

Mr. A. M. Toye,
Bridge Engineer.
Materials & Research Section,
(Foundations Office).

September 25, 1961.

D.H.O. FOUNDATION INVESTIGATION
REPORT.
W.J. 61-P-82 -- W.P. 140-61.

Attention: Mr. S. Macomber.

Re: Town of Grimsby, Olive St. Extension,
County of Lincoln, District No. 4.

Accompanying this memo, is our detailed foundation
report on the subsurface conditions existing at the above site.

We believe you will find the conclusions and recom-
mendations summarized therein, self-explanatory and adequate for
your future design work.

If we can be of further assistance in connection with
this project, please do not hesitate to contact our Office.

AGS/WdeF
Attach.

A. G. Sternas
A. G. Sternas,
PRINCIPAL FOUNDATION ENGINEER

cc: Messrs. A. M. Toye (2)
H. A. Tregachies
H. D. McMillan
I. C. Campbell
J. C. Thatcher
T. J. Kovach
J. Roy
E. B. Saint
J. E. Graspier
P. Norman
A. Watt
Foundations Office
Gen. Files. ✓

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FOUNDATION INVESTIGATION

at

Town of Grimsby, Olive
St. Extension, County
of Lincoln, District #4
N.S.61-F-82 - W.P.140-61

1. INTRODUCTION:

A subsoil investigation was carried out by this section at the site of a proposed new structure in Grimsby where Olive St. extension crosses Forty Mile Creek. Results and the discussion of the field investigation, as well as conclusions and recommendations for the future design work and construction procedure, are contained in this report.

2. DESCRIPTION OF SITE AND GEOLOGY:

The proposed structure is part of the Olive Street extension which involves the construction of a structure and approach fill and will connect Elizabeth and Ontario Streets. These streets are parallel and are separated by a valley which has a near vertical westerly side, a flat bed and a 2:1 sloping easterly side. A creek, known as Forty Mile Creek, flows north along the westerly edge and the proposed new structure crosses this creek.

The valley has been cut into Queenston shale and consequently the subsoil is derived from this material.

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2. DESCRIPTION OF SITE AND GEOLOGY: (Cont'd.)...

The Queenston Shale is an Ordovician rock. Its formation is predominantly reddish brown with a few greenish gray bands of sandy structure. The shale is fairly homogeneous and contains a large percentage of clay. As a result it weathers easily and the weathered product is plastic.

3. FIELD INVESTIGATION PROCEDURE:

In order to determine the subsoil conditions existing at the location of the proposed structure, four sampled boreholes and two boreholes to establish elevation of bedrock were carried out. The samples recovered in the Split Spoon were used for classification purposes and the rock cores were used to establish the soundness of the shale.

The four sampled boreholes were advanced a minimum depth of 5.0' into bedrock to determine the bedrock profile and the depth of weathering.

No ground water was observed in the subsoil.

The locations and elevations of boreholes are shown on the site plan, Drawing 61-P-62A.

4. SUBSOIL CONDITIONS:

The stratigraphy of the soil at the site is a shallow bedrock of Queenston Shale with a reddish brown weathered

4. SUBSOIL CONDITIONS: (Cont'd.)...

shale overburden. The overburden varies in thickness from 4.0 ft. ± BM No. 5 to 7.0 ft. ± BM's No. 1 and 2, and grades from clayey silty sand at the surface to gravel (weathered shale) at the bedrock face. There was practically no topsoil.

The bedrock, Queenston Shale, is of the Ordovician formation. It is predominantly reddish brown with a few greenish grey bands of sandy structure. It contains a large percentage of clay and becomes plastic on weathering. It weathers very easily.

The elevations of bedrock were established in each borehole and are shown on Drawing 361-V-82A.

No ground water was observed above the bedrock.

5. DISCUSSION AND RECOMMENDATIONS:

The bedrock being at a shallow depth it is recommended to use shallow spread footings with a safe bearing load of 4 T.S.F. The foundations of the structure at stations 6+25, 7+25 and 8+00 should be placed on shale at depths 6.0', 5.0' and 5.0' below present ground level (Elevations 276.0', 249.0' and 249.0') respectively.

It is also recommended that the footing on the top of the escarpment be situated at a certain distance from

Cont'd. /4 ...

5. DISCUSSION AND RECOMMENDATIONS: (Cont'd.)...

the nearly vertical escarpment slope. The investigation revealed the escarpment top material at the southern end of the original location footing to be weathered and the escarpment slope practically vertical. Some seepage zones have also been established at the toe of the escarpment. The Forty Mile Creek erodes the banks gradually and takes away the weathered and wasted shale. The nearly vertical slope is a result of this creek action.

Based on the above reasons and findings it is recommended that the easterly face of the footing be at least 12 feet away from the escarpment edge. It is considered that this distance is adequate and that the abutment will be sufficiently safe. A record should be kept about the state of the escarpment's face in order to be able to decide in time on preservation or remedial measures should they prove to be necessary.

The subsoil being weathered shale on shallow bedrock, no stability problems for the fill are expected. Also since no ground water was encountered, no dewatering problems during construction are anticipated.

6. SUMMARY:

The site of the proposed structure is located at a

Cont'd. /5 ...

6. SUMMARY: (Cont'd.)...

valley cut into Queenston shale. This shale is overlain by an average depth of 5.0' of weathered shale. A shallow creek known as Forty Mile Creek flows beside and parallel to the western nearly vertical side of the valley.

Shallow Spread Footings with a safe bearing load of 4 T.S.F. are recommended. Footings at stations 6+25, 7+25 and 8+00 should be placed at elevations 276.0', 249.0' and 249.0' respectively. The footing on the escarpment should have its easterly face at least 12.0' from the cliff edge.

No water problems are anticipated during construction and no stability problems of the fill are expected.

7. MISCELLANEOUS:

The field work was carried out from Aug. 18 to Aug. 22, 1961, by the F. E. Johnston Drilling Co. Ltd., using a Penn drill and a diamond core drill adapted for soil testing. The work was supervised by I. Holubec, Foundation Project Engineer for the Ontario Department of Highways.

REPORT PREPARED BY:

I. Holubec
I. Holubec,
Proj. Fdn. Engineer.

August, 1961.

REPORT APPROVED BY:

K. G. Selby
K. G. Selby,
Sr. Proj. Fdn. Engineer.

APPENDIX I.

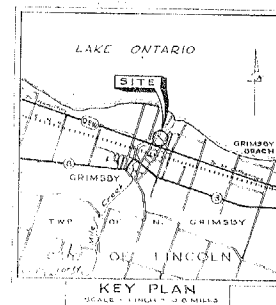
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61-F-82

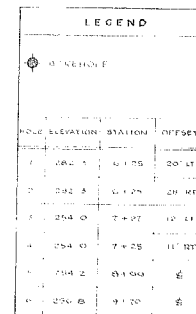
W.P. 140-61

OLIVE STREET.

FORTY MILE
CREEK



PLAN
SCALE - 1 INCH = 20 FEET



PROFILE
SCALE - HORIZ - 1 INCH = 50 FEET
VERT - 1 INCH = 10 FEET

DEPARTMENT OF HIGHWAYS - UTAH
MATERIALS & RESEARCH SECTION

OLIVE STREET EXTENSION
OVER
FORTY MILE CREEK

ORIGINATED BY	DATE
D REED	15 SEPT 1966
APPROVED	
AS SHOWN	
	61-F-82A