

**SURVEY OF HIGHWAY CONSTRUCTION MATERIALS
IN THE TOWN OF LONDONDERRY, WINDHAM COUNTY, VERMONT**

prepared by

**Engineering Geology Section, Materials Division
Vermont Department of Highways**

in cooperation with

**United States Department of Transportation
Federal Highway Administration**

Montpelier, Vermont

February 1973

TABLE OF CONTENTS

Introduction

| | |
|---|------------|
| Acknowledgements | 1 |
| History | 1 |
| Inclosures | 2 |
| Location | 4 |
| County and Town Outline Map of Vermont | |
| Survey of Rock Sources | |
| Procedure for Rock Survey | 5 |
| Discussion of Rock and Rock Sources | 6 |
| Survey of Sand and Gravel Deposits | |
| Procedure for Sand and Gravel Survey | 7 |
| Discussion of Sand and Gravel Deposits | 8 |
| Summary of Rock Formations in the Town of Londonderry | 9 |
| Glossary of Selected Geologic Terms | 10 |
| Bibliography | 11 |
| Partial Specifications for Highway Construction Materials | Appendix I |
| Londonderry Granular Data Sheets | Table I |
| Londonderry Property Owners - Granular | Supplement |
| Londonderry Rock Data Sheets | Table II |
| Londonderry Property Owners - Rock | Supplement |
| Granular Materials Map | Plate I |
| Rock Materials Map | Plate II |

Acknowledgements

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

1. Various departments and individuals of the Vermont State Department of Highways, notably the Planning and Mapping Division and the Highway Testing Laboratory.
2. Professor D. P. Stewart of Miami University, Oxford, Ohio.
3. Professor C. G. Doll, Vermont State Geologist, University of Vermont, Burlington, Vermont.
4. United States Department of Commerce, Bureau of Public Roads.

History

The Materials Survey Project was formed in 1957 by the Vermont State Department of Highways with the assistance of the United States Bureau of Public Roads. Its prime objective was to compile an inventory of highway construction materials in the State of Vermont. Prior to the efforts of the personnel of the Survey as described in this and other reports, searches for highway construction materials were conducted only as the immediate situation required. Thus only limited areas are surveyed, and no overall picture of material resources was available. Highway contractors or resident engineers are usually required to locate the materials for their respective projects and have samples tested by the Highway Testing Laboratory. The additional cost of exploration for construction materials is passed onto the State in the form of higher construction costs. The Materials Survey Project was established to minimize or eliminate this factor by enabling the State and its contractors to proceed with information

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

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

Inclosures

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

The granular materials map depicts areas covered by various types of glacial deposits (outwash, moraines, kames, kame terraces, eskers, etc.) by which potential sources of gravel and sand may be recognized. This information was obtained primarily from a survey conducted by Professor D. P. Stewart of Miami University, Oxford, Ohio, who had been mapping the glacial features of Vermont during the summer months since 1956. Further

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

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

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

LOCATION

The town of Londonderry is located in the northwest corner of Windham County in the southern part of the State. It is bounded on the east by the town of Windham; in the south by Jamaica; on the west by the towns of Landgrove and Winhall in Bennington County; and on the north by Landgrove, and by the towns of Weston and Andover in Windsor County. (See County and Town Outline Map of Vermont on the following page.)

Londonderry lies entirely within the Green Mountain physiographic region and its topography is mainly characterized by rugged, steep-sided mountains. Elevations range from 2940 feet at the summit of Glebe Mountain to less than 920 feet at the point where the West River crosses the Jamaica town line. The Winhall River and several brooks including Cook, Flood and Utley drain eastward into the West River. Lowell Lake is drained by an unnamed stream westward into the West River which enters the Connecticut River at Brattleboro.

SURVEY OF ROCK SOURCES

Procedure for Rock Survey

The routine employed by the project in a survey of possible sources of rock for highway construction is divided into two main stages; office and field investigations.

The office investigation is conducted primarily during the winter months and comprises the mapping and description of rock types as indicated in various reference sources. Many different sources of information are utilized, as indicated in the bibliography. These references differ considerably in dependability due to new developments and studies that have contributed to the obsolescence of a number of reports. In addition, the results of samples taken by other individuals are analyzed, and the location at which these samples were taken is mapped when possible. In other words, as complete a correlation as possible is made of all the information available concerning the geology of the area under consideration.

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

Discussion of Rock and Rock Sources

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

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

The western four-fifths of Londonderry is underlain by metamorphic gneiss of the Mount Holly complex. Because of extensive glacial till deposition in the lower elevations, where most of the highways are located, no potential quarry site of Item 704.06, Crushed Stone for Sub-base, was found near a local road.

The southwest escarpment of a hill in the woods 1000 feet east of Vermont Route 100 about 1.7 miles south of its junction with Vermont Route 11, was tested and found to have suitable rock. This escarpment has a vertical 40-foot face with 15-foot overhangs. Large detached blocks are scattered at the foot of the slope. There is no access road.

SURVEY OF SAND AND GRAVEL SOURCES

Procedure for Sand and Gravel Survey

The method employed by the project in a survey of possible sources of sand and gravel for highway construction is divided into two main stages; office and field investigations.

The office investigation is conducted primarily during the winter months and comprises the mapping of possible potentially productive areas as indicated from various references. Of these references, the survey of glacial deposits mapped by Professor Stewart proves to be valuable, particularly when used in conjunction with other references such as soil-type maps, aerial photographs, and United States Geological Survey quadrangles. The last two are used in the recognition and location of physiographic features indicating glacial deposits and in the study of drainage patterns. In addition, the locations of existing pits are mapped when known. The locations in which samples were taken by other individuals are noted and mapped when possible.

The field investigation is begun by making a cursory preliminary survey of the entire town. All pits and other areas which show physiographic features that give evidence of glacial or fluvial deposition are noted. These locations are later investigated by obtaining samples of pit faces and other exposed materials. Test pits, dug with a backhoe to a depth of approximately 11 feet, are also sampled. The samples are submitted to the Materials Testing Laboratory where they are tested for gradation and stone abrasion, the latter by the Deval Method (AASHO T-4), and the Los Angeles Method (AASHO T-96).

Discussion of Sand and Gravel Deposits

According to Stewart and MacClintock depositional features within the town of Londonderry productive of granular materials are glaciofluvial in origin. These features consist principally of outwash spillway gravels, horizontally bedded along stretches of the principal streams; kame moraines southwest of Thompsonburg and flanking Cook Brook near the Winhall town line; and kame terraces at the northeast edge of the town, and flanking the West River valley north and east of the village of Londonderry and northwest of South Londonderry.

Gravel sources at Map Identification Nos. 2,3,4,7,8,14 and 16 either are largely depleted, limited in extent or would be restricted for development by the current owners. The largest potential gravel sources would appear to be in the outwash deposition at the vicinities of Map Identification Nos. 1, 13, and 17. Only one area, at Map Identification No. 6, in the margin of a kame terrace, may be an extensive future source of sand.

When permission from the property owners is obtained, future testing may prove that outwash deposition along Cook and Utley Brooks consists of specification granular materials.

SUMMARY OF ROCK FORMATIONS IN THE TOWN OF LONDONDERRY

Hoosac formation - Quartz-sericite-albite-biotite-chlorite schist characterized by albite porphyroblasts--biotite and garnet porphyroblasts common southward; locally carbonaceous.

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

Mount Holly Complex - Quartzite, locally in massive beds as much as 30 feet thick, micaceous quartzite, and quartz-mica schist that commonly contains garnet or pseudomorphs (largely chlorite) after garnet; schists are locally rusty weathered and contain conspicuous flakes of graphite; also includes amphibolite and minor hornblende gneiss, biotite gneiss, and pegmatite.

Pinney Hollow formation - Pale green quartz-sericite (muscovite-paragonite)-chlorite phyllite and schist with abundant magnetite, chloritoid phyllite and schist, quartz-sericite-albite-chlorite schist, and rare beds of carbonaceous and schistose quartzite; garnet porphyroblasts common south of Ottauquechee River.

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

GLOSSARY OF SELECTED GEOLOGIC TERMS

Block - A large angular rock fragment showing little or no modification by transporting agencies. May be nearly in place or transported superglacially or by gravity or other agencies.

Deltaic - Relating to predominantly alluvial deposition built out by a stream into the sea or other body of water. It usually is formed like the Greek letter delta.

Glaciofluvial - A term used to denote formation by, or relation to, streams within, upon or emerging from glacial ice.

Gneiss - Originally meaning a more or less banded metamorphic rock with the mineral composition of granite. The term now designates a foliated metamorphic rock with no specific composition implied, but having layers that are mineralogically unlike and consisting of particles visible to the eye. Usually gneiss displays an alternation of granular minerals and schistose minerals with the rock tending to split along the schistose bands.

Ice-Contact - Refers to sediments which have accumulated in contact with stagnant or wasting ice. They assume the varied topographic forms expressed by eskers, kames and kame terraces.

Joint - A fracture or parting plane along which there has been little if any movement parallel with the walls.

Kame Moraine - An accumulation of material deposited directly from the frontal portion of the glacial ice and partially sorted by water action. Deposits may take the form of coalescent knolls, hummocks, ridges, etc.

Kame Terrace - Stratified sands and gravels deposited by streams between a glacier and an adjacent valley wall.

Kamic - Relating to stratified drift deposited by glacial streams flowing in or on the ice at the sides or terminus of a glacier.

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

Outwash - Stratified sands and gravels that are stream-built beyond the glacier; deposited by meltwater streams issuing from the face of the glacial ice.

Oxidized Zone - The part of the earth's surface in which surface waters carrying oxygen, carbon dioxide, etc., have been active.

Spillway Gravel - Outwash gravel deposited in a valley that acted as a spillway for a melting glacier.

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

Bibliography

- A survey of the glacial geology of Vermont conducted by D.P. Stewart, the partial results of which were published in Vermont Geological Survey Bulletin No. 19; 1961.
- The Surficial geology and Pleistocene history of Vermont, David P. Stewart and Paul MacClintock; 1969; Vermont Geological Survey Bulletin No. 31.
- Soil Survey (Reconnaissance) of Vermont, W.J. Latimer; 1930; Bureau of Chemistry and Soils, United States Department of Agriculture.
- Soil Exploration and Mapping; 1950; Highway Research Board, Bulletin 28.
- Survey of Highway Aggregate Materials in West Virginia; December, 1959; Engineering Station, West Virginia University, Morgantown, West Virginia.
- Materials Inventory Bangor Quadrangle, South Half; September, 1959; University of Maine.
- Glacial Geology and the Pleistocene Epoch, R.F. Flint; 1947; John Wiley and Sons, Inc.
- A Handbook of Rocks, J.F. Kemp; June, 1946; D. Van Nostrand Company Inc.
- Rock and Rock Minerals, L.V. Pirsson; June, 1949; John Wiley and Sons, Inc.
- Glossary of Selected Geologic Terms; J.L. Stokes and D.J. Varnes; 1955; Colorado Scientific Proceedings, Vol. 16.
- Centennial Geologic Map of Vermont, C.G. Doll; 1961.
- Londonderry Quadrangle: Geological Survey, United States Department of the Interior, 1932.
- Saxtons River Quadrangle: Geological Survey, United States Department of the Interior, 1957.
- Wallingford Quadrangle: Geological Survey, United States Department of the Interior, 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 a complete list of specifications see Standard Specifications for Highway and Bridge Construction, approved and adopted by the Vermont Department of Highways in July, 1971.

DIVISION 700 - MATERIALS

Section 703.03, Soils and Borrow Materials

703.03 Sand Borrow and Cushion

Sand Borrow shall consist of material reasonably free from silt, loam, clay, or organic matter. It shall be obtained from approved sources and shall meet the requirements of the following table:

Table 703.03A - Gradation Requirements

| Sieve Designation | Percentage by Weight Passing Square Mesh Sieves | |
|-------------------|---|--------------|
| | Total Sample | Sand Portion |
| 2" | 100 | |
| 1½" | 90-100 | |
| ¾" | 70-100 | |
| No. 4 | 60-100 | 100 |
| No. 100 | | 0-30 |
| No. 200 | | 0-12 |

703.05 Granular Borrow

Granular Borrow shall be obtained from approved sources, consisting of satisfactorily graded, free draining, hard, durable stone and coarse sand reasonably free from loam, silt, clay, and organic material.

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

Table 703.05A - Gradation Requirements

| Sieve Designation | Percentage by Weight Passing Square Mesh Sieves | |
|-------------------|---|--------------|
| | Total Sample | Sand Portion |
| No. 4 | 20-100 | 100 |
| No. 200 | | 0-15 |

The maximum size stone particles of the Granular Borrow shall not exceed 2/3 of the thickness of the layer being spread.

Section 704, Aggregate

704.05 Gravel for Sub-base

Gravel for Sub-base shall consist of material reasonably free from silt, loam, clay, or organic matter. It shall be obtained from approved sources and shall meet the following requirements.

- (a) Grading
The gravel shall meet the requirements of the following table:

Table 704.05A - Gradation Requirements

| Sieve Designation | Percentage by Weight Passing Square Mesh Sieves | |
|----------------------|---|--------------|
| | Total Sample | Sand Portion |
| No. 4 | (20-60) | 100 |
| No. 100 | | 0-18 |
| No. 200 | | 0- 8 |

The stone portion of the gravel shall be uniformly graded from coarse to fine, and the maximum size stone particles shall not exceed 2/3 the thickness of the layer being placed.

- (b) Percent of Wear
The percent of wear of the gravel shall be not more than 25 when tested in accordance with AASHTO T 4, or more than 40 when tested in accordance with AASHTO T 96.

704.06 Crushed Stone for Sub-base

Crushed Stone for Sub-base shall consist of clean, hard, crushed stone, uniformly graded, reasonably free from dirt, deleterious material, pieces which are structurally weak and shall meet the following requirements:

- (a) Source
This material shall be obtained from approved sources and the area from which this material is obtained shall be stripped and cleaned before blasting.
- (b) Grading
This material shall meet the requirements of the following table:

Table 704.06A - Gradation Requirements

| Sieve Designation | Percentage by Weight Passing Square Mesh Sieves | |
|----------------------|---|--|
| | Total Sample | |
| 4½" | 100 | |
| 4" | 90-100 | |
| 1½" | 25- 50 | |
| No. 4 | 0- 15 | |

- (c) Percent of Wear
The percent of wear of the parent rock shall be not more than 8 when tested in accordance with AASHTO T 3, or the crushed stone a percent of wear of not more than 40 when tested in accordance with AASHTO T 96.
- (d) Thin and Elongated Pieces
Not more than 30 percent, by weight, of thin and elongated pieces will be permitted.
Thin and elongated pieces will be determined on the material coarser than the No. 4 sieve.

(e) Filler

The filler shall be obtained from approved sources and shall meet the requirements as set up for Sand Cushion, Subsection 703.03.

(f) Leveling Material

The leveling material shall be obtained from approved sources and may be either crushed gravel or stone screening produced by the crushing process. The material shall consist of hard durable particles, reasonably free from silt, loam, clay or organic matter.

This material shall meet the requirements of the following table:

Table 704.06B - Gradation Requirements

| Sieve Designation | Percentage by Weight Passing Square Mesh Sieves | |
|-------------------|---|--------|
| | Total Sample | |
| 1" | | 100 |
| 3/4" | | 90-100 |
| 1/2" | | 50- 90 |
| No. 4 | | 30- 70 |
| No. 100 | | 0- 20 |
| No. 200 | | 0- 10 |

704.07 Crushed Gravel for Sub-base

Crushed Gravel for Sub-base shall consist of material reasonably free from silt, loam, clay or organic matter. It shall be obtained from approved sources and shall meet the following requirements:

(a) Grading

The crushed gravel shall be uniformly graded from coarse to fine and shall meet the requirements of the following table:

Table 704.07A - Gradation Requirements

| Grading | Sieve Designation | Percentage by Weight Passing Square Mesh Sieves | |
|---------|-------------------|---|--------------|
| | | Total Sample | Sand Portion |
| Coarse | 4" | 100 | |
| | No. 4 | 25- 50 | 100 |
| | No. 100 | | 0- 20 |
| | No. 200 | | 0- 12 |
| Fine | 2" | 100 | |
| | 1 1/2" | 90-100 | |
| | No. 4 | 30- 60 | 100 |
| | No. 100 | | 0- 20 |
| | No. 200 | | 0- 12 |

(b) Percent of Wear

The percent of wear of the parent gravel shall be not more than 20 when tested in accordance with AASHTO T 4, or the crushed gravel a percent of wear of not more than 35 when tested in accordance with AASHTO T 96.

(c) Fractured Faces

At least 30 percent, by weight, of the stone content shall have at least one fractured face.

Fractured faces will be determined on the material coarser than the No. 4 sieve.

704.09 Dense Graded Crushed Stone for Sub-base

Dense Graded Crushed Stone for Sub-base shall consist of clean, hard, crushed stone, uniformly graded, reasonably free from dirt, deleterious material and pieces which are structurally weak, and shall meet the following requirements:

(a) Source

This material shall be obtained from approved sources and the area from which this material is obtained shall be stripped and cleaned before blasting.

(b) Grading

This material shall meet the requirements of the following table:

Table 704.09A - Gradation Requirements

| Sieve Designation | Percentage by Weight Passing Square Mesh Sieves | Total Sample |
|-------------------|---|--------------|
| 3½" | | 100 |
| 3" | | 90-100 |
| 2" | | 75-100 |
| 1" | | 50- 80 |
| ½" | | 30- 60 |
| No. 4 | | 15- 40 |
| No. 200 | | 0- 10 |

(c) Percent of Wear

The percent of wear of the parent rock shall be not more than 8 when tested in accordance with AASHTO T 3, or the crushed stone a percent of wear of not more than 40 when tested in accordance with AASHTO T 96.

(d) Thin and Elongated Pieces

Not more than 30 percent, by weight, of thin or elongated pieces will be permitted.

Thin and elongated pieces will be determined on the material coarser than the No. 4 sieve.

704.10 Gravel Backfill for Slope Stabilization

Gravel Backfill for Slope Stabilization shall be obtained from approved sources, consisting of satisfactorily graded, free draining, hard, durable stone and coarse sand reasonably free from loam, silt, clay, and organic material.

The gravel backfill shall meet the requirements of the following table:

Table 704.10A - Gradation Requirements

| Sieve Designation | Percentage by Weight Passing Square Mesh Sieves | |
|----------------------|---|--------------|
| | Total Sample | Sand Portion |
| No. 4 | 20-50 | 100 |
| No. 100 | | 0- 20 |
| No. 200 | | 0- 10 |

The stone portion of the gravel backfill shall be uniformly graded from coarse to fine, and the maximum size stone particles shall not exceed 2/3 the thickness of the layer being placed.

704.11 Granular Backfill for Structures

Granular Backfill for Structures shall be obtained from approved sources, consisting of satisfactorily graded, free draining granular material reasonably free from loam, silt, clay, and organic material.

The granular backfill shall meet the requirements of the following table:

Table 704.11A - Gradation Requirements

| Sieve Designation | Percentage by Weight Passing Square Mesh Sieves | |
|----------------------|---|--------------|
| | Total Sample | Sand Portion |
| 3" | 100 | |
| 2½" | 90-100 | |
| No. 4 | 50-100 | 100 |
| No. 100 | | 0- 18 |
| No. 200 | | 0- 8 |

LONDONDERRY 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 | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks |
|----------------|----------------|-------------------|----------------------|-----------------|--------------|--------------------------|-----|-----|-----|------|------|-----------------------|----------------------|---|
| | | | | | | 2" | 1½" | ¾" | #4 | #100 | #200 | | | |
| | | | | | | | | | | | | | | |
| 1 | 1 | 1972 | 2-8 | 0-2 | Yes | 90 | 80 | 57 | 44 | 20 | 13 | 21.4% | Gran. Borrow (Grav.) | <p>Owner: Donald J. Larsen</p> <p>Area is a grown-in pit that truncates a kame terrace east of Vt. Route 100 just south of the Weston Town Line. Possible eastward extension of pit is crossed by access road. Cobblestones are common in the area.</p> <p>Test #1 was west of access road at point 175' S45°E of locked gate near Vt. Route 100. Material is: 0-2', overburden; 2'-8', fine gravel with less than 5% 6"+ cobblestones.</p> |
| | 2 | 1972 | 1-8 | 0-1 | Yes | 77 | 66 | 37 | 30 | 10 | 6 | 16.1% | Gravel | <p>Test #2 was east of access road at point 300' S70°E of locked gate near Vt. Route 100. Material is 0-1', sod; 1'-8', coarse gravel.</p> |
| 2 | 1 | 1972 | 3.5-10 | 0-3.5 | Yes | --- | --- | --- | 100 | 42 | 11 | --- | Gran. Borrow (Sand) | <p>Owner: Donald J. Larsen</p> <p>Area is an extensive (1500'X 500') pit which exploits outwash deposition west of the West River south of the Weston Town Line. Floor of the pit might be a future source of granular borrow but faces are of limited extent.</p> <p>Test #1 was 400' north of the south end of pit and 150' west of a line of trees that mark the east property line of the area. Material</p> |

LONDONDERRY GRANULAR DATA SHEET NO. 2

| Map Ident. No. | Field Test No. | Year Field Tested | Depth of Sample (Ft) | Overburden (Ft) | Existing Pit | Sieve Analysis % Passing | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks |
|----------------|----------------|-------------------|----------------------|-----------------|--------------|--------------------------|-----|----|----|------|------|-----------------------|----------------------|--|
| | | | | | | 2" | 1½" | ½" | #4 | #100 | #200 | | | |
| | 2 | 1972 | 1-8 | 0-1 | Yes | 93 | 75 | 44 | 54 | 35 | 21 | 10.2% | -- | <p>in the floor is: 0-3.5', moss, silt and gravel (not in place); 3.5'-10', medium to fine sand.</p> <p>Test #2 was of east face of upper level remnant about 600' south of north end of pit and 135' west of trees that mark east property line. Material is: 0-1', sod; 1'-8', coarse to fine gravel with much silt.</p> |
| 3 | 1 | 1972 | 1-5 | 0-1 | Yes | 65 | 65 | 43 | 26 | 19 | 10 | 17.1% | Gran. Borrow (Grav.) | <p>Owner: Paul Truax</p> <p>Area consists of two adjacent pits that truncate a northeast trending ridge which lies north of the town dump east of Vermont Route 100. Ridge is probably kamic in origin. There were an estimated 5,000 yards of material at this location when the survey was done but the pits were being used by the town.</p> <p>Test #1 was in the southeast face of the smaller north pit. Material is: 0-1', overburden; 1'-5', dirty fine gravel over coarse gravel.</p> |
| | 2 | 1972 | 2-8 | 0-2 | Yes | 68 | 63 | 46 | 30 | 9 | 6 | 24.6% | Gravel | <p>Test #2 was in the northeast face of the larger south pit. Material is: 0-2', overburden and roots; 2'-8', coarse cobbly gravel. Up to 10% of the stones are over</p> |

LONDONDERRY 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 | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks |
|----------------|----------------|-------------------|----------------------|-----------------|--------------|--------------------------|-----|----|-----|------|------|-----------------------|----------------------|---|
| | | | | | | 2" | 1½" | ½" | #4 | #100 | #200 | | | |
| | 3 | 1972 | 0.5-6.5 | 0-0.5 | Yes | -- | -- | -- | 100 | 7 | 4 | -- | Sand | 6" in diameter and were not included with the sample. Test #3 was in the west face of the south pit. Bedding here appears to be deltaic. Material is: 0-0.5', overburden; 0.5'-6.5', clean sand that coarsens in lenses. |
| | 4 | 1972 | 1-6 | 0-1 | Yes | 72 | 55 | 29 | 20 | 29 | 12 | 18.7% | Gran. Borrow (Grav.) | Test #4 was in the southwest face of the south pit. Ice-contact bedding was noted. Material is: 0-1', overburden; 1'-3', cobbly silty gravel; 3'-6', sandy gravel; bottom, sloughings. |
| | 5 | 1972 | 1-7.5 | 0-1 | Yes | 66 | 60 | 47 | 34 | 6 | 4 | 9.7% | Gravel | Test #5 was in the north floor of the south pit. Material is: 0-1', silt and small cobbles; 1'-7.5', sandy, cobbly gravel. Test bottoms on boulders. |
| | 6 | 1972 | 1-6 | 0-1 | Yes | 54 | 44 | 38 | 32 | 41 | 28 | --- | --- | Test #6 was in extension, 55' N40°W of Test #4. Material is: 0-1', sod; 1'-4', cobbly brown silt with occasional boulders; 4'-6', sand and cobbles; bottom, boulders. |
| | 7 | 1972 | 0.5-9 | 0-0.5 | Yes | 73 | 68 | 47 | 38 | 5 | 2 | 22.1% | Gravel | Test #7 was in the floor of the north pit. Material is: 0-0.5', overburden; 0.5'-5', coarse, sandy gravel; 5'-7', fine pebbly gravel; 7'-9', coarse sand and pebbles (water was encountered at 7'). |

LONDONDERRY 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 | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks |
|----------------|----------------|-------------------|----------------------|-----------------|--------------|--------------------------|-----|----|-----|------|------|-----------------------|----------------------|---|
| | | | | | | 2" | 1½" | ½" | #4 | #100 | #200 | | | |
| 4 | 1 | 1972 | 0-7.5 | ---- | Yes | -- | -- | -- | 100 | 53 | 13 | -- | Gran Borrow (Sand) | <p>Owner: Paul Truax</p> <p>Area is an almost depleted, extensive (1200' X 500') pit which exploits the south end of the same outwash depositional feature that occurs at Map Identification No. 2. It is reached by private road that joins Vermont Route 100 just northwest of the town dump. Most of the gravel has been drawn out of this pit but there is a limited amount of granular borrow remaining.</p> <p>Test #1 was in a lower west face south of the access road. Material is: 0-7.5', medium to fine sand.</p> |
| | 2 | 1972 | T H E R E I S | | | N O T E S T # 2 | | | | | | | | |
| | 3 | 1972 | 1-7 | 0-1 | Yes | 77 | 68 | 45 | 35 | 9 | 6 | 17.2% | Gravel | <p>Test #3 was in face with southern exposure just south of the access road. Material is: 0-1', silt and moss; 1'-7', coarse to fine sandy gravel.</p> |
| | 4 | 1972 | 0.5-7 | 0-0.5 | Yes | 100 | 89 | 73 | 57 | 10 | 7 | -- | Gran. Borrow (Grav.) | <p>Test #4 was in face with western exposure in the southeast central floor. Material is: 0-0.5', silt and moss; 0.5'-7', sand with some stones.</p> |
| | 5 | 1972 | 1-4 | 0-1 | Yes | 84 | 75 | 49 | 32 | 8 | 5 | 17.8% | Gravel | <p>Test #5 was in face with eastern exposure at southeast corner of pit. Material is: 0-1', sod;</p> |

LONDONDERRY GRANULAR DATA SHEET NO. 5

| Map Ident. No. | Field Test No. | Year Field Tested | Depth of Sample (Ft) | Overburden (Ft) | Existing Pit | Sieve Analysis % Passing | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks |
|----------------|----------------|-------------------|----------------------|-----------------|--------------|--------------------------|-----|---------|-----|------|------|-----------------------|---------------------|--|
| | | | | | | 2" | 1½" | ¾" | #4 | #100 | #200 | | | |
| | | | | | | | | | | | | | | 1'-4', fine to medium gravel; 4'-6', sand (not tested). |
| | 6 | 1972 | 1-7 | 0-1 | Yes | -- | -- | -- | 100 | 48 | 19 | -- | -- | Test #6 was in face with eastern exposure at northeast edge of pit. Material is: 0-1', sod; 1'-7', fine to medium sand. |
| | 7 | 1972 | 1-10 | 0-1 | Yes | -- | -- | -- | 100 | 88 | 38 | -- | -- | Test #7 was in south floor at point 75' S35°E of Test #1. Material is: 0-1', coarse gravel (not tested); 1'-10', sand to silt. |
| | 8 | 1972 | 0.5-10 | 0-0.5 | Yes | -- | -- | -- | 100 | 21 | 1 | -- | -- | Test #8 was in southeast floor at point 105' S5°W of Test #4. Material is: 0-0.5', moss and silt; 0.5'-10', sand. |
| | 9 | 1972 | 0-11.5 | ---- | Yes | -- | -- | -- | 100 | 64 | 17 | -- | -- | Test #9 was in southeast floor, 25' south of Test #5. Material is: 0-11.5', silt to fine sand. |
| | 10 | 1972 | 0-11 | -- | Yes | -- | -- | -- | 100 | 50 | 14 | -- | Gran. Borrow (Sand) | Test #10 was in northernmost floor of pit. Material is: 0-11', fine to medium sand. Water was encountered at 10.5'. |
| | 11 | 1972 | 1-6 | 0-1 | Yes | LOST | IN | TRANSIT | | | | | | Test #11 was in north face, 40' north of Test #10. Material is: 0-1', sod and silt; 1-6', coarse sandy gravel. |
| | 12A | 1972 | 0-3.5 | -- | Yes | 92 | 87 | 69 | 53 | 2 | 1 | 14.6% | Gravel | Test #12A was in stripped extension, 65' N45°W of north face. Material is: 0-3.5', sandy gravel with a few cobbles. |

LONDONDERRY GRANULAR DATA SHEET NO. 6

| Map Ident. No. | Field Test No. | Year Field Tested | Depth of Sample (Ft) | Overburden (Ft) | Existing Pit | Sieve Analysis % Passing | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks |
|----------------|----------------|-------------------|----------------------|-----------------|--------------|--------------------------|--------|------|-----|------|------|-----------------------|------------------|--|
| | | | | | | 2" | 1 1/2" | 1/2" | #4 | #100 | #200 | | | |
| | 12B | 1972 | 3.5-10 | -- | Yes | -- | 100 | 99 | 97 | 49 | 16 | -- | -- | Test #12B was below Test #12A. Material is: 3.5'-10', fine to medium sand. |
| | 13 | 1972 | 0-11 | -- | Yes | -- | -- | -- | 100 | 74 | 25 | -- | -- | Test #13 was in floor about 375' south of north face. Material is: 0-11', fine to medium sand. |
| | 14 | 1972 | 0-9 | -- | Yes | -- | -- | -- | 100 | 85 | 43 | -- | -- | Test #14 was in floor of small lobe in northeast part of pit. Material is: 0-1.5', fine sand; 1.5'-1.8', silt; 1.8'-9', fine sand; bottom, sloughed over. |
| | 15 | 1972 | 1-14 | 0-1 | Yes | -- | -- | -- | 100 | 74 | 25 | -- | -- | Test #15 was in floor near east edge of pit, 300' S150E of Test # 14. Material is: 0-1', strippings; 1'-14', sand. |
| 5 | 1 | 1972 | 1-13 | 0-1 | Yes | -- | 100 | 99 | 97 | 8 | 4 | -- | Sand | <p>Owner: Frank J. Flanagan</p> <p>Area is a sand pit on the northwest side of Town Highway No. 64 within real estate being developed for house lots. Material is not available. This area is within a large kame terrace east of West River.</p> <p>Test #1 was in southeast face. Material is: 0-1', sod; 1'-13', medium to fine tan sand; bottom, same.</p> |

LONDONDERRY GRANULAR DATA SHEET NO. 7

| Map Ident. No. | Field Test No. | Year Field Tested | Depth of Sample (Ft) | Overburden (Ft) | Existing Pit | Sieve Analysis | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks | |
|----------------|----------------|-------------------|----------------------|-----------------|--------------|----------------|-----|----|-----|------|------|-----------------------|---------------------|---|---|
| | | | | | | % Passing | | | | | | | | | |
| | | | | | | 2" | 1½" | 1" | #4 | #100 | #200 | | | | |
| 6 | 1A | 1972 | 0-2 | -- | Yes | 100 | 97 | 89 | 85 | 32 | 13 | -- | Gran. Borrow (Sand) | <p>Owner: George and Harold Michel.</p> <p>Area is a large (470'X 310') pit northeast of the junction of Town Highway No. 16 with Vermont Route No. 11. It is probably within the same kame terrace that is covered by areas at Map Ident. Nos. 5, 7, 8, and 9.</p> <p>Test #1A was in the floor near the south end. Material is: 0-2', silty sand.</p> | |
| | 1B | 1972 | 2-6.5 | -- | Yes | 90 | 90 | 69 | 53 | 9 | 2 | 14.0% | Gravel | <p>Test #1B was in floor below Test #1A. Material is 2'-6.5', sandy gravel.</p> | |
| | 2 | 1972 | 1.5-13 | 0-1.5 | Yes | -- | -- | -- | 100 | 31 | 8 | -- | Gran. Borrow (Sand) | <p>Test #2 was in south-central east face. Material is: 0-1.5', sod and silt; 1.5'-13', fine sand and silt seams.</p> | |
| | 3 | 1972 | 2-19 | 0-2 | Yes | -- | -- | -- | 100 | 53 | 23 | -- | --- | | <p>Test #3 was in north face. Material is: 0-2', sod and silt; 2'-15', fine sand; 15'-19', pebbly silt; bottom, same.</p> |
| | 4 | 1972 | 2-12 | 0-2 | Yes | -- | -- | -- | 100 | 19 | 2 | -- | Sand | <p>Test #4 was in possible extension, 300' S45°E of Test #2 and 240' north of barn on Vermont Route 11. Material is: 0-2', sod and silt; 2'-12', moist fine sand; bottom, same.</p> | |

LONDONDERRY 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 | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks |
|----------------|----------------|-------------------|----------------------|-----------------|--------------|--------------------------|--------|------|-----|------|------|-----------------------|----------------------|---|
| | | | | | | 2" | 1 1/2" | 1/2" | #4 | #100 | #200 | | | |
| | 5 | 1972 | 1-10 | 0-1 | Yes | -- | -- | -- | 100 | 32 | 3 | -- | Gran. Borrow (Sand) | Test #5 was in possible extension at north end of field 185' S80°E of Test #3. Material is: 0-1', sod; 1'-10', fine to medium sand. |
| 7 | 1 | 1972 | 0.5-5 | 0-0.5 | Yes | 80 | 78 | 56 | 38 | 15 | 9 | 17.5 | Gran. Borrow (Grav.) | Owner: George and Harold Michel. Area is a long (950') pit east of, and separated by trees from, Map Identification No. 6. Test #1 was in the northwest floor, 160' southeast of the north end. Material is: 0-0.5', silt and stones (not in place); 0.5'-5', sandy cobbly gravel (water at 4.0'); 5'-7', cobblestones. |
| | 2 | 1972 | 1.5-10 | 0-1.5 | Yes | -- | -- | -- | 100 | 41 | 4 | -- | Gran. Borrow (Sand) | Test #2 was in possible extension, 225' S15°E of Test #1. Material is: 0-1.5', sod and orange silt; 1.5'-10', fine to medium sand (water encountered at 10'). |
| | 3 | 1972 | 0.5-10 | 0-0.5 | Yes | -- | -- | -- | 100 | 52 | 11 | -- | Gran. Borrow (Sand) | Test #3 was in upper level of floor at southwest corner of pit. Material is: 0-0.5', moss and silt; 0.5'-4.5', fine sand; 4.5'-10', fine to medium sand (water at 8.5'). |
| | 4 | 1972 | 1.5-5 | 0-1.5 | Yes | 76 | 65 | 54 | 42 | 15 | 8 | 16.0% | Gravel | Test #4 was in southeast floor, 160' northwest of property line. |

LONDONDERRY 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 | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks |
|----------------|----------------|-------------------|----------------------|-----------------|--------------|--------------------------|-----|----|-----|------|------|-----------------------|----------------------|--|
| | | | | | | 2" | 1½" | ½" | #4 | #100 | #200 | | | |
| | 5 | 1972 | 7-12 | 0-7 | Yes | -- | -- | -- | 100 | 78 | 43 | -- | --- | <p>Material is: 0-1.5', silt and stones (not in place); 1.5'-5', sandy cobbly gravel with a boulder noted (water at 4.0').</p> <p>Test #5 was in far northwest face. Material is: 0-7', sand (not accessible); 7'-12', sandy silt; bottom, fine gravel.</p> |
| 8 | 1 | 1972 | 1-9 | 0-1 | Yes | 100 | 88 | 78 | 73 | 32 | 17 | --- | --- | <p>Owner: Robert Clark</p> <p>Area is a pit connected with another pit at northwest (see Map Ident. No. 7)</p> <p>Test #1 was in upper face with eastern exposure near southeast corner. Material is: 0-1', sod and silt; 1'-4', fine gravel; 4'-9', fine sand to silt; 9'-10', silt to clay; bottom, boulder.</p> |
| | 2 | 1972 | 0.5-7 | 0-0.5 | Yes | 76 | 72 | 58 | 46 | 26 | 15 | 14.1% | Gran. Borrow (Grav.) | <p>Test #2 was in lower face with northern exposure at northwest corner of area. Material is: 0-0.5', silt and stones; 0.5'-7', sandy gravel with brown silt.</p> |
| | 3 | 1972 | 4.5-16.5 | 0-4.5 | Yes | 81 | 60 | 41 | 25 | 20 | 16 | 18.6% | -- | <p>Test #3 was in lowest northeast face next to property line. Extension would be onto property described at Map Ident. No. 9. Material is: 0-4.5', silt and sand with stones; 4.5'-16.5', coarse to fine dirty gravel.</p> |

LONDONDERRY GRANULAR DATA SHEET NO. 10

| Map Ident. No. | Field Test No. | Year Field Tested | Depth of Sample (Ft) | Over-burden (Ft) | Exist-ing Pit | Sieve Analysis % Passing | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks |
|----------------|----------------|-------------------|----------------------|------------------|---------------|--------------------------|-----|----|----|------|------|-----------------------|----------------------|---|
| | | | | | | 2" | 1½" | ½" | #4 | #100 | #200 | | | |
| | 4 | 1972 | 1-8 | 0-1 | Yes | 81 | 71 | 57 | 51 | 11 | 5 | -- | Gravel* | Test #4 was in middle of floor at point 70' north of Test #2. Material is: 0-1', moss and silt; 1'-8', sandy gravel with small cobblestones; bottom, cobblestones. |
| | 5 | 1972 | 0-3 | -- | Yes | -- | 100 | 99 | 95 | 13 | 4 | -- | Sand | Test #5 was in upper floor at point S65°E of Test #1. Material is: 0-3', sand with stones (water was encountered at 1.5'). |
| 9 | 1 | 1972 | 0.5-10.5 | 0-0.5 | Yes | 86 | 76 | 58 | 45 | 28 | 19 | 20.3% | -- | Owner: Leroy Williams Area is a pit southeast of the pit at Map Ident. No. 8 and about 500 feet north of Vermont Route 11. Test #1 was in the upper south-east face. Material is: 0-0.5', sand; 0.5'-10.5', silty gravel with some sand and a few cobblestones. |
| | 2 | 1972 | 1-6 | 0-1 | Yes | 87 | 77 | 57 | 41 | 19 | 8 | 20.9% | Gran. Borrow (Grav.) | Test #2 was in lower west floor about 100' west of Test #1. Material is: 0-1', silt; 1'-6', sandy gravel; 6'-7', boulders. |
| 10 | 1 | 1972 | 0-2 | 2-6 | No | 100 | 72 | 64 | 56 | 44 | 31 | -- | -- | Owner: Erwin J. Dostal Area is a knoll about 400 feet southwest of the Rest Haven Cemetery on Town Highway No. 33. Test #1 was on south side of knoll. Material is: 0-2', sod and cobbles; 2'-6', sandy silt and stones. |

*Meets Grading Requirements only

LONDONDERRY 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 | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks |
|----------------|----------------|-------------------|----------------------|-----------------|--------------|--------------------------|-----|----|-----|------|--------|-----------------------|---------------------|--|
| | | | | | | 2" | 1½" | ¾" | #4 | #100 | #200 | | | |
| 11 | 1 | 1972 | 1-8 | 0-1 | Yes | 89 | 75 | 66 | 53 | 48 | 28 | 11.4% | -- | Owner: John Luinetti Area is a pit west of Vermont Route 100 at a point about 1.7 miles south of Vermont Route 11 and is part of a kame terrace. Test #1 was in north face. Material is: 0-1', silt and stones; 1'-2', coarse gravel with sand; 2'-3', cobblestones and boulders; 3'-6', gravelly silt; 6'-7', cobblestones; 7'-8', gravelly sand. |
| | 2 | 1972 | 8-11 | See Test #1 | Yes | 100 | 91 | 84 | 72 | 55 | 35 | --- | -- | Test #2 was in north face just below Test #1. Material is: silty fine sand with small boulders. |
| | 3 | 1972 | 2-10.5 | 0-2 | Yes | 100 | 79 | 72 | 57 | 32 | 14 | --- | Gran. Borrow (Sand) | Test #3 was in floor, 15' west of Test #2. Material is: 0-2', brown silt; 2'-10.5', silty sand with stones (water at 10'). |
| | 4 | 1972 | 2-4 | 0-2 | No | | DID | | NCT | | SAMPLE | | | Test #4 was in field at edge of woods, 225' east of pit. Material is: 0-2', sod and organic silt; 2'-4', sand and boulders. |
| 12 | 1 | 1972 | 1-1.5 | 0-1 | Yes | | DID | | NCT | | SAMPLE | | | Owner: Earl Melendy Area is an overgrown pit at south end of pine covered ridge about 0.5 mile south of State Aid Highway No. 2 and east of Town Highway No. 38. |

LONDONDERRY 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 | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks |
|----------------|----------------|-------------------|----------------------|-----------------|--------------|-----------------------------|-----|----|----|------|------|-----------------------------|------------------------|--|
| | | | | | | 2" | 1½" | ½" | #4 | #100 | #200 | | | |
| | 2 | 1972 | 0.5-5 | 0-0.5 | Yes | 70 | 56 | 38 | 28 | 32 | 21 | 15.3% | --- | <p>Test #1 was in trail at top of slope northwest of pit. Material is: 0-1', sod; 1'-1.5', silt and 3/4 inch stones; bottom, boulders.</p> <p>Test #2 was in west-central floor. Material is: 0-0.5', forest duff; 0.5'-5', coarse silty gravel with 24"+ boulders; bottom, boulders.</p> <p>This area might be good for crushing.</p> |
| 13 | 1 | 1972 | 1.5-9 | 0-1.5 | No | 80 | 70 | 51 | 36 | 7 | 3 | 18.0% | Gravel | <p>Owner: U.S. Army Corps of Engineers - Lot B-13.</p> <p>Area is a long (1000'+) field, designated Lot B-13, east of unnumbered road connecting Town Highway 38 and Town Highway 53.</p> <p>Test #1 was in north-central part of field, 140' S67°E of 20-inch maple. Material is: 0-1.5', overburden; 1.5'-2.5', boulders; 2.5'-9', well-packed gravel (water at 9').</p> |
| | 2 | 1972 | 2.5-7.5 | 0-2.5 | No | 58 | 48 | 34 | 27 | 10 | 5 | 19.2% | Gravel | <p>Test #2 was on knoll 720' S23°E of Test #1. Material is: 0-2.5', sod and silt; 2.5'-4', cobblestones and boulders; 4'-7.5', cobbly coarse dirty gravel (water at 6.5').</p> |

LONDONDERRY GRANULAR DATA SHEET NO. 13

| Map Ident. No. | Field Test No. | Year Field Tested | Depth of Sample (Ft) | Overburden (Ft) | Exist- ing Pit | Sieve Analysis % Passing | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks |
|----------------|----------------|-------------------|----------------------|-----------------|----------------|--------------------------|-----|----|----|------|------|-----------------------|----------------------|---|
| | | | | | | 2" | 1½" | ½" | #4 | #100 | #200 | | | |
| | 3 | 1972 | 1.5-6 | 0-1.5 | No | 86 | 76 | 52 | 34 | 16 | 8 | 17.5% | Gravel | Test #3 was near center of east side of field, 450' N15°W of Test #2. Material is: 0-1.5', overburden; 1.5'-6', coarse gravel and boulders (water at 4'). |
| | 4A | 1972 | 1-6 | 0-1 | No | -- | 100 | 97 | 93 | 28 | 7 | -- | Sand | Test #4A was near northeast corner of field, 130' N25°E of Test #1. Material is: 0-1', overburden; 1'-6', sand; bottom, gravel and water. |
| | 4B | 1972 | 6-9 | See Test #4A | No | 92 | 83 | 63 | 48 | 5 | 2 | 18.0% | Gravel | Test #4B was below Test #4A. Material is: 6'-9', fine gravel and pebbly sand; bottom, sand (and water). |
| 14 | 1 | 1972 | 0-16 | -- | Yes | 81 | 72 | 51 | 39 | 13 | 8 | 22.0% | Gravel | Owner: William and Arthur Burdick Area is a pit east of unnumbered road connecting Town Highway 38 and Town Highway 53 at point 0.8 mile south of State Aid Highway 2. Test #1 was in upper east face. Material is: 0-16', brown coarse gravel with sand. |
| | 2 | 1972 | 16-21 | See Test #1 | Yes | 76 | 69 | 54 | 38 | 14 | 9 | 17.0% | Gran. Borrow (Grav.) | Test #2 was in lower east face. Material is: 16'-21', coarse gravel with cobblestones. |

LONDONDERRY GRANULAR DATA SHEET NO. 14

| Map Ident. No. | Field Test No. | Year Field Tested | Depth of Sample (Ft) | Overburden (Ft) | Existing Pit | Sieve Analysis % Passing | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks |
|----------------|-------------------------------|-------------------|----------------------|-----------------|--------------|--------------------------|-----|----|----|------|------|-----------------------|----------------------|---|
| | | | | | | 2" | 1½" | ½" | #4 | #100 | #200 | | | |
| | 3 | 1972 | | | | | | | | | | | | See Map Ident. No. 15, Tests #3A, #3B. |
| | 4 | 1972 | 1-9 | 0-1 | No | 59 | 53 | 38 | 30 | 9 | 5 | 15.9% | Gravel | Test #4 was in small clearing in woods, 210' N25°E of pit. Material is: 0-1', sod; 1'-9', coarse clean gravel with some 6"+ stones that were not included with the sample. |
| 15 | 1 | 1972 | 1-4 | 0-1 | No | 100 | 94 | 77 | 64 | 25 | 15 | --- | Gran. Borrow (Grav.) | Owner: Central Vermont Public Service. Area is right-of-way for projected utility line adjacent to and northeast of pit at Map Ident. No. 14. Test #1 was 105' from test #3A and N60°E of pit. Material is: 0-1', sod; 1'-4', silty sand with gravel; bottom, boulders. |
| | T H E R E I S N O T E S T # 2 | | | | | | | | | | | | | |
| | 3A | 1972 | 2.5-6.5 | 0-2.5 | No | 100 | 74 | 67 | 56 | 6 | 4 | ---- | Gran. Borrow (Grav.) | Test #3A was 105' N35°E of pit. Material is: 0-1', sod and silt; 1'-2.5', coarse cobbly gravel (not tested); 2.5'-6.5', sand and gravel. |
| | 3B | 1972 | 6.5-10 | See Test #3A | No | 84 | 80 | 48 | 35 | 5 | 3 | 13.0% | Gravel | Test #3B was below Test #3A. Material is: 6.5'-10', gravel. |
| 16 | 1 | 1972 | 2-9 | 0-2 | Yes | 92 | 81 | 57 | 43 | 3 | 2 | 19.8% | Gravel | Owner: Richard Biggins |

LONDONDERRY 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 | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks |
|----------------|----------------|-------------------|----------------------|-----------------|--------------|-----------------------------|--------|------|----|------|------|-----------------------|------------------|--|
| | | | | | | 2" | 1 1/2" | 1/2" | #4 | #100 | #200 | | | |
| | 2 | 1972 | 0.5-6.5 | 0-0.5 | Yes | 82 | 72 | 54 | 41 | 8 | 4 | 16.1% | Gravel | <p>Area is a pit complex east of unnumbered road connecting Town Highway No. 38 and Town Highway No. 53 at point 0.9 mile south of State Aid Highway No. 2.</p> <p>Test #1 was in upper floor of northeast pit. Material is: 0-0.5', moss and silt; 0.5'-2', gravelly sand with clay lenses (not tested); 2.5'-7.5', sandy gravel (water at 7').</p> <p>Test #2 was in middle floor 100' S20°W of, and 6' below Test #1. Material is: 0-0.5', moss and silt; 0.5'-6.5', bouldery sandy gravel.</p> <p>Test #3 was in lower floor 90' S50°W of, and 8' below Test #2. Material is: 0-3', boulders.</p> <p>Test #4 was in lowest floor 190' north of, and 7' below Test #3. Material is: 0-3', pebbly sand; 3'-6', gravel (water encountered at 5').</p> |
| | 3 | 1972 | 0-3 | -- | Yes | N | O | T | T | E | S | T | E | D |
| | 4 | 1972 | 0-6 | -- | Yes | 88 | 84 | 68 | 58 | 18 | 7 | -- | Gravel* | |
| 17 | 1 | 1972 | 1-11 | 0-1 | Yes | 66 | 56 | 37 | 27 | 10 | 5 | 15.1% | Gravel | <p>Owner: U.S. Army Corps of Engineers - Lot B-209</p> <p>Area is a pit east of the West River and west of unnumbered road connecting Town Highway No. 38 and Town Highway No. 53 at point</p> |

*Meets grading requirements only

LONDONDERRY 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 | | | | | | Abrasion AASHO T-4-35 | Passes VHD Spec. | Remarks |
|----------------------------------|----------------|-------------------|----------------------|-----------------|--------------|--------------------------|--------|------|----|------|------|-----------------------|------------------|--|
| | | | | | | 2" | 1 1/2" | 1/2" | #4 | #100 | #200 | | | |
| | | | | | | | | | | | | | | 1,3 miles south of State Aid Highway No. 2. |
| | 2 | 1972 | 1-7.5 | 0-1 | Yes | 88 | 66 | 53 | 42 | 5 | 3 | -- | Gravel* | <p>Test #1 was in upper east face. Material is: 0-1', sod and silt; 1'-11', sandy gravel with many small (3"-6") cobblestones.</p> <p>Test #2 was in field, 100' N75°E of Test #1 and 100' S40°W of massive outcrop and boulders. Material is: 0-1', sod; 1'-3.5', sand overlying fine gravel; 3.5'-7.5', compact cobbly gravel; bottom, boulder or bedrock.</p> |
| | 3 | 1972 | 1-9 | 0-1 | Yes | 64 | 51 | 36 | 20 | 7 | 3 | 14.5% | Gravel | <p>Test #3 was near south end of field, 475' S10°E of Test #2. Material is: 0-1', sod; 1'-5', cobbly gravel; 5'-9', bouldery gravel; bottom, sand layer.</p> |
| | 4 | 1972 | 1-9 | 0-1 | Yes | 91 | 74 | 44 | 34 | 13 | 8 | 18.8% | Gravel | <p>Test #4 was near north end of field, 390' N10°W of Test #2. Material is: 0-1', overburden; 1'-3.5', fine gravel (oxidized zone); 3.5'-6', gravelly sand with cobblestones; 6'-8', bouldery gravel; 8'-9', coarse cobbly gravel.</p> |
| | 5 | 1972 | 1-9 | 0-1 | Yes | 67 | 62 | 38 | 25 | 6 | 3 | 14.4% | Gravel | <p>Test #5 was in lower level of field, 160' S85°W of, and 40' below Test #4. Material is: 0-1', overburden; 1'-5', loose, fine gravel with an occasional cobblestone; 5'-9', compact gravel (water encountered at 9").</p> |
| *Meets Grading requirements only | | | | | | | | | | | | | | |

TABLE I
Supplement

| LONDONDERRY PROPERTY OWNERS - GRANULAR | Map Ident. No. |
|--|----------------|
| Biggins, Richard | 16 |
| Burdick, William and Arthur | 14 |
| Central Vermont Public Service | 15 |
| Clark, Robert | 8 |
| Dostal, Erwin J. | 10 |
| Flanagan, Frank J. | 5 |
| Larson, Donald J. | 1, 2 |
| Luinetti, John | 11 |
| Melendy, Earl | 12 |
| Michel, George and Harold | 6, 7 |
| Truax, Paul | 3, 4 |
| U.S. Army Corps of Engineers | 13, 17, 18 |
| Williams, Leroy | 9 |

LONDONDERRY ROCK DATA SHEET NO. 1

| Ident. No. | Field Test No. | Year Field Tested | Rock Type | Existing Quarry | Method of Sampling | Abrasion AASHO T-3 | Results |
|------------|----------------|-------------------|------------------------|-----------------|--------------------|--------------------|--|
| 1 | 1 | 1972 | Gneiss and Amphibolite | No | Chip | 5.1% | <p>Owner: John Luinetti. Area consists of the southwest escarpment of a heavily forested hill east of Vermont Route 100. Tests were made below a 15-foot overhang that is located about 1000 feet east of Route 100 at a point 1.7 miles south of its junction with Vermont Route 11. Bedrock is well exposed at this locality; however, a thin veneer of forest duff and many detached blocks cover the lower slope. A quarry would be necessary for development along with the construction of a one-quarter mile long access road of moderate to steep gradients.</p> <p>Test #1 was at the southwest end of the lower slope. Granitoid gneiss of the Mount Holly complex, with an amphibolite band, comprised the 75-foot section that was sampled at random. This sample had an AASHO T-96 abrasion test result of 51.6%.</p> |
| | 2 | 1972 | Gneiss | No | Chip | 4.5% | <p>Test #2 was an extension from 75 to 135 feet northeast of Test #1 to the bottom of a nearly vertical face below a 15-foot overhang. Gneiss with a well-developed NW to SE cleavage was sampled at random. This sample had an AASHO T-96 abrasion test result of 41.8%.</p> |

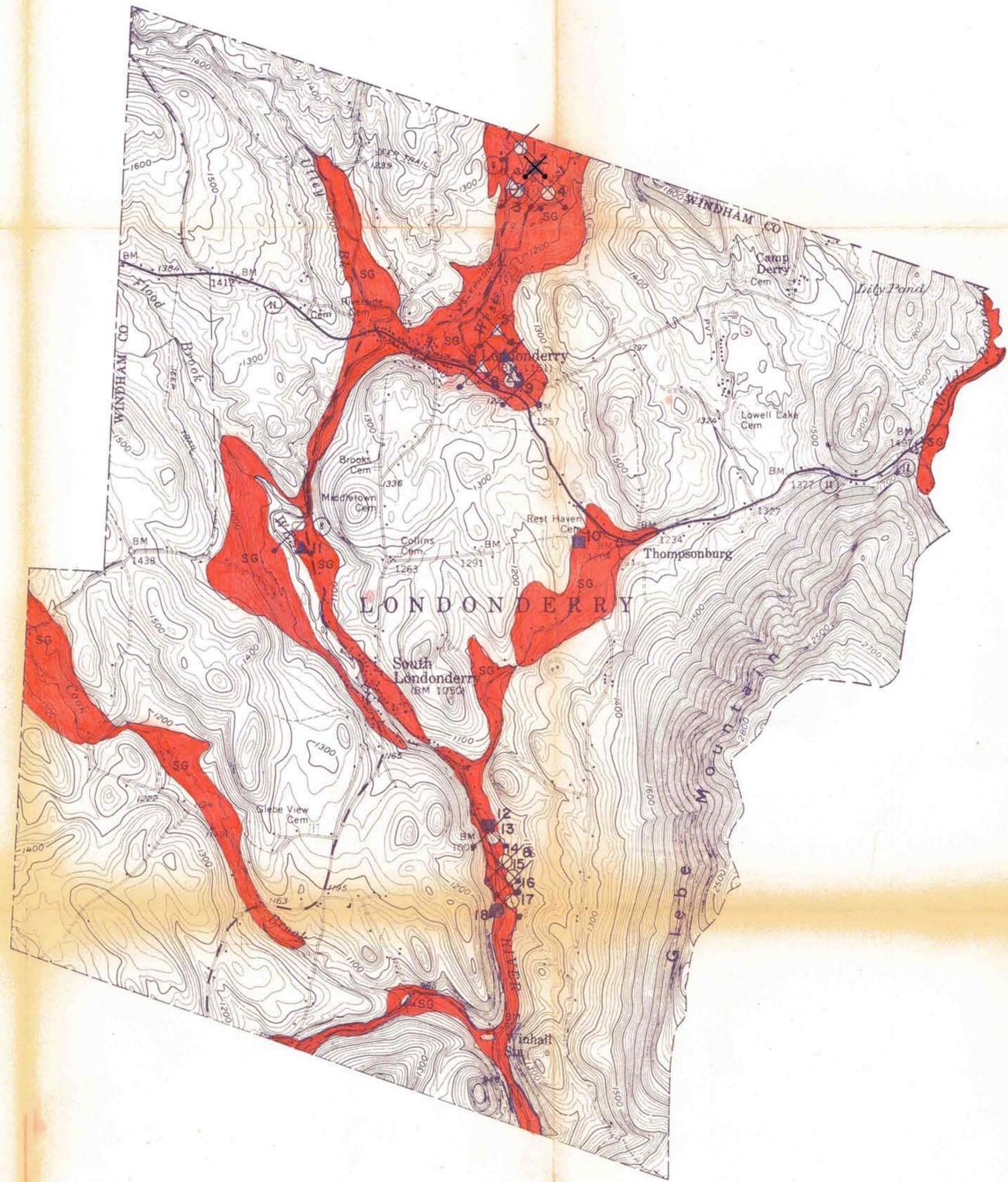
TABLE II
Supplement

LONDONDERRY PROPERTY OWNERS - ROCK

Map Ident. No.

Luinetti, John

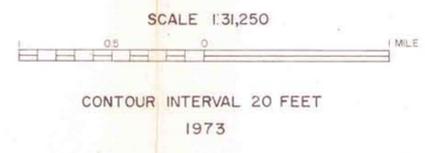
1



LEGEND

- GRAVEL, ACCEPTABLE FOR ITEM 704.05 (gravel for sub-base)
- GRAVEL, DEPLETED OR NOT ACCEPTABLE FOR ITEM 704.05
- △ SAND, ACCEPTABLE FOR ITEM 703.03 (sand borrow and cushion)
- ▲ SAND, DEPLETED OR NOT ACCEPTABLE FOR ITEM 703.03
- GRANULAR BORROW, ITEM 703.05
- MATERIAL NOT ACCEPTABLE FOR ITEM 703.05
- ✕ EXISTING PIT
- SAND & GRAVEL DEPOSIT
- SAND DEPOSIT
- 3 IDENTIFICATION NUMBER (refer to data sheets)

LONDONDERRY

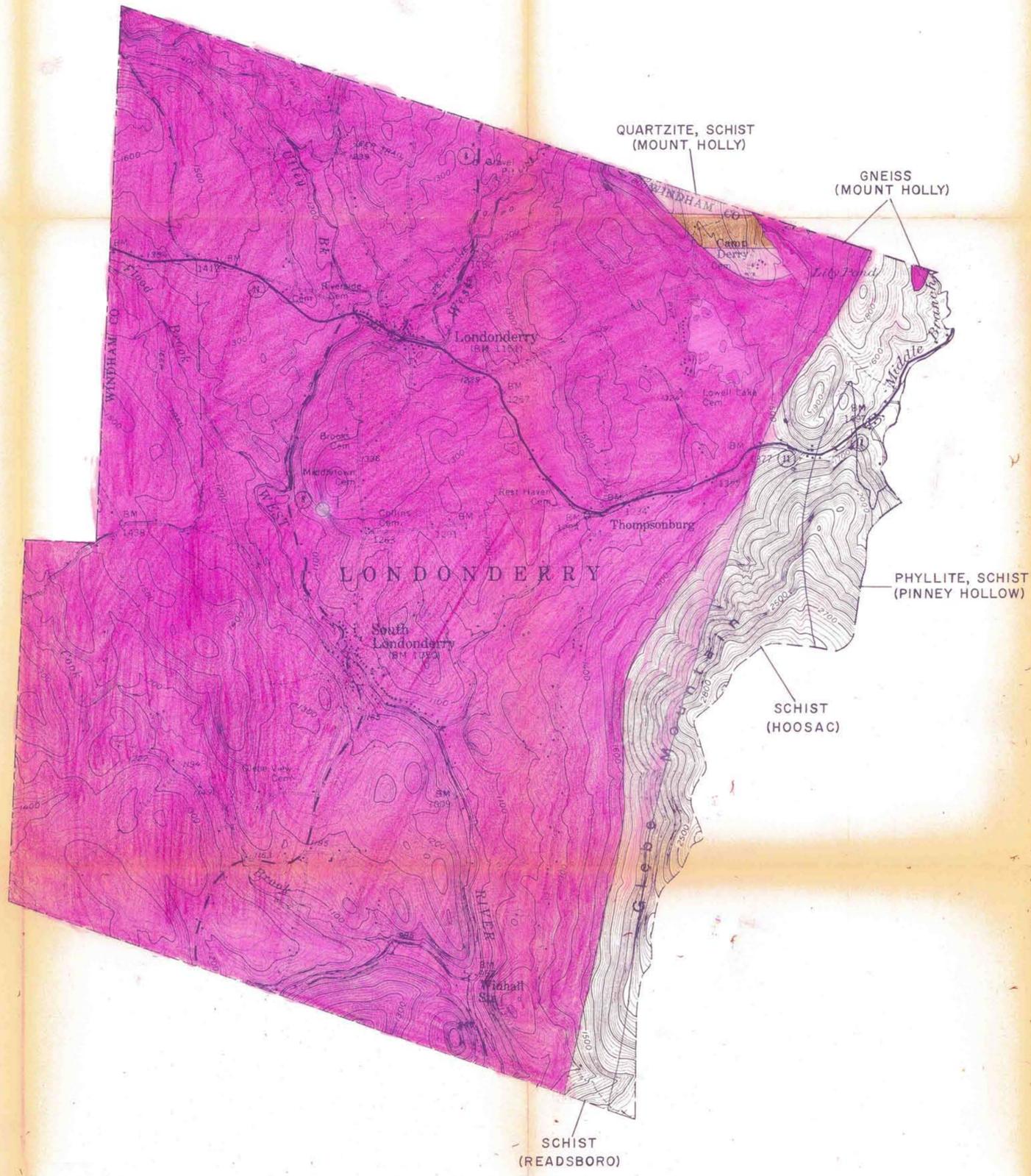


GRANULAR MATERIALS MAP

BY
VERMONT DEPARTMENT OF HIGHWAYS
IN COOPERATION WITH
U.S. BUREAU OF PUBLIC ROADS

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

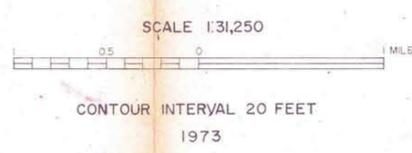
| DATE | BY | | | |
|------|----|--|--|--|
| | | | | |



LEGEND

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

LONDONDERRY



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

| | | | | |
|------|--|--|--|--|
| DATE | | | | |
| BY | | | | |