

#62-F-9

W.P. #44-58-2

Hwy. #50

AT BOLTON

Mr. R. D. McMillan,
Road Design Engineer.
Materials & Research Division,
(Foundation Section).
Attention: Mr. D. Farren.

February 2, 1962.

D.E.C. FOUNDATION INVESTIGATION
REPORT,
W.J. 62-F-9 -- W.P. 44-58-2.

Re: Hwy. No. 50 at Bolton, Ontario,
Sta. 136+00 to Sta. 149+00.,
District #6.

Upon the verbal request by the Assistant Road Design Engineer, Mr. Doug. Farren, this Section has carried out a subsoil investigation on the East side of the deep cut on Hwy. 50 in Bolton, extending between approximate Stations - 136+00 to 149+00.

The purpose of this investigation was to determine whether it would be possible to avoid the flattening of the existing slope as presently designed and required in connection with the realignment of this portion of Hwy. 50.

The present slope surface is uneven and there is ample evidence of soil movements. However, all the evidence points to relatively very shallow surface movements that could be partly described as sloughing and partly as creep. The subsoil investigation has confirmed this impression.

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One borehole was put down at Sta. 144+60, some 10 ft. from the edge of the slope. The location of the borehole in relation to the existing house on the top of the slope, as well as the determined soil stratigraphy, are shown on the attached Drawing No. 62-P-9A. As can be seen from the subsoil profile, the material is predominantly silt and very dense. On the top, a 6-ft. layer of sand was found. Another thin (3 ft.) sand layer was encountered at a depth of 35 ft. below the surface.

Bearing in mind the material and its properties, it becomes evident that no deep-seated failures are taking place, or can take place, but that the slope surface, which is very long and exposed, becomes unstable due to the influence of surface water and also of water that penetrates into the soil during prolonged precipitations and finds its way out of the ground somewhere on the slope. The detrimental influence of the surface sand layer can now easily be assessed.

In order to prevent soil movements on the slope, steel wire meshes were installed in the past, apparently with not too much success. This is understandable, since these meshes did, in no way, influence the main cause of the movement - i.e., the water.

In view of the above-described soil conditions and causes of soil instability, the following is proposed and recommended:-

The present slope can be maintained. Because the required and designed widening of the highway cuts into the toe

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of the present slope, the erection of a bin-type wall is recommended.

To reduce water entry into and onto the slope, and to control the movements of the seepage water, the following should be carried out:-

A drainage trench (intercepting ditch) on the top of the slope, extending into the silt layer. According to the available information, this trench would be about 7 ft. deep. It should have a subdrain pipe at the bottom, and should be filled with coarse gravel and/or crushed rock. The top surface of the trench should be concave and formed as a shallow ditch.

A drainage ditch at the toe of the slope incorporated in the bin wall and road design.

A drainage trench in the middle of the slope, some 4 ft. deep and equally equipped as the one at the top.

Drainage trenches 4 ft. deep and two feet wide, filled with coarse gravel and/or crushed rock, spaced at 20-ft. centres running along the slope perpendicular to the road centre line. These trenches are tied in with the trenches at the top, the middle and at the toe of the slope.

Whether special draining of the sand layer between approx. elev. 785 and 788 will be necessary, will have to be determined either during construction or in the course of time. Presently, it is believed that the proposed trenches running at 20-ft. centres along the slope will take care of any water that would be coming out of this sand layer.

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If, in the course of time, some further instability of the surface soil between the trenches is observed, shallow trenches between the existing ones in a herring-bone pattern can be incorporated. These trenches will have to be only 2 ft. deep and 1 ft. wide, also filled with crushed rock.

Between approximate Sta. 142+00 and 143+00, timber piles were driven into the slope, presumably with the intention of preventing further soil movements. From the present conditions, it can be concluded that this measure again was not too effective. It is believed that here, also, the ground can be stabilized by the construction of proper drainage facilities. The height of the slope at this location is considerably smaller and it also appears that the flattening of the slope does not present any problem. However, it is our recommendation that here, also, proper drainage facilities be installed.

As far as vegetation on the slope is concerned, it is believed that sodding should be successful. The overall stabilization of the slope surface will contribute to the permanency of the vegetation.

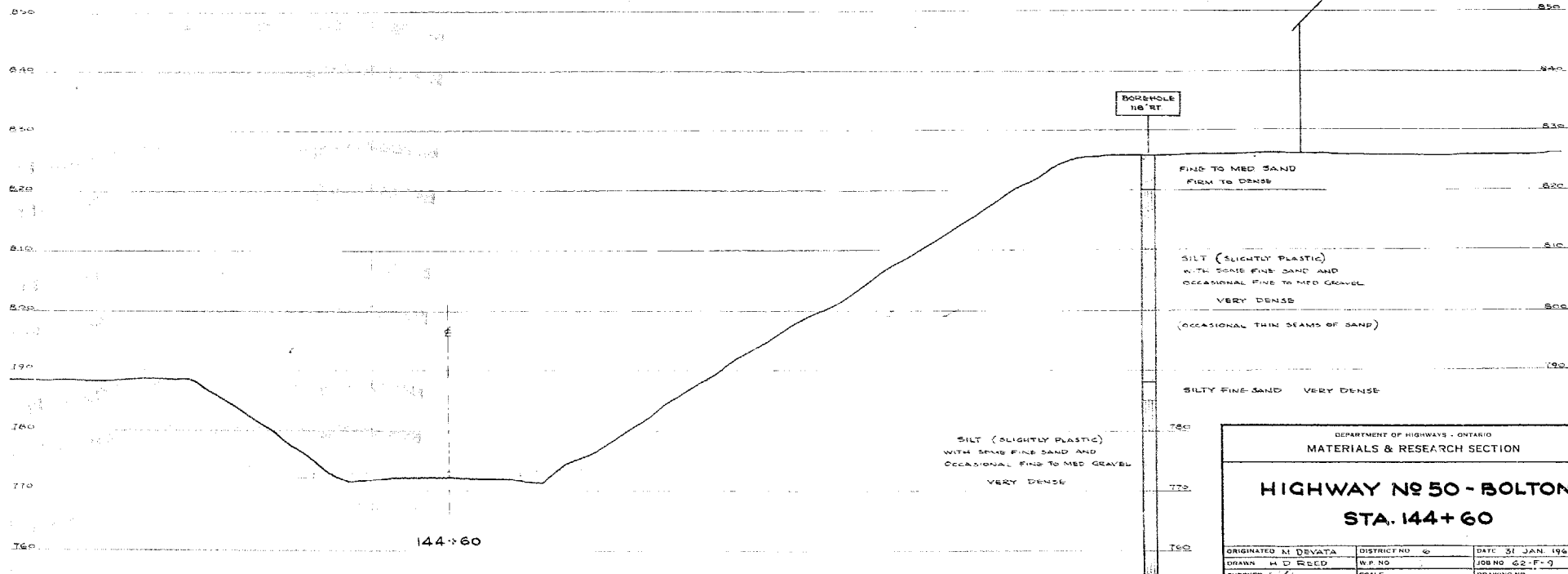
We believe that the given information will enable you to redesign the required stretch of the road. Should there be any additional information required, please feel free to call on us.

AG/WMEF

attach.

cc: Messrs. H. C. McMillan
E. A. Peregaskas
I. Campbell
C. Fraser
I. J. Kovich
Foundations Office
Gen. Files.

A. G. Stermac
A. G. Stermac,
PRINCIPAL FOUNDATION ENGINEER



DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH SECTION

HIGHWAY NO 50 - BOLTON **STA. 144+60**

ORIGINATED M. DEVATA	DISTRICT NO. 6	DATE 31 JAN. 1962
DRAWN H. D. REED	W.P. NO.	JOB NO. 62-F-9
CHECKED A. J.	SCALE	DRAWING NO.
APPROVED	1" = 10'	62-F-9A