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Commonwealth of Massachusetts
Department of Public Works
W. F. Callahan, Commissioner

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

Braintree-Weymouth
Stations 29-36
[no 34]

Cooperative Geologic Project

Geologic Interpretation of Seismic Data

Braintree-Weymouth By-Pass

Stations 29-36

Liberty Street Grade Separation

in Braintree, Mass.

by

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

and

Rev. Daniel Linehan, S. J., seismologist, Weston College

3 pages of text
1 plate

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Seismic Series #_____

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General Statement

At the request of the Massachusetts Department of Public Works, seismic and geologic studies were made for the projected Braintree-Weymouth By-Pass grade separation at Liberty Street in Braintree, Mass. The work was performed in order to furnish data that would aid the engineers in preparing estimates of the quantity of bedrock to be excavated for this project. The study represents part of a cooperative program of the Massachusetts Department of Public Works and the United States Geological Survey. The work was performed in May 1949.

Surface Geology

At this location the proposed highway crosses diagonally a till-bedrock ridge; the planned bridge site ~~being located~~ is near the crest of the ridge. The ridge appears to be dominantly bedrock partly covered with a thin veneer of loose till, for many small outcrops of relatively coarse-grained granite occur within and near the construction area. Locations of these exposures are shown on the accompanying map.

Seismic Traverses

Two consecutive 220-foot traverses, A-B and B-C, were run along the base line; shot point A ~~being~~ was located at station 33+65, B at station 31+45 and C at station 29+25. Two consecutive traverses, E-F 150 feet long and F-G 165 feet long, diagonally crossed the base line at station 31+48, 43 feet from G. Shot-point E was located approximately 223 feet to the right (east) of station 33; F approximately 99 feet to the right (east) of station 32+20; and G approximately 36 feet to the left (west) of station 31+24. Traverse A_1-D, 220 feet long, extended in a southwesterly direction from station 33+75 to a point approximately 180 feet to the left (west) of station 32+55.

Depths to Bedrock

The approximate depths to bedrock below the shot points as calculated from the seismic data are:

A,	8	feet
A_1,	8	"
B,	4	"
C,	8	"
D,	5	"
E,	5	"
F,	5	"
G,	4	"

The depth values for shot points A and A_1 are based on till velocity data of reasonable accuracy. All the other depth values were determined by means of an average estimated till velocity. The actual depth may be somewhat less than the figure stated for shot points C, D and G, and somewhat greater for shot point B.

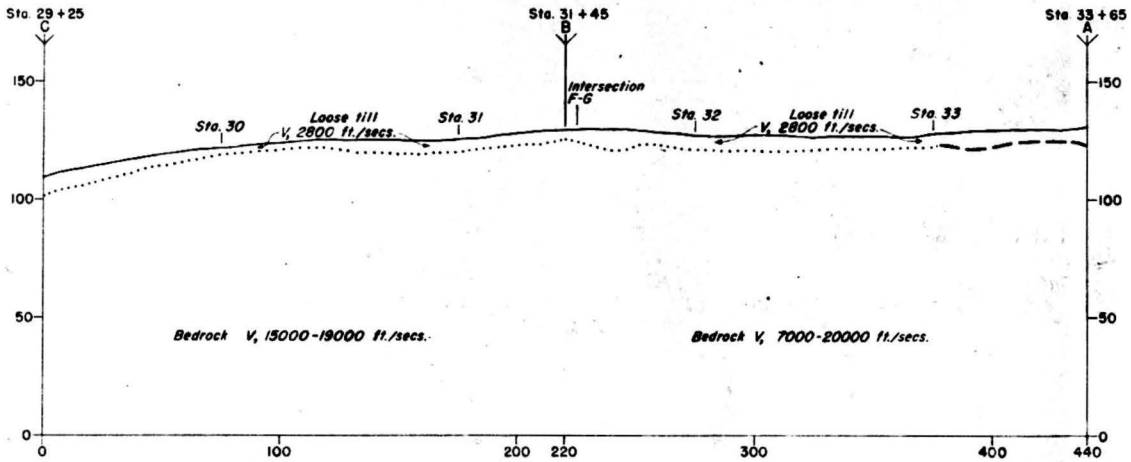
Interpretation of Seismic Data

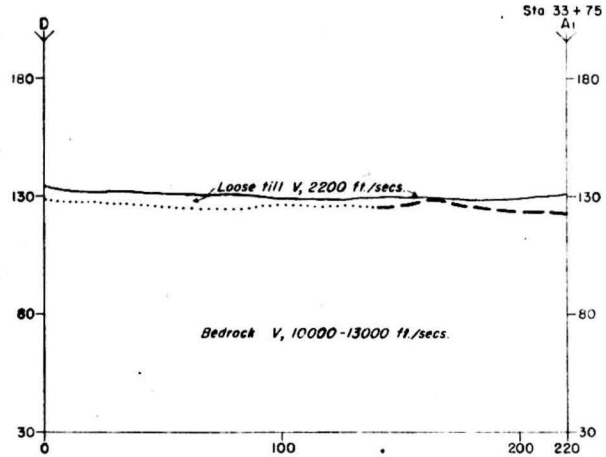
The geologic sections as interpreted from the surface geology and the seismic data are shown on sheet 1. All the sections indicate that the bedrock is shallow, in general, not more than 8 feet below the surface. Along most of the sections the boundaries of the bedrock surfaces have been dotted because the depth values for most of the shot points were calculated from an estimated average till velocity. This estimated value, however, is probably very close to the actual velocity of the material. The positions of the bedrock surfaces on the geologic sections must be used with caution by the engineer as it is difficult to make accurate interpretations between shot points when bedrock is at such shallow depths. Small ridges, knobs, or pinnacles may extend above the altitudes indicated by the dotted lines; conversely small depressions may be present at altitudes below those indicated by the dotted lines.

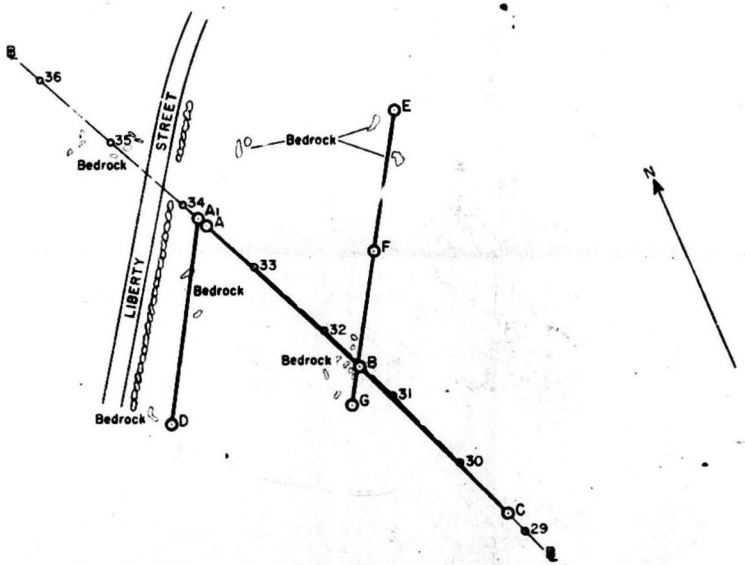
COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

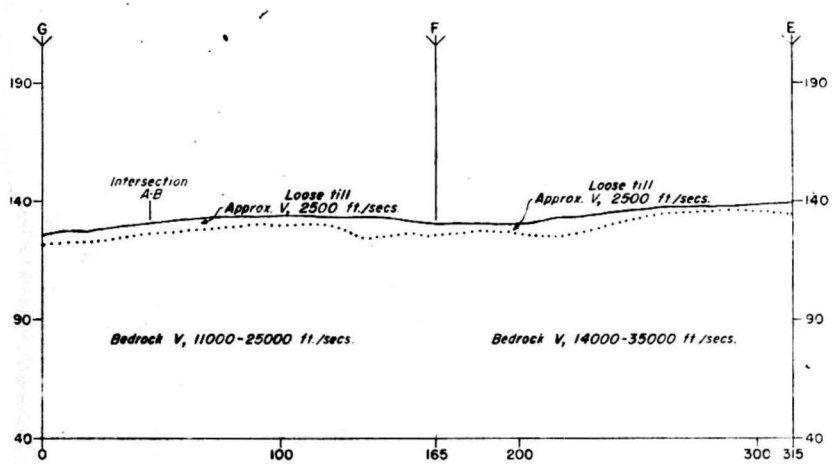
U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

COOPERATIVE GEOLOGIC PROJECT









PLAN OF TRAVERSES

SCALE: 1 INCH = 100 FEET

Letters refer to shot points at ends of traverses
Numbers refer to D.P.W. stations on baselines.

NOTE:
Dotted portions of sections indicate inconclusive seismic data.

INTERPRETATIVE GEOLOGIC SECTIONS ALONG SEISMIC TRAVERSES

BRAINTREE	ROUTE NO
BRAINTREE-WEYMOUTH BY-PASS LIBERTY ST. GRADE SEPARATION, BRAINTREE STAS. 29-36	
SCALE 1 INCH = 40 FEET	GEOLOGY BY J.E. MAYNARD & M. WILLARD
↓ Shot point	SEISMIC DATA BY DANIEL LINEHAN, S.J.
V- Apparent seismic velocity (ies) in feet per second.	ENGINEERING BY WILLIAM H. STEAD
	DATE MAY, 1949 — SHEET 1 OF 1