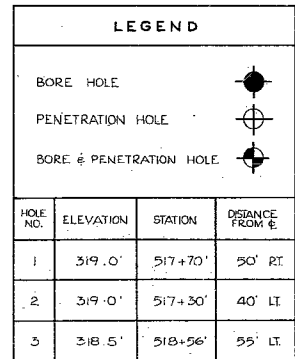


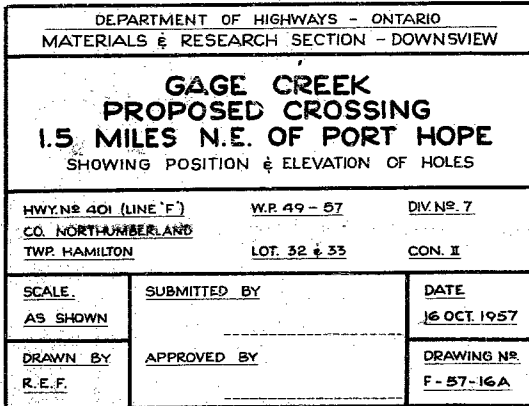
57-F-16
W.P.# 49-57
Hwy.# 401
GAGE CREEK
1.5 MILES N.E. OF
PORT HOPE

EDITED
FOR MICROFILMING
BY *BB* DATE *4/1/72*



— NOTE —

THE BOUNDARIES BETWEEN SOIL STRATA HAVE BEEN ESTABLISHED ONLY AT BORE HOLE LOCATIONS. BETWEEN BORE HOLES THE BOUNDARIES ARE ASSUMED FROM GEOLOGICAL EVIDENCE AND MAY BE SUBJECT TO CONSIDERABLE ERROR.



Mr. G. D. Webster,
Culvert Design Engineer,
Bridge Office.

April 10, 1958.

Re: Gages Creek -

Materials & Research Section.

40 Ft. Arch - W.P. 49-57.

With reference to your memorandum of March 31, 1958, regarding the bearing value of 6.5 tons per square foot at elevation 307.0 at the above location.

We have reviewed the soils borings and the subsoil consists generally of a fairly dense granular material. According to the penetration resistance, the safe bearing value for a spread footing foundation of no more than one inch settlement, would be approximately 5 tons. Normally, the bearing values are limited to the anticipated settlement. However, in this particular case, the depth of overburden to bedrock would be less than 10 feet and, consequently, the settlement could be considered of relatively minor importance and the bearing value can be increased over the 5 tons suggested. If the assumption is made that the subsoil is fairly uniform and that there are no soft pockets, the subsoil can support the 6.5 tons per square foot desired.

We would suggest, however, that fairly close inspection be made during excavation operations and that should any soft pockets occur, these should be excavated and be replaced with suitable materials, properly compacted.

F. C. Brownridge,
MATERIALS & RESEARCH ENGR.

Per:

AR/MdeF

(A. Rutka,
Principal Soils Engineer)

cc: Messrs. H. McMillan
H. Tregaskes
J. Gruspier
~~A. Rutka~~ *Vent*

File



ONTARIO

DEPARTMENT OF HIGHWAYS

Memo to Mr. V. Korlu.

Date February 10th, 1958.

From Alex Rutka.

Subject Re: Foundation Report -HWY.401
Gage Creek. W.P. 49-57. W.J.F.57-16.

Further to our discussion of this morning on the above, I have advised Gord Webster of the Bridge Office that he may use the value of 4 tons per square foot at elevation 306. As you know, this will be an arch type concrete culvert and will require this bearing value in view of the high fill.

A handwritten signature in cursive script, appearing to be 'AR'.

A. RUTKA.
Principal Soils Engineer.

C.C. FOUNDATION SECTION.

Mr. A. Towe.

November 7th, 1957.

Bridge Engineer.

Materials & Research Section.

Re: Foundation Report on New Bridge
at Highway No. 401 crossing the
Cage Creek, 1.5 miles north east
of Port Hope.
C.P. 49-57. U.J. F-57-16.

Attached are two copies of the above mentioned Report
for your information and use.



A. RUTKA.
Principal Soils Engineer.

c.c. Mr. A. Towe (2)
Mr. H. Tregaskes.
Mr. D.C. Ramsay.
Mr. H. Duff.
Foundation Section.
File.

Feb 21

On Feb. 10, 1958 your request of 4 T.s.f. bearing value was confirmed by designating elevation 306 ft. for the footings.

For your present request of 6.5 T.s.f. a further review of the soil investigation data available indicate that:

1. Due to the diversion of the stream the borehole locations do not correspond to exact footing locations. Only by correlating the findings from the three boreholes a subsoil stratigraphy of the site has been obtained. Our calculations and assessments of bearing values are based on these findings in the boreholes. Even if the chances of the subsoil material within the vicinity of these boreholes being different is unlikely, the possibility always exists, hence, assumption of bearing values at random may involve unprecise hazards.
2. From the boreholes it is pretty well established that starting at elevation about 305 ft. down to bedrock there is a dense sand layer (granular 90% and 10% cohesive material) while above this elevation the soil contains 20-30% cohesive material. The point is that once the layer is loaded some sort of settlement will take place. The more the cohesive material in the layer the longer the time duration for the settlement. While in cohesionless material the settlement is quick so that by the time the fill is completed almost all of the settlement has already taken place...
3. It appears that the required load of 6.5 T.s.f. can be placed on the layer but whether at elevation 307 or 305

depends on the staging of the fall, so as
to be able to control the hazards of
untimely settlement.

FOUNDATION REPORT

on

New Bridge at Highway No. 401 crossing
the Gage Creek, 1.5 miles north east
of Fort Hope.

Plan No. F-3132-3
Station: 518/60.

DISTRIBUTION:

Mr. A. Toye Bridge Engineer	(2)
Mr. H. Tregaskes Construction Engineer	(1)
Mr. D. C. Ramsay Design Engineer.	(1)
Mr. H. L. Buff Dist. Eng. Fort Hope	(1)
Foundation Section	(1)
File	(1)

L. P. 49-57

L. J. F-57-16.

*note: Feb 10/58
Edward Lord Hallett
4T/2' at 306' OK
OK*

INTRODUCTION:

A subsoil investigation was carried out to determine the bearing values of layers for supporting the foundations of the proposed structure.

The location is where the new highway 401 crosses the Gage Creek some 1.5 miles north east of Fort Hope, Hamilton Township (station 518/60, profile no. F-3132-7).

The work started on 28 May 1957 and was completed on 4 June 1957.

PROCEDURE:

The subsoil investigations were carried out by means of a skid mounted coredrill machine. In the course of investigations three boreholes with dynamic cone penetration tests were made. The physical nature of the terrain made the site of the no. 4 hole south eastern corner inaccessible.

The location of the holes is shown on drawing F-57-16A and their elevations on log sheets under the Appendix 1.

SUBSOIL FINDINGS AND ANALYSIS:

In a rolling country the Gage Creek flows in a small ravine spotted with big old trees. The waters of the creek have been carving into the eastern side where the ravine descends with a sharp slope right into the creek waters. An extensive erosion has converted this slope into loose falling soil.

From the borings the following subsoil structure was revealed:

Under the topsoil down to elevation 313.5 ft. the soil

is alluvial material of fine sandy loam. It contains some organic decayed matter. It has natural moisture content of 22% in borehole no. 1, and 42% in borehole no. 2. Due to its granular structure the samples yielded very low (less than 10%) Liquid and Plastic limits. Below this soil down to elevation 305 ft. the layer is dense gravelly (36% - 50%) sandy loam. The natural moisture content was found to be 4.2% to 7.2% and density 138 P.c.f. Below this soil down to bedrock (at elevation 300 ft. in boreholes no. 1 and 2, and elevation 296.5 ft. in borehole no. 3), the layer is dense fine sandy loam and with 55% gravel in borehole no. 3. The natural moisture content was found to be 13% to 15% and density 124 P.c.f.

The bedrock was drilled with diamond bit and core samples extracted. The rock is limestone interbedded with shale layers.

During sampling standard penetration tests were carried out in the field. The results of these tests are shown on log sheets.

CONCLUSIONS AND RECOMMENDATIONS:

From the above discussion it will follow that:

1. The subsoil, under the topsoil, is granular material reaching the bedrock at elevation about 300 ft. in boreholes no. 1 and 2 (western side of the creek), and elevation 296.5 ft. in borehole no. 3 (Eastern side of the creek). The top layer down to elevation 313 ft. is rather recently deposited loose, fine sandy loam. Below this down to elevation about 305 ft. the material is dense gravelly sandy loam. Below this down to bedrock the material is dense fine sandy loam containing appreciable gravel in bore hole no. 3 only.

2. This stratification of the subsoil presents a favourable picture for supporting spread footing type foundations. At elevation about 310 ft. the layer can provide a bearing value of 2.5 T.s.f.

3. It will be necessary to point out that the topography of the site presents an impressive picture of erosion and scouring taken place on the banks of the creek. It appears necessary to correct the course of the creek at the site by straightening it. Such a correction will help to control the erosion on the eastern bank. It will also lessen the scouring hazards during flood season when the water elevation rises some 4 - 5 feet.

4. The new grade line necessitates an approach fill of about 33 ft. on the western side of the structure. This will constitute some 2 T.s.f. of overburden. From the investigations the subsoil down to elevation about 313.5 ft. is found to be rather loose material. However due to its granular nature, the subsoil is expected to settle during the normal time of filling operations. So that by the time the fill will be completed the subsoil will have undergone the expected settlement and capable to carry the total load of the fill.

V. Korlu

Foundation Engineer.

APPENDIX 1.

DEPARTMENT OF HIGHWAYS - ONTARIO
MATERIALS & RESEARCH BRANCH - FOUNDATIONS SECTION - DOWNSVIEW
OFFICE REPORT ON SOIL EXPLORATION

DRILL RIG 54-1 OPERATION BORE & PENET JOB F-57-16 WP 49-54 BORING 1 STA. 517+10 (50 RT)
CASING BX (standard samplers to fit unless noted) DATUM GEODETIC DATE REPORT AUG 1957
SAMPLER HAMMER WT. 250 LBS. DROP 19 INCHES COMPILED BY H.S. CHECKED BY A.L. DATE BORING 27 MAY 1957

ABBREVIATIONS

V - INSITU VANE SHEAR TEST Q - TRIAXIAL QUICK K - PERMIABILITY
M - MECHANICAL ANALYSIS S - TRIAXIAL SLOW C - CONSOLIDATION
U - UNCONFINED COMPRESSION WL - WATER LEVEL IN CASING CA - CASING
QC - TRIAXIAL CONSOLIDATED QUICK WT - WATER TABLE IN SOIL γ - UNIT WEIGHT

SAMPLE TYPES

CS - CHUNK SS - SLEEVE SAMPLE
DO - DRIVE OPEN PS - PISTON SAMPLE
DF - DRIVE FOOT VALVE WS - WASHED SAMPLE
TO - THIN WALLED OPEN RC - ROCK CORE

SAMPLE CONDITION


- DISTURBED
- FAIR
- GOOD
- LOST

