular borrow.

ESSEX GRANULAR DATA SHEET NO. 16

dent. No.	Field Test No.	Year Field Tested	Depth of Sample (ft)	Over-Burden (ft)	Exist-ing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing				Color AASHO T-21	Abrasion AASHO T-4-35	Passes W.H.D. Spec.	Remarks
							1½"	#4	#100	#270				
26	1	1960	4.5-13.5	0-4.5	Yes		—	43.7	4	1	2	27.8%	Gran. Bor. (Grav)	Owner: D.A.V. (Leased by Charles Petri). A deposit of fluvial gravel. Bottom is fine blu sand with silt & clay. Fails on stone wear for Item 201, sub-base of gravel. Acceptable for Item 102A, granular borrow.
27	1	1960	3-25	0-3	Yes		100	93.1	4.7	0.5	1	—	Sand	Owner: Essex Town. Two pits on each side of town road. Test #1 contains thin bands of material varying from fine to coarse sand. Test #1 in south face o east pit. Pit on opposite side of road contains similar material. Acceptable for Item 20 sub-base of sand.
28	1	1960	0-8	0	Yes		100	100	12	0.75	3	—	Sand	Owner: Charles Petrie. A small pit in a large sand area. Test #1 in southwest face. Acceptable for Item 202, sub-base of sand.
29	1	1960	0-5	0	No		100	100	14	0.5	1	—	Sand	Owner: Roy Beshaw. Test #1 in windblown dune-like area. In large san area. Acceptable for Item 202, sub-base of sand.

ESSEX GRANULAR DATA SHEET NO. 17

ent. o.	Field Test No.	Year Field Tested	Depth of Sample (ft)	Over-Burden (ft)	Exist-ing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing				Color AASHO T-21	Abrasion AASHO T-4-35	Basses W.H.D. Spec.	Remarks
							1½"	#4	#100	#270				
30	1	1960	0-5		No		100	100	23	2	3	——	Gran. Bor. (Sand)	Owner: Desjardin. At extremity of very large sand area. Material too fine for Item 202, sub-base of sand. Has 23% passing #100 mesh. Acceptable for Item 102A, granular borrow.
31	1	1960	0-5		No		100	100	24	0.5	1	——	Gran. Bor. (Sand)	Owner: G. Monti. Test #1 in same large sand area as Ident. #12. Sand with sand bottom. Material too fine for Item 202, sub-base of sand. Has 24% passing #100 mesh. Acceptable for Item 102A, granular borrow.
32	1	1960	8-14	0-1	Yes		——	35	5	2	1	33%	Gran. Bor. (Grav)	Owner: Town of Essex. (Formerly Fishman Pit). A series of small pits in a terrace stretching northward. Limited by ledge on west. Test #1 in east face of southernmost pit. 0-1' overburden, 1-8' dirty gravel, 8-14' gravel. Sampled gravel in 8-14' zone. Clay and water in bottom of pit. Fails on stone wear for Item 201 sub-base of gravel. Acceptable for Item 102A, granular borrow.

ESSEX GRANULAR DATA SHEET NO. 18

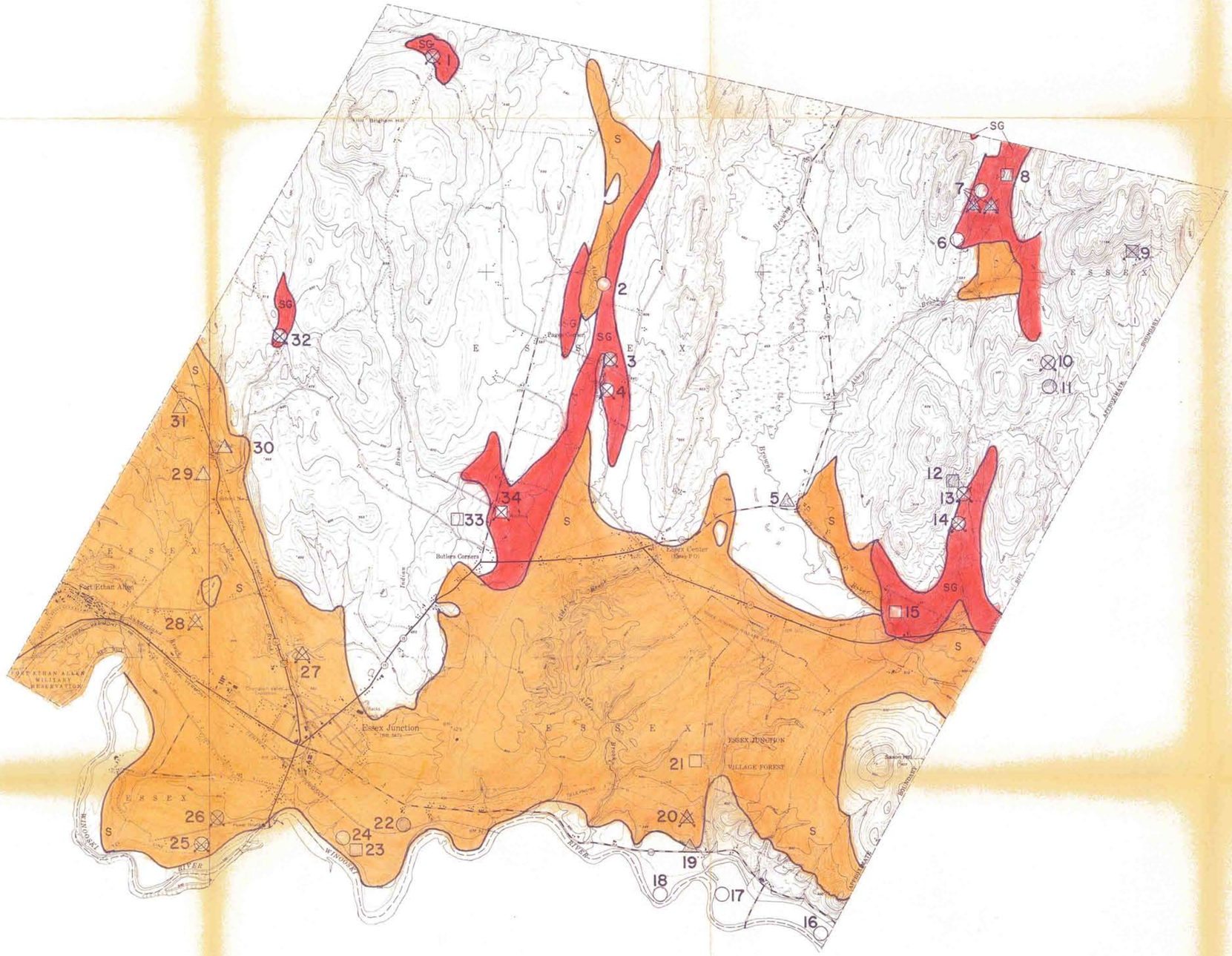
ent. o.	Field Test No.	Year Field Tested	Depth of Sample (ft)	Over-Burden (ft)	Exist-ing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing 1½"	#4	#100	#270	Color AASHO T-21	Abrasion AASHO T-4-35	Passes W.H.D. Spec.	Remarks
32	2	1960	2-15	0-2	Yes		—	24.2	2	1.25	1	24%	Gravel	Test #2 in north face of north pit. Gravel with clay bottom. Acceptable for Item 201, sub-base of gravel.
	3	1960	1-9	0-1	No		—	Not	Sampled	—	—	—	—	Test #3 30' north of north pit. Silty sand. Bottom of hole silty sand.
33	1	1960	1-3	0-1	No		—	Not	Sampled	—	—	—	—	Owner: Parker. Test #1 northeast of town road between ledges. Till with till bottom.
34	1	1960	0.5-7	0-0.5	Yes		—	See	Remarks	—	—	—	Gran. Bor.	Owner: Yandow. A small pit containing a mixture of sand & gravel. Test #1 tested by Soils Lab: 100% passing 2" 95.4 " 1½" 92.6 " 3/4" 84.1 " 3/8" 74.3 " #4 64.7 " #10 49.9 " #40 3.5 " #200 2.2 " #270 Soil type A-1-b. Acceptable for Item 102A, granular borrow.
	1A	1960	1-9.5	0-1	Yes		—	Not	Sampled	—	—	—	—	Test #1A taken with backhoe in same place as Test #1. Pebbly sand with clay bottom.

ESSEX GRANULAR DATA SHEET NO. 19

ent. o.	Field Test No.	Year Field Tested	Depth of Sample (ft)	Over-Burden (ft)	Exist-ing Pit	Volume Estimate (cu yds)	Sieve Analysis % Passing 1½"	#4	#100	#270	Color AASHO T-21	Abrasion AASHO T-4-35	Passes W.H.D. Spec.	Remarks
34	2	1960	1-4	0-1	No		—	Not	Sampled	—	—	—	—	Test #2 60' south of barn lying east of Test #1A. Contains dirty, stony gravel.
	3	1960	0.5-4.5	0-0.5	No		—	Not	Sampled	—	—	—	—	Test #3 300' north of Test #1A. 0-0.5' over-burden, 0.5-3.5' stony sand, 3.5-4.5' silty clay with clay bottom.

ESSEX ROCK DATA SHEET NO. 1

Ident. No.	Field Test No.	Year Field Tested	Rock Type	Existing Quarry	Method of Sampling	Abrasion AASHO T-3	Distance Between Samples (ft)	Remarks
1	1	1960	Dolomite	No	Chip	3.2%	200' across strike	Owner: Parizo. A long narrow ridge approximately 200' across strike with a 20 to 25' face. Material for Test #1 was taken from 200' strip across strike. Acceptable for Item 204, sub-base of crushed rock; Item 211, crushed stone base course, and Item 361B, bituminous concrete.
2	1	1960	Quartzite	No	Chip	5%	50' across strike	Owner: Desso. A small low ridge reaching south from the town road. Acceptable for Item 204, sub-base of crushed stone, Item 211, crushed stone base course & Item 361B, bituminous concrete.
3	1	1960	Dolomite	No	Chip	2.8%	200' across strike	Owner: R. Recor. A gray dolomite with veins of calcite. Large outcrop with good relief. Material for Test #1 was taken from 200' strip across strike. Many outcrops in area not sampled.



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 102-A
- □ BORROW, ITEM 102
- ⊠ EXISTING PIT
- SG SAND & GRAVEL DEPOSIT
- S SAND DEPOSIT
- 3 IDENTIFICATION NUMBER (refer to data sheets)

ESSEX

SCALE 1:31,250

1 0.5 0 1 MILE

CONTOUR INTERVAL 20 FEET

1961

GRANULAR MATERIALS MAP

BY

VERMONT DEPARTMENT OF HIGHWAYS

IN COOPERATION WITH

U.S. BUREAU OF PUBLIC ROADS

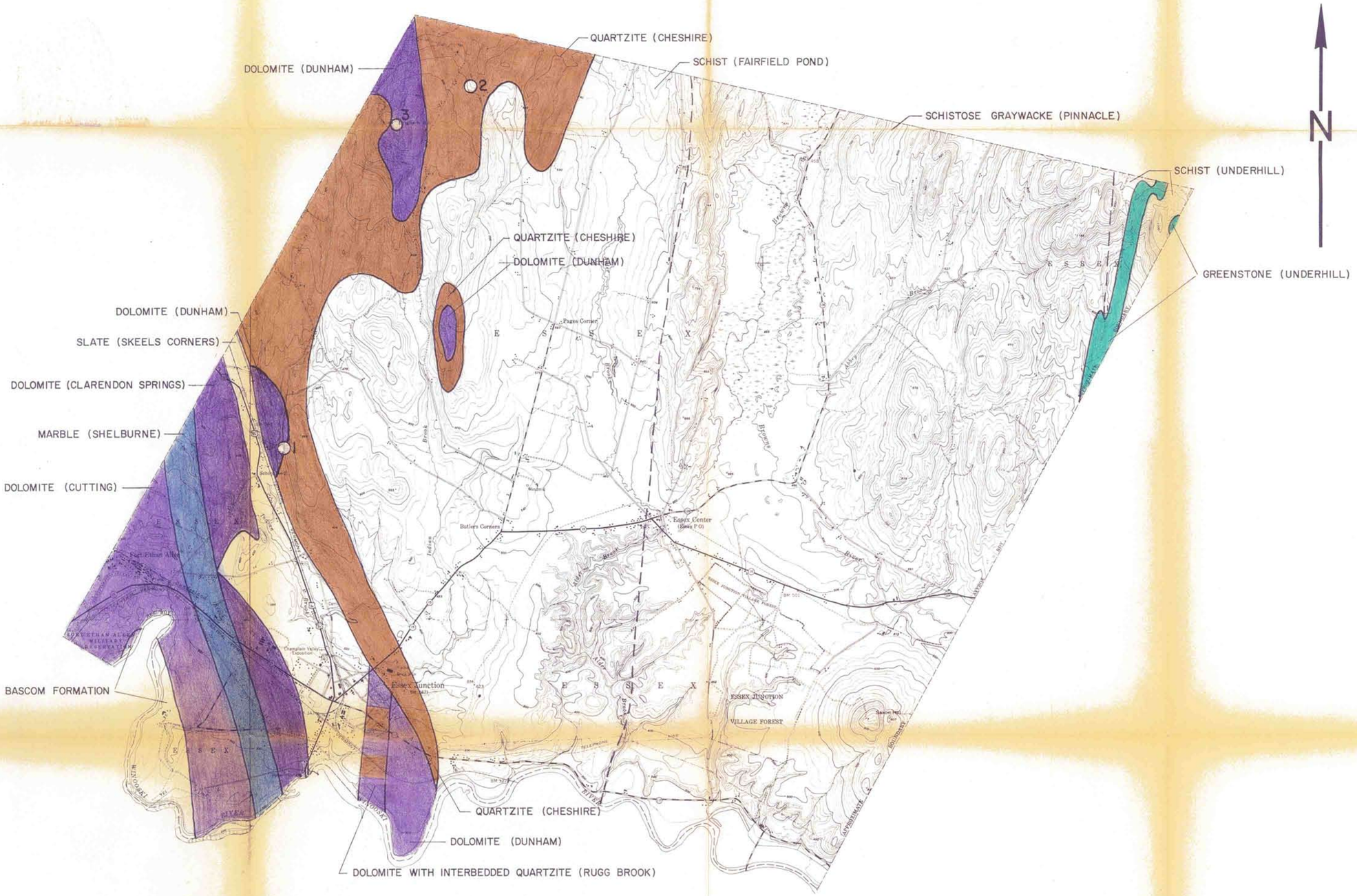
NOTE: BASED ON U.S.G.S. TOPOGRAPHIC MAPS

PLATE I GRANULAR

CHITTENDEN COUNTY VT. HWY. DISTRICT NO. 8

REVISIONS

DATE							
BY							



LEGEND

- ○ ROCK, ACCEPTABLE FOR ITEM 204 (sub-base of crushed rock)
- ◎ ROCK, NOT ACCEPTABLE FOR ITEM 204
- ⚒ EXISTING QUARRY
- GRANITE TO DIORITE (light to intermediate igneous rocks)
- AMPHIBOLITE, GABBRO, DIABASE, METADIABASE, GREENSTONE, TRAP DIKES (basic or dark igneous rocks)
- PERIDOTITE, PYROXENITE, SERPENTINITE (ultra-basic igneous rocks)
- GNEISS
- QUARTZITE
- DOLOMITE
- MARBLE, LIMESTONE
- SCHISTS, SLATES, PHYLLITES, SHALES, CONGLOMERATES
- 3 IDENTIFICATION NUMBER (refer to text)

ESSEX

SCALE 1:31,250

0.5 0 1 MILE

CONTOUR INTERVAL 20 FEET

1961

ROCK MATERIALS MAP

BY

VERMONT DEPARTMENT OF HIGHWAYS

IN COOPERATION WITH

U.S. BUREAU OF PUBLIC ROADS

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

PLATE 2

ROCK

CHITTENDEN COUNTY VT. HWY. DISTRICT NO. 8

REVISIONS

DATE						
BY						