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Department of Public Works  
John A. Volpe, Commissioner

U. S. Department of the Interior  
Geological Survey  
W. E. Wrather, Director

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Cooperative Geologic Project

File Report

Geologic and Seismic Investigations for

South-East Expressway, Stations 600 - 603

in Quincy, Mass.

by



James E. Maynard, Geologist, U. S. Geological Survey

2 pages of text  
2 plates

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U. S. GEOLOGICAL SURVEY MASS. DEPT. OF PUBLIC WORKS  
COOPERATIVE GEOLOGIC PROGRAM  
OPEN FILE REPORT

Boston, Massachusetts  
June 1954.

Seismic Series # \_\_\_\_\_

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General Statement

At this site the southbound lane of the proposed highway will be located approximately 75 feet to the left (south) of the base line. This will place it close to the base of a mound of granite quarry waste with very steep slopes. As a cut of considerable depth will be required for the road, the mound of waste with its unstable slope constitutes a very hazardous condition, especially with respect to the possibility of rock-falls and slides. Seismic work was performed at the site with two aims in view; firstly, to obtain information on depths to bedrock that would aid in estimating the quantities of materials to be removed from the proposed cut, secondly, to obtain data that might aid in estimating the quantity of material in the mound of quarry waste with the object of obtaining estimates for its removal. Traverses A-13 and C-D were made for this latter purpose. Additional traverses would have been of value, but they were not made because of the possibility of starting rock-falls or slides, a situation that would have exposed personnel to unwarranted danger, and equipment to avoidable risk.

Mr. M. E. Chandler and Mr. W. L. Carney, Massachusetts Department of Public Works' Engineers, performed pertinent survey work required for this project, and prepared the essential plans and profiles. Mr. Chandler also operated the seismic equipment and assisted in the preparation of the seismic velocity data.

The work was performed in June 1953 as part of a cooperative program of the Massachusetts Department of Public Works and the United States Geological Survey.

### Surface Geology

The site occupies part of the northern slope of a till-bedrock hill. For many years granite has been quarried from some of the exposures, and the waste from the operations has been dumped along the northern slope of the hill. Numerous masses of rock of all sizes have rolled and slid downslope variable distances beyond the main base of the waste pile. Thus it is very difficult not only to fix a reliable boundary between quarry waste and till, but to obtain even an approximation of the position of the original surface beneath the quarry waste.

### Seismic Traverses

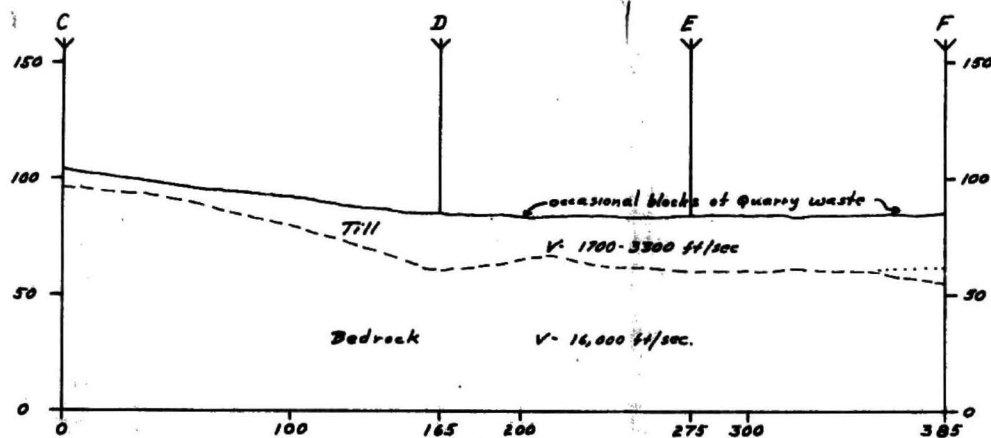
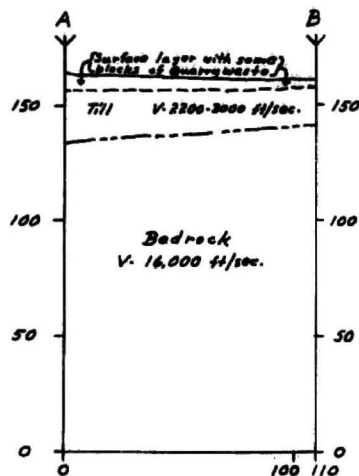
Four seismic traverses were made at this site. The locations of the shot points and the arrangement of the seismic lines are shown on sheet 1.

### Subsurface Interpretation

The geologic sections as interpreted from the surface geology and the seismic data are shown on sheet 2. Quarry waste appears to be absent from the surface layer along section C-D; it occurs along section D-E-F, but appears to be mainly scattered blocks resting on, or protruding from the original surface of the ground. Along section A-B, quarry waste is relatively abundant, but nowhere does it appear to extend more than 8 feet below the surface of the ground.

Two possible depths to bedrock could be calculated from the seismic data at shot point F, 23 feet and 30 feet; the deeper of these is preferred.





# PLAN OF TRAVERSES

SCALE: 1 INCH = FEET

Letters refer to shot points at ends of traverses.

Numbers refer to D.P.W. stations on baseline.

Y Shot point.

V - Apparent seismic velocity (ft/sec.) in feet per second.

Dotted bedrock lines indicate inconclusive seismic data. Vertical measurements refer to elevations above mean sea level (datum 1929).

Numbers at shot points indicate depths to bedrock, as follows: Y<sub>165</sub> 165, Y<sub>275</sub> 275, Y<sub>385</sub> 385.

## INTERPRETATIVE GEOLOGIC SECTIONS ALONG SEISMIC TRAVERSES

GEOLOGY BY: James F. Maynard

SEISMIC DATA BY: James F. Maynard  
M.E. Chandler

ENGINEERING BY: M.E. Chandler  
W. L. Carney

QUINCY

ROUTE NO. S.E. Expressway

Stations 600 to 603

SCALE: 1 INCH = 40 FEET

DATE: July 1953

SHEET 2 OF 2

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF PUBLIC WORKS

U.S. DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

COOPERATIVE GEOLOGIC PROJECT