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DIST. 9 REGION EASTERN

W.P. No. 72-70-01

CONT. No.

W. O. No.

STR. SITE No.

HWY. No. 401

LOCATION LANCASTER & FRASER ROAD. OVERPASS

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT.

REMARKS:

MATERIALS & TESTING OFFICE

EASTERN REGION

Lancaster and Fraser Road Overpasses

Hwy. 401

W.P. 72-70-01

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October 20, 1970
Date

SOILS DESIGN REPORT

Hwy. 401 Lancaster and Fraser Road Overpasses

W.P. 72-70-01

Proposed Grading, Granular Base, Hot Mix Paving and Structure Repairs Project

GENERAL DATA

This project is for the construction of 80 mph design acceleration and deceleration lanes for the entrance and exit ramps of highway 401 at Interchange No. 127. The approach fills to the structure have settled and will be corrected under this project. The structure requires repairs to the deck which will be detailed in this report.

The Fraser Road overpass 3± miles west of this project requires repairs to the curbing in the approach slab areas and some minor correction of the approach fills.

The approach fills at Lancaster were constructed using the normal 2:1 slopes. The height of fill constructed in 1962 was approximately 24' over 35 - 40' of soft sensitive marine clay overlying 5 - 10' of glacial till over limestone bedrock. The south approach has settled about 2.2' while the north approach has subsided a maximum 3' - 4'.

The site conditions at the Fraser Road Overpass are similar to Lancaster but the depth of the firm to stiff sensitive clay was approximately 23' over 0 - 6' of clayey silt. These 2 strata are underlain with compact to very dense silty sand and gravel over limestone bedrock.

Continued /2

Berms were recommended for the approach fills over 12' in height. The approach fills including berms were constructed (Cont. 66-179) about 7 months in advance of placing the structure (Contract 67-18). Settlements in the order of 6" - 9" have occurred at the ends of the approach slabs and over approximately 300' on the north approach and about 250' on the south approach.

INVESTIGATIONS

Winky drill cores have been obtained through the existing pavement structure about 25' and 50'± north of the north approach slab and south of the south approach slab. Cores were also taken through the approach slabs to determine the extent of voids which might have occurred due to the settlements at both structure locations. Profiles are enclosed showing voids determined.

PHYSIOGRAPHY

This project is located in the physiographic region known as the Lancaster Flats which is a lowland area where the till plain has been bu.ied under water-laid deposits. A few drumlins and till ridges have been left exposed in some locations. The clay in this particular area was deposited in the upper reaches of the Champlain Sea which covered the St. Lawrence Lowlands in recent geological time. This marine clay or "Leda" clay is generally underlain by till over limestone and shale bedrock at 25 to 100' below the surface.

Continued /3

EARTH BORROW

A clayey sand till earth borrow is expected to be available within a 5 mile haul distance. This material will be required to widen the north approach fill at Lancaster.

GRANULAR MATERIALS

Granular base course Class 'A' and hot mix aggregates will probably be obtained from commercial sources in the vicinity of Cornwall at a 17± mile haul distance.

RECOMMENDATIONS AND CONSTRUCTION FEATURES

1.1 Type of Granular Material

All granular material required for this project should consist of G.B.C. Class 'A' only.

1.2 Depth and Width of Granular Material

Granular material for the approach fills and widenings should consist of G.B.C. Class 'A' placed full width.

(a) Approach Fills - Lancaster Structure

Place all granular base course Class 'A' from the level of the present roadway to the design profile grade. Any fill below the level of the present roadway should consist of earth borrow.

Note:

Granular padding over the existing pavement should not be less than 4".

Continued /4

(b) Hwy. 401 - Pavement Widenings For Speed Change Lanes

Earth fill - provide for 12" G.B.C. Class 'A'.

Earth cut - no excavation required except for placing of hot mix in existing granular shoulders.

2.1 Pavement Types and Depths

(a) Speed Change Lanes

The existing pavement structure on Hwy. 401 in the Lancaster area consists of a 9" concrete slab over 9" of granular material. A deep strength pavement is recommended adjacent to the existing concrete pavement for uniformity of performance.

Surface Course	- H.L. 5	- 1½"
Binder Course	- H.L. 5	- 1½"
Binder Course	- H.L. 5	- 2 "
Binder Course	- H.L. 5	- 2"
Total Depth		7"

(b) Approach Fills

Pavement for the approach fills at Lancaster and the padding required on Fraser Road should consist of H.L.5.

The Lancaster approach fills should be placed with 2" H.L.5 and 1½" H.L.5 surface course.

(c) Since additional settlement is expected at the approaches to the structures, asphalt curb and gutter in lieu of concrete is suggested for pavement surface runoff control.

Continued /5

3.1 Widening of Existing Fills - Lancaster

(1) Topsoil should be removed from fill slopes. (Assume 4"±).

(2) Place new earth fill from original ground to level of existing shoulders. Keying of the slopes as per DD 416 should be applied if feasible.

(3) An additional 2' width of earth fill widening could be considered for the north approach fill Sta. 1+20± to Sta. 6+00 so that future settlements would not require widening of the existing fill.

4.1 Compaction Equipment

Since the earth borrow is expected to be of a sandy type, wobble wheel rollers can be used for all compaction hours required.

5.1 Structure Recommendations

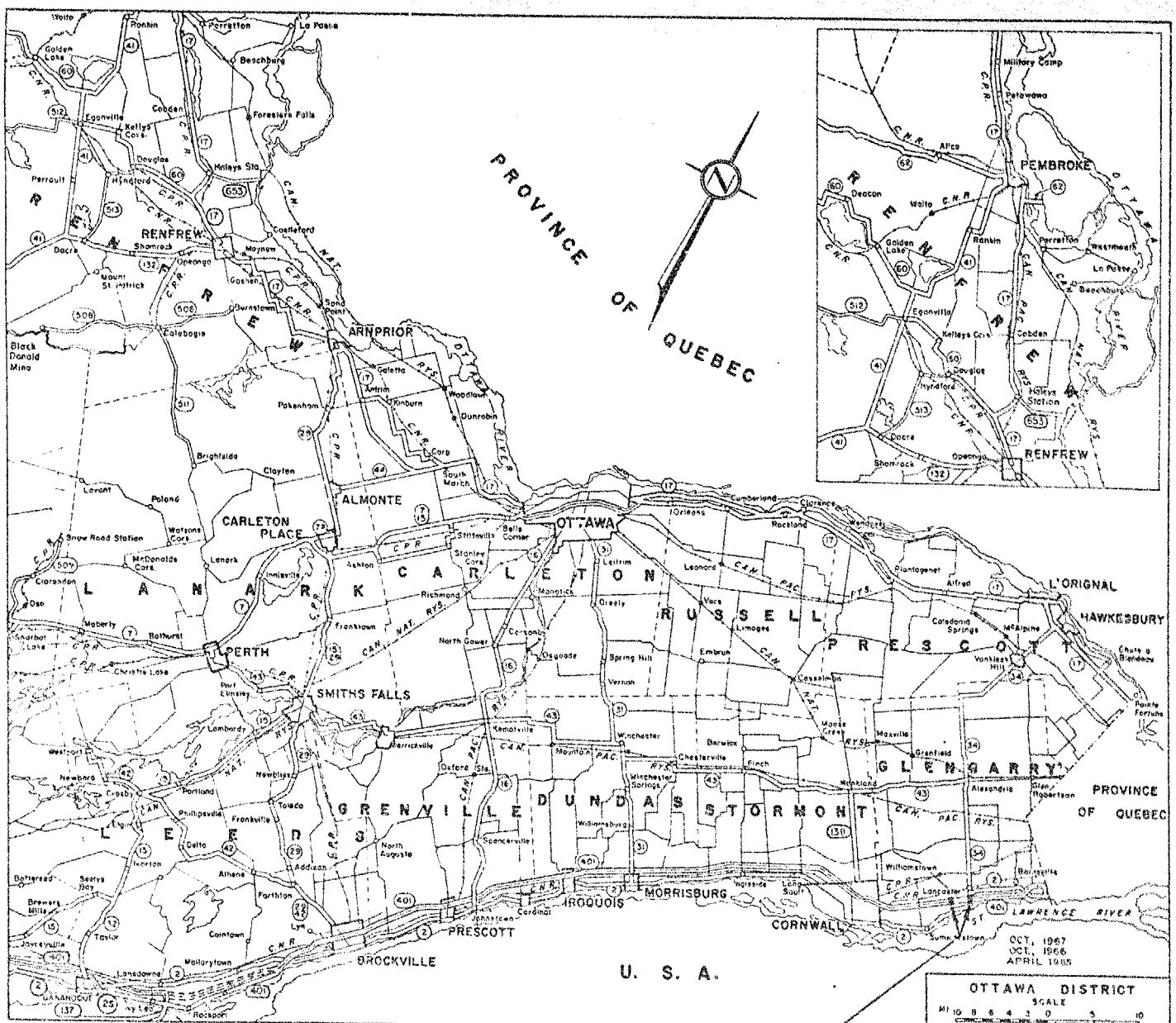
The Bridge Maintenance Office will be recommending specific treatments for Fraser Road and Lancaster structures including waterproofing of the deck of the latter.

6.1 Approach Slabs

No treatment is required of the voids under the approach slabs.

RDG:mgm

October 20, 1970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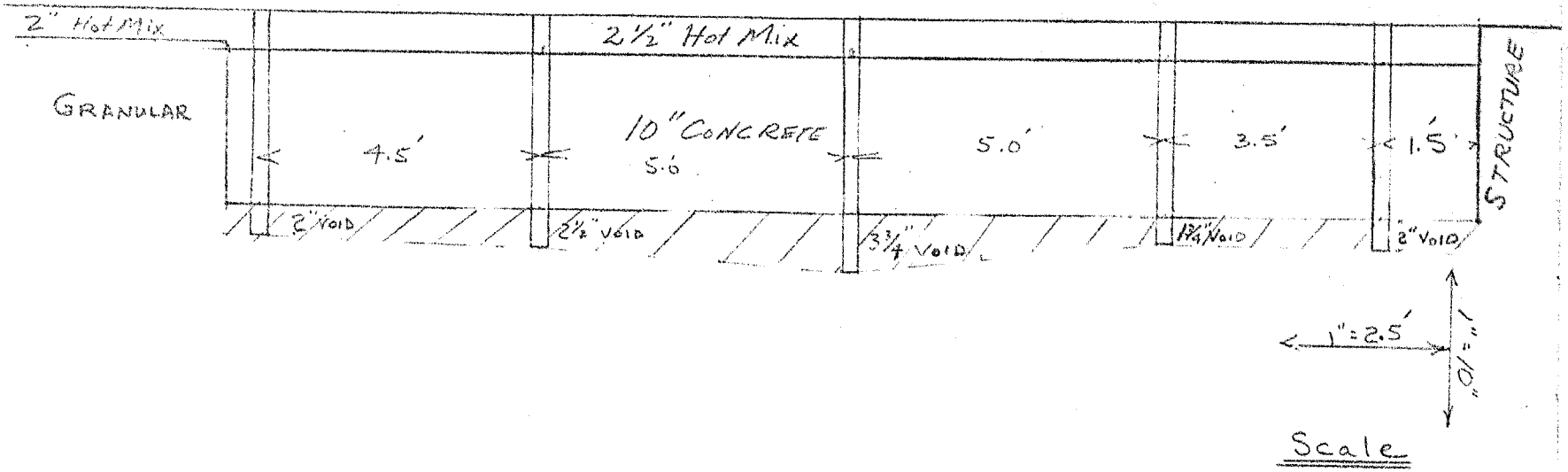
FRASER ROAD OVERPASS

North Approach Slab



Scale

South Approach Slab