Geologic Reconnaissance Along the Proposed Location of Route 128 in Newton and Norwood Quadrangles, Massachusetts

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Introduction

In August, 1952, a reconnaissance geologic map was made along the proposed relocation of Route 128 from Route 9 in Wellesley to Green Street in Canton, a distance of about 5 miles. The mapped area is about ½ mile to 1 mile wide along this segment. The study was made to determine the geologic conditions along the route as an aid in the selection of sites where further studies of the surficial and bedrock materials should be made. These studies, both detailed geology and seismic profiles, facilitate the determination of depth to bedrock and are of assistance in choosing final grade lines and in estimating amounts of various materials to be excavated.

The project was undertaken at the request of the Massachusetts Department of Public Works, and was performed under a cooperative program of the Commonwealth of Massachusetts and the U. S. Department of the Interior, Geological Survey.

The Newton and Norwood 7½ minute quadrangle topographic maps were used as a base for the geologic mapping. The geology of the Norwood quadrangle was mapped earlier by N. E. Chute, and the corresponding portion of this map was taken from his manuscript maps of the quadrangle. The type of material comprising the various landforms is shown on the accompanying geologic map and is intended as a guide in choosing areas which will be suitable as a

source of granular material. The map is colored to further emphasize the types of materials. Each land form is described in the legend accompanying the map and is further identified by an appropriate symbol.

Bedrock

Two general types of rocks will be found in the cuts along the proposed highway. At the northern end, between Route 9 and Central Avenue, Needham, conglomerate is covered to shallow depths with sand and some gravel. The conglomerate is composed of pebbles and cobbles from one inch to a foot in diameter set in a well cemented sandy matrix. It is a hard rock, but it is cut by numerous joints and by a cleavage which facilitates breakage.

Elsewhere along the road the rocks which appear at the surface are of one general type. They are hard, jointed, medium- to fine-grained crystal-lined rocks, that range in color from pink to purple and from dark gray green to black.

Surficial Geology

Just south of Route 9 the proposed centerline involves a deep cut through a hill of conglomerate. The bedrock here is either exposed at the surface or appears to be no more than a few feet below it; the cover is composed of sands, gravels, and sandy till. South of this area the sand layer is thicker, and at Central Avenue it ends in a poorly defined scarp that faces the south; it seems unlikely that bedrock would be found in a cut here, but if a cut is contemplated at this place the site should be checked seismically.

South of Central Avenue the centerline crosses an area of sands and gravels much modified by pitting.

South of Highland Avenue the centerline crosses a swamp and the north end of a kame terrace (kt) of sand and gravel; in places this layer of sand and gravel may overly (ie) till. It is probable that the surface of the till layer under the gravel slopes abruptly southward, so that at Kendrick Street the gravels are at the present floor of the pit. Although bedrock has not been seen in the present pits, it would be desirable to determine the depth to bedrock by seismic methods ff the grade includes a deep cut through the terrace. South of Kendrick Street several lenses or small hills of till have been observed in an abandoned gravel pit; similar lenses may exist elsewhere in the terrace.

Between Kendrick Street and the New York, New Haven and Hartford Railroad the proposed highway traverses an area of great topographic irregularity. This segment of the highway crosses several kame terraces of intricate form, at several levels along the valley. Some ice channel fillings are indicated in the area. The bedrock valley wall against which the terraces were built has an irregular slope, as interpreted from the map; where the bedrock is exposed near the centerline seismic studies may be desired. The surface materials in this segment range from sand to medium to coarse gravels.

At the intersection of the railroad and the present Route 128 in Needham the higher kame terrace is composed of medium gravels and sands, and bedrock is found about 8'-13' below the surface; however it seems unlikely that bedrock will be set in shallow cuts on the centerline, owing to the eastward curvature of the highway which carries the centerline well away from the valley wall. From the railroad to the Charles River the centerline passes through three elongated ridges of gravel and sand, (ice channel filling, or esker, ie).

South of the Charles River the centerline crosses a kame terrace. From West Street to Route 1A in Dedham the proposed relocation traverses a general area of bedrock that is largely covered by thin deposits of till, gravel, and sand. The bedrock is a hard, medium to fine grained crystalline variety. It is exposed as knobs and cliffs. The thickness of the surface material is difficult to determine, but is thought to be generally very thin, so that for all practical purposes, bedrock is considered to be at the surface.

The sandy kame terrace indicated between Route 1A and Route 1 is probably a thin deposit over bedrock. An area of kames and eskers occurs between Route 1 and East Street; here the sands and gravels as indicated on the map, are mixed and interbedded, and of variable texture. From the present appearance of the pits, it seems that the materials are dominantly pebble and cobble gravels, with a great many large scattered boulders.

Southeast of East Street the proposed highway line crosses an area of ground moraine; this is a moderately thick layer of till. Bedrock is probably well below the surface of the ground here, and unlikely to be reached by cuts. Southeast of this area of ground moraine the centerline crosses an area of undifferentiated sands and gravels (indicated here as kame terrace, kt), and another area of ground moraine, in which bedrock is found near the surface on the south side of the highway. However, the bedrock surface probably slopes steeply to the north, so that it will not be penetrated by shallow cuts.

East of the swamp through which the Neponset River flows the proposed highway crosses an area of low hillocks of sand, and along the base of a large deltaic deposit of sand and gravel.

Sources of Sand and Gravel

Several excellent sources of sand and gravel occur along and near the right of way of the proposed highway. The northernmost of these is the gravel pit just north of Kendrick Street on the east side of Route 128. This pit contains a large supply of coarse gravel, sand, and a considerable quantity of till which would be suitable for fill material. The till, however, should be checked for its clay content since it is finer textured than most of this till in the area. A smaller pit just south of Kendrick Street contains similar material.

Sand and gravel deposits are numerous along the right of way between Kendrick Street and the New York, New Haven, and Hartford Railroad.

Necessary fill for the swampy area to be traversed between the railroad and the Charles River to the south can be easily and conveniently obtained from the eskers (ic) and kames in the immediate vicinity.

The kame area in Dedham and Westwood, between Route 1 and East Street, is a good source of coarse gravels.

The large kame delta on Route 128 just south of the Blue Hills Reservation on the eastern edge of the Norwood quadrangle is an excellent source of fine granular material. A large gravel pit is already in operation here and a great quantity of sand and gravel is available.