

28-13,

Mr. F. S. Cavell,  
Superintendent,  
Special Services Section.  
Materials & Research Section.  
(Foundations Office).

May 17, 1961.

D.H.O. FOUNDATION INVESTIGATION  
REPORT.  
W.J. 61-P-37 -- W.P. (H11).

RE: PROPOSED NEW DISTRICT YARD AT NORTH BAY, ONTARIO. - DIST. #13.

This memo accompanies our detailed foundation report on the subsoil conditions existing at the above site.

The conclusions and recommendations contained in this report are, we believe, self-explanatory, and should prove adequate for your future work on this project. If, however, you require further assistance, please do not hesitate to contact our Office.

L. G. Soderman,  
PRINCIPAL FOUNDATION ENGR.  
Per:

AGS/ndaf  
Attach.

cc: Messrs. F. S. Cavell (2)  
J. Hamilton  
H. A. Tregaskes  
H. D. McMillan  
H. C. Teckmerry  
J. D. Foster  
E. R. Saint  
Foundations Office  
Gen. Files.

*L. G. Soderman*  
(A. G. Stermac,  
SUPERVISING FOUNDATION ENGR.)

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-

# FOUNDATION INVESTIGATION

For

PROPOSED NEW DISTRICT YARD AT NORTH BAY -  
W.J. 61-F-37 -- W.P. (Nil) -- District #13.

## 1. INTRODUCTION:

At the site of the proposed new District Yard, the location of which is shown on Drawing #61-F-37A, it is proposed to construct various new buildings, together with parking areas and driveways. An investigation was carried out by this office, the purpose of which was to determine the subsoil conditions existing at the site of the proposed buildings. An investigation was also carried out by the North Bay Region Soils Office in order to determine soil conditions at the site of the proposed roadways and parking areas.

A total of 17 boreholes and 29 penetration tests was carried out during the period May 1st to May 5th, 1961. The locations of these are shown on Drawing #61-F-37A.

The locations of the buildings and roadways were set out on the ground by a North Bay District survey party. The elevations of the boreholes were interpolated from contours shown on Plan #4-37C.

Foundation recommendations for the various buildings are given in Section 3 of this report; recommendations as to parking areas and roadways are given in Section 4.

## 2. SOIL TYPES AND SOIL CONDITIONS:

Most of the site is covered by a thin layer of sandy topsoil which is underlain by a deposit of silty, fine to medium sand in a loose to compact state which is, itself, underlain by a

cont'd. /2 ...

2. SOIL TYPES AND SOIL CONDITIONS: (cont'd.) ...

very dense silt, sand, and gravel, mixture. Beneath this deposit is granite bedrock. In the western half of the proposed garage and storage area, however, deposits of soft to medium clayey silt are also present. The estimated stratigraphic profiles through the proposed building locations are shown on Drawing #61-F-37A.

At the time of the investigation, the water table at the location of all buildings except the proposed Bailey Bridge building was about 6" below G.L. At the latter location, it was about 5.0' below G.L.

3. FOUNDATION RECOMMENDATIONS:

For the purpose of foundation recommendations, each building is discussed separately below:-

3.1) Proposed District & Regional Office:

It is recommended that this structure be founded in the dense silt sand and gravel deposit shown in Sections A-A and B-B, Plan #61-F-37A. This will involve an average excavation of about 6.0'. A design load of 2.5 T.S.F. may be used.

At the time of the investigation, the water table was close to the surface, but it is possible that this level will drop during the construction season. In any case, the method of construction suggested is to excavate open trenches, allowing percolating water to reach its final level and place tremie concrete to an elevation just above the water table. The rest of the footing may then be formed and concrete placed dry. Above the water table, the sides of the trenches are expected to slope about 35°; below the water table, they should be almost vertical.

3. FOUNDATION RECOMMENDATIONS: (cont'd.) ...

3.1) Proposed District & Regional Office: (cont'd.) ...

An alternative to this method would be to drive steel sheeting into the dense stratum, attaining about 1.0' of penetration, then excavate, dewater and pour footings in the dry. This latter alternative would prove to be very expensive.

For estimating purposes, it will be necessary to determine what the water table will be at the time of construction.

3.2) Proposed District Repair Garage:

It is recommended that this structure be founded in the dense silt, sand, and gravel deposit shown in sections C-C and D-D, Plan #61-F-37A. Over most of the area this will involve an excavation of about 6.0' increasing to about 10.0' at the west end of the building. A design load of 2.5 T.S.F. may be used.

Construction methods, as outlined in the previous case, are recommended.

3.3) Proposed Heated & Unheated Storage Buildings:

These structures should be founded in the dense silt, sand, and gravel stratum shown in sections E-E, F-F, and G-G, Plan #61-F-37A, except for the North-East corner of the Unheated Building which may be founded partly on bedrock. Average excavation should vary from 6.0' to 8.0'.

A design load of 2.5 T.S.F. may be used.

Construction methods, as outlined previously, are recommended.

cont'd. /4 ...

3. FOUNDATION RECOMMENDATIONS: (cont'd.) ...

3.4) Proposed Paint Shop:

The footings for this structure should be placed in the dense silt, sand and gravel stratum shown in sections F-F and G-G, Plan #61-F-37A, except for the South-West corner which may be on bedrock. Care must be taken to ensure that the dense stratum is reached, or differential settlements may occur. A design load of 2.5 T.S.F. may be used.

Construction procedures should be as outlined in the previous cases.

3.5) Proposed Carpenters Shop:

In the case of this structure, the footings may be placed in the dense silt sand and gravel stratum as shown in section B-E, Plan #61-F-37A, and a design load of 2.5 T.S.F. assumed. However, this will involve an excavation of approximately 15.0'.

An alternative to this would be to grade the area up an additional 2.0' to elevation 733.0' and found the structure in the sand deposit which occurs from ground level down to elevation 721.0'. The formation level should be at elevation 728.0'. Settlements of about 1" may occur due to the presence of the 2'- 3' compressible layer which exists below elevation 721.0', but these should be uniform for the whole building and, consequently, not serious. In this case, a design load of 0.5 T.S.F. may be used.

cont'd. /5 ...

3. FOUNDATION RECOMMENDATIONS: (cont'd.) ...

3.6) Proposed Bailey Bridge Building:

At this location, subsoil consists of a deep deposit of compact, fine to medium sand. Footings should be placed at a depth of 6.0' below ground level at which elevation a design load of 0.75 T.S.F. may be used. No dewatering problems are anticipated as the water table is estimated to be 5.0' to 6.0' below the ground surface.

4. GRADING RECOMMENDATIONS:

Grading recommendations as submitted by Mr. F. Rendulic, Project Soils Engineer, North Bay Region, are as follows:-

(1) For all roadways, parking areas, etc., it is recommended that 24" of granular be placed both on the existing material and in cuts. This lift is to consist of 6" of G.B.C., Class 'A' and 18" of sand cushion.

(2) All topsoil should be removed for the full width where granular is being placed. The topsoil varies in depth from 0" to 12" and consists of a mixture of sandy loam and black organic.

(3) The entire site area should be properly drained, and this will require extensive ditching, and possibly field tile should be employed in some areas.

(4) All surface boulders should be removed in the applicable areas.

cont'd. /6 ...

5. SURFACING RECOMMENDATIONS:

It is recommended that the surfacing for the roadways and parking areas should consist of a 2" binder course of H.L.-4 and a 1-1/2" wearing course of H.L.-4. The wearing course should be modified to allow the use of a sandier mix.

May 1961. REPORT PREPARED BY:

*K. G. Selby*  
.....  
K. G. Selby,  
PROJECT FOUNDATION ENGINEER.

REPORT APPROVED BY:

*A. G. Stermac*  
.....  
A. G. Stermac,  
SUPERVISING FOUNDATION ENGINEER.



APPENDIX I.

FILE :- 61-F-37



ONTARIO  
DEPARTMENT OF HIGHWAYS

<i>Memo to</i>	<u>Mr. G.A. Wrong</u>	<i>Date</i>	<u>May 12, 1961</u>
	<u>Principal Soils Engineer</u>	<i>Subject</i>	<u>Proposed Regional Office</u>
<i>From</i>	<u>Mat'ls &amp; Res. North Bay</u>		<u>North Bay</u>

Attached is the soils design report covering the service roads and parking areas for the site. Also enclosed is a plan of the area indicating the location of the borings and the log of holes.

This area is fairly flat and hence poorly drained. The use of perimeter ditches will increase the rate of runoff and lower the water table. Storm drains for the parking areas etc. will also reduce the amount of ground water. The plan as received does not indicate any final grade for the area. It is therefore assumed that the final grade will be as it is at present. In any event the same depths of granular material will be required whether it is cut or fill, of the parent material.

mas/jh  
c.c. File

*E.A. Saint*  
E.A. Saint  
Regional Soils Engineer

## SOILS DESIGN REPORT

Proposed Site for District Yard and District and  
Regional Office at North Bay

Project No. 61 F - 37

Plan - Refer to Site Plan

### GENERAL DATA

At the request of the Services Branch a soils and foundation investigation was carried out on the proposed site for the district office and yard and the Regional Office.

The site is located in the flat area north of Highway #17 on the North Bay by-pass and east of Gormanville Road.

This report is only concerned with the soils investigation in connection with the various roadways, parking areas and storage areas. The part of the report concerned with the building foundations will be prepared by Mr. K. Selby of the Foundation Section.

### INVESTIGATION

The investigation consisted of borings by hand equipment at various intervals over the sections applicable and to a minimum depth of 36 inches. The location of the boreholes have been plotted on the site plan along with the logs of the holes.

This plan is attached with this report.

### SOILS DATA AND PHYSIOGRAPHY

The site is located in a flat area between Highway #17 and the high ridge which runs in the east-west direction north of the city of North Bay. It is believed to be part of the beach formations of old Lake Nipissing.

Part of this fill has been cultivated and ploughed and the top 6 to 12 inches consists of a sandy loam mixed with some black organic. The main soil type is a fine sand to a very fine sand and silt in varying depths over bedrock. Bedrock appears at the surface in some locations and the central part which still has to be cleared is covered with numerous boulders up to 3 feet in diameter.

At the time of the survey this area was quite wet with the existing water table varying from the surface to 15 inches below the surface.

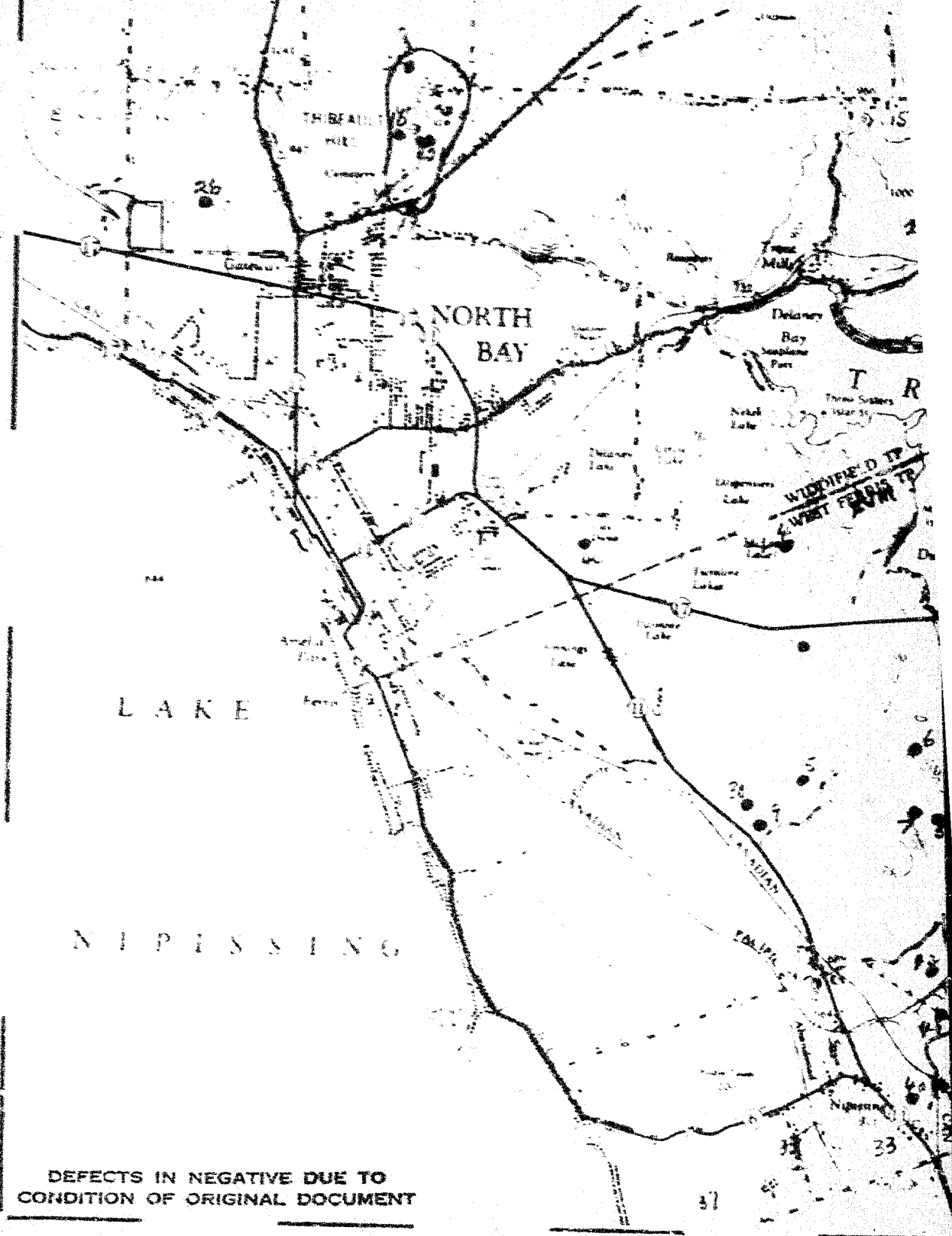
RECOMMENDATIONS 4-7 INCLUDED IN 61-F-37

1. For all the roadways, parking areas etc, it is recommended that 24 inches of granular be placed both on the existing material and in cuts. This lift is to consist of 6 inches of G.B.C. Class "A" and 18 inches of sand cushion.
2. All top soil should be removed for the full width where granular material is being placed. The topsoil varies in depth from 6 to 12 inches and consists of a mixture of sandy loam and black organic.
3. The entire site area should be properly drained and this will require extensive ditching and possibly field drain tile should be employed in some areas.
4. All large surface boulders should be removed in the applicable areas.

Prepared by: F. Rendulic  
Project Soils Engineer

Approved by: E.R. Saint  
Regional Soils Engineer

In Southern To Capital



DEFECTS IN NEGATIVE DUE TO  
CONDITION OF ORIGINAL DOCUMENT

1970 JUN 25 PM 12:03

0027

DOWN NBAR 5 JUNE 25 1970 1115 AM  
A RUTKA M AND T ENG ATTENTION G A WRONG  
RE: WP 88-70-00 PRE ENG FOR NEW OFFICE  
BUILDING NORTH BAY

IN 1961 A SOILS DESIGN REPORT WAS ISSUED COVERING THE PROPOSED  
SITE OF THE NEW REGIONAL OFFICE BUILDING IN NORTH BAY UNDER PROJECT NO.  
61F-37. ATTACHED TO THE REPORT WAS A SITE PLAN INDICATING THE  
LOCATION OF THE BORE HOLES. THIS PLAN SEEMS TO HAVE BEEN MISLAID  
IN THIS OFFICE. WOULD YOU CHECK YOUR FILES TO SEE IF YOU HAVE A COPY  
OF THE PLAN AND FORWARD SAME TO THIS OFFICE. THANK YOU.

D GARNER FOR E R SAINT R M E

JH



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PLEASE CHECK THIS OUT

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## MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

## MEMORANDUM

TO: Mr. W.J. Peck,  
Senior Soils Engineer,  
Northern Region, North Bay.

FROM: Soil Mechanics Section,  
Geotechnical Office,  
West Bldg., Downsview.

ATTENTION:

DATE: March 11th, 1974.

OUR FILE REF.

IN REPLY TO

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SUBJECT: RE: Proposed Laboratory Building,  
Northern Region, North Bay,  
W.O. 61-11037.

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As to your request we have reviewed the conditions at the site of the proposed Laboratory Building using the information obtained during the foundation investigation carried out in 1961, Job 61-11037. The contours shown on drawing 61-11037 A are about 10 feet higher than those shown on the Systems Design drawing. The elevations quoted in this letter correspond to the contours which appear on this latest drawing. From the new drawing it appears that the location of the Laboratory building is covered by Boreholes 2, 3, 4, 5, 6 and 7.

The subsoil at this site consists of a thin layer of sandy topsoil covering a loose to compact, fine to medium silty sand, followed by a very dense layer of a silt, sand and gravel mixture, all overlying the granitic bedrock.

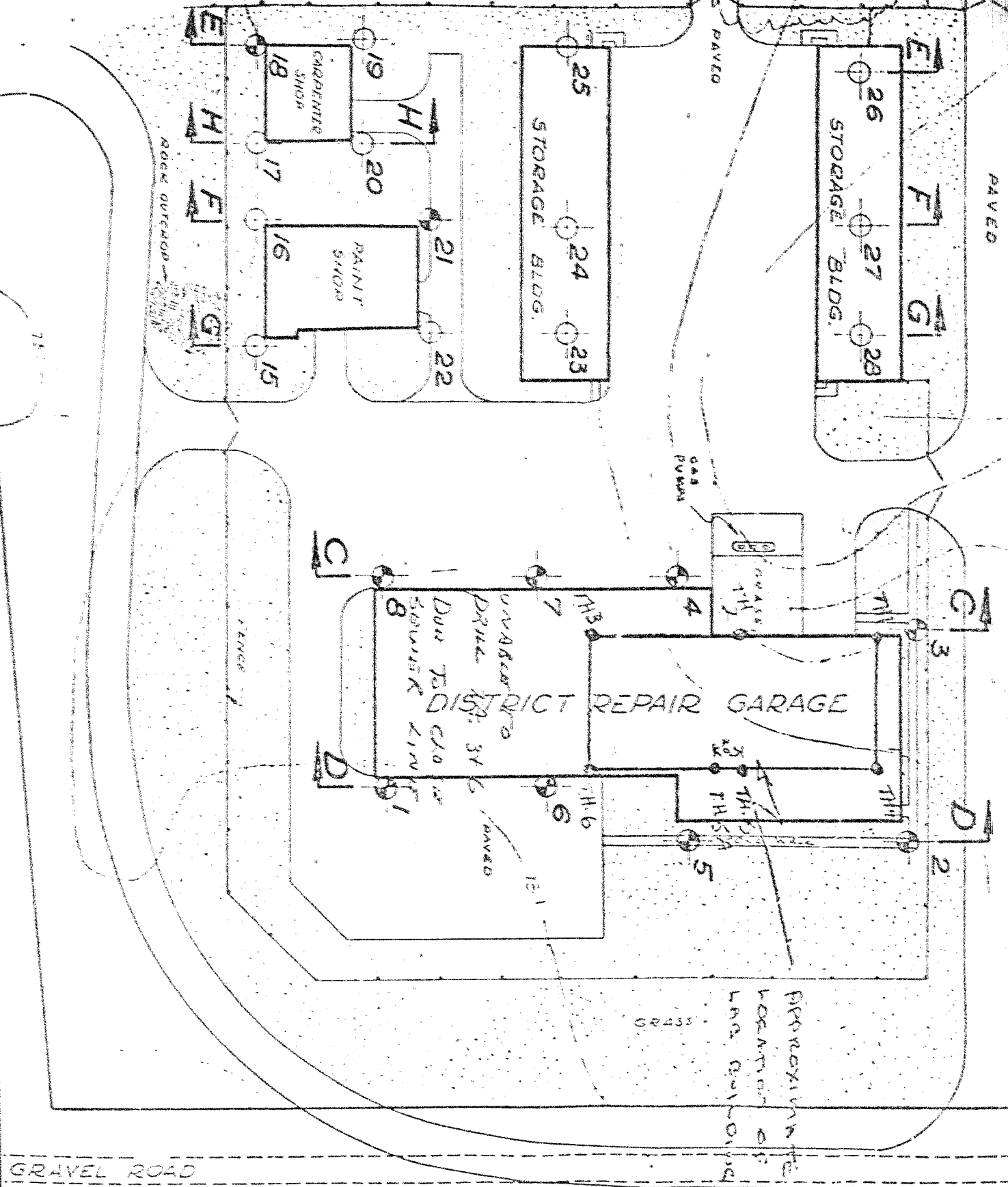
The Laboratory Building may be founded within the very dense silt, sand and gravel layer at about elev. 716 to 717 (726 to 727 on drawing 61-11037A) will require an average excavation of 6 feet. A safe bearing capacity of 2.5 T.S.F. may be assumed for design purposes. At the time of the investigation in 1961 the groundwater was at about elev. 723 (733 on drawing 61-11037 A). Dewatering the site will be a problem in that the very dense silt, sand and gravel layer is highly susceptible to boiling under an unbalanced hydraulic head. The dewatering may be handled either by driving sheet piles and pumping from the excavations, which will be very expensive, or by overexcavating the trenches and pumping from perimeter ditches so that the material below the proposed footings is not disturbed.

*P. Korgemagi*

P. Korgemagi,  
Project Engineer,  
For: K.G. Selby,  
Supervising Engineer.

PK/mj  
c.c. H. Grandson (Sp. Services)  
Files  
Documents





E NO. 1 of 1

TWP.

DATE 20 March 1974

T.H. No. 1 Elev. 725.6

0" - 18" M. Sa

Frozen to 24"

18" - 5' F - M Sa Lo

5' - 7' F - V F Sa Lo

W.T. 46"

7' - 12 $\frac{1}{2}$ ' Sa Lo Stny Dense12 $\frac{1}{2}$ ' N.F.P. Sloughing and Dense

T.H. No. 2 Elev. 725.8

0" - 24" M Sa Stny

Frozen to 24"

24" - 48" Blk Org &amp; Blds

48" - 7' F - M Sa Lo

7' - 9' Sa Lo Stny Dense

W.T. 51"

9' N.F.P. B/R

T.H. No. 5 Elev. 725.9

0" - 20" M Sa

20" N.F.P. Blds &amp; Frozen

T.H. No. 4 Elev. 725.4

0" - 60" M Sa Frozen to 24"

60" - 10' F - M Sa Lo Stny

W.T. 44"

10' N.F.P. Dense &amp; Sloughing

T.H. No. 5A Elev. 725.9

0" - 36" M Sa Stny

Frozen 36"

36" - 60" Blk Org &amp; Blds

60" - 8' F - M Sa Lo Stny

W.T. 58"

8' N.F.P. Bld

Unable to drill locations 3 and 6 due to close proximity of sewer pipe

61-11037

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

61-F-37

TO: Mr. H. Gransden,  
Special Services Officer,  
Northern Region.

FROM: Materials & Testing Office,  
Northern Region.

ATTENTION:

DATE: 25 March 1974

OUR FILE REF.

IN REPLY TO

SUBJECT:

Soils Investigation for  
Proposed Laboratory Building  
Northern Region - North Bay

A soils investigation over the site of the proposed laboratory building was carried out on March 20, 1974 using power augering equipment.

The object of this investigation was to confirm the ground water conditions as found to be during the foundation investigation carried out in 1961, prior to constructing the District and Regional Office Building. An attempt was also made to determine the depth of bedrock.

The depth of the water table was measured approximately twenty-four hours after the test holes were drilled.

A visual survey of the terrain as well as the borings indicate that some soil has been deposited over the area during the time of constructing the existing buildings.

The soil was found to be frozen to a depth of two to three feet.

The soils were found to consist of medium sand (deposited) over fine to medium sandy loam underlain by dense sandy loam (stony).

Due to the type of equipment used, frost, boulders and sloughing, the depth of bedrock could be determined only at one location (T.H. No.2 = Test Hole No. 2).

The water table was found to be approximately four feet below the surface. Thus, the recommendations made in Mr. P. Korgemog's memorandum dated March 11, 1974 (copy attached) are applicable for the Foundation Design.

.....2

25 March 1974

61-F-37

Attached to this memorandum are logs of borings and a site plan showing the location of the test holes.

For your information an underground sewer crosses the building site in the area of T.H. Nos. 3 and 6, the exact location of which we were unable to ascertain.

CKL/WJP/bn

c.c. - Mr. J. E. Gruspier  
- Mr. K. Selby



C.K. Lischkoff,  
Project Soils Supervisor.

For:

W. J. Peck,  
Senior Soils Engineer.



61-F-37

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS, ONTARIO

MEMORANDUM

TO: Mr. W.J. Peck,  
Senior Soils Engineer,  
Northern Region, North Bay.

FROM: Soil Mechanics Section,  
Geotechnical Office,  
West Bldg., Downsview.

ATTENTION:

DATE: March 11th, 1974.

OUR FILE REF.

IN REPLY TO

SUBJECT: RE: Proposed Laboratory Building,  
Northern Region, North Bay,  
W.O. 61-11037.

31L -17

GEOCREs No.

As to your request we have reviewed the conditions at the site of the proposed Laboratory Building using the information obtained during the foundation investigation carried out in 1961, Job 61-11037. The contours shown on drawing 61-11037 A are about 10 feet higher than those shown on the Systems Design drawing. The elevations quoted in this letter correspond to the contours which appear on this latest drawing. From the new drawing it appears that the location of the Laboratory building is covered by Boreholes 2, 3, 4, 5, 6 and 7.

The subsoil at this site consists of a thin layer of sandy topsoil covering a loose to compact, fine to medium silty sand, followed by a very dense layer of a silt, sand and gravel mixture, all overlying the granitic bedrock.

The Laboratory Building may be founded within the very dense silt, sand and gravel layer at about elev. 716 to 717 (726 to 727 on drawing 61-11037A) will require an average excavation of 6 feet. A safe bearing capacity of 2.5 T.S.F. may be assumed for design purposes. At the time of the investigation in 1961 the groundwater was at about elev. 723 (733 on drawing 61-11037 A). Dewatering the site will be a problem in that the very dense silt, sand and gravel layer is highly susceptible to boiling under an unbalanced hydraulic head. The dewatering may be handled either by driving sheet piles and pumping from the excavations, which will be very expensive, or by overexcavating the trenches and pumping from perimeter ditches so that the material below the proposed footings is not disturbed.

*P. Korogian*

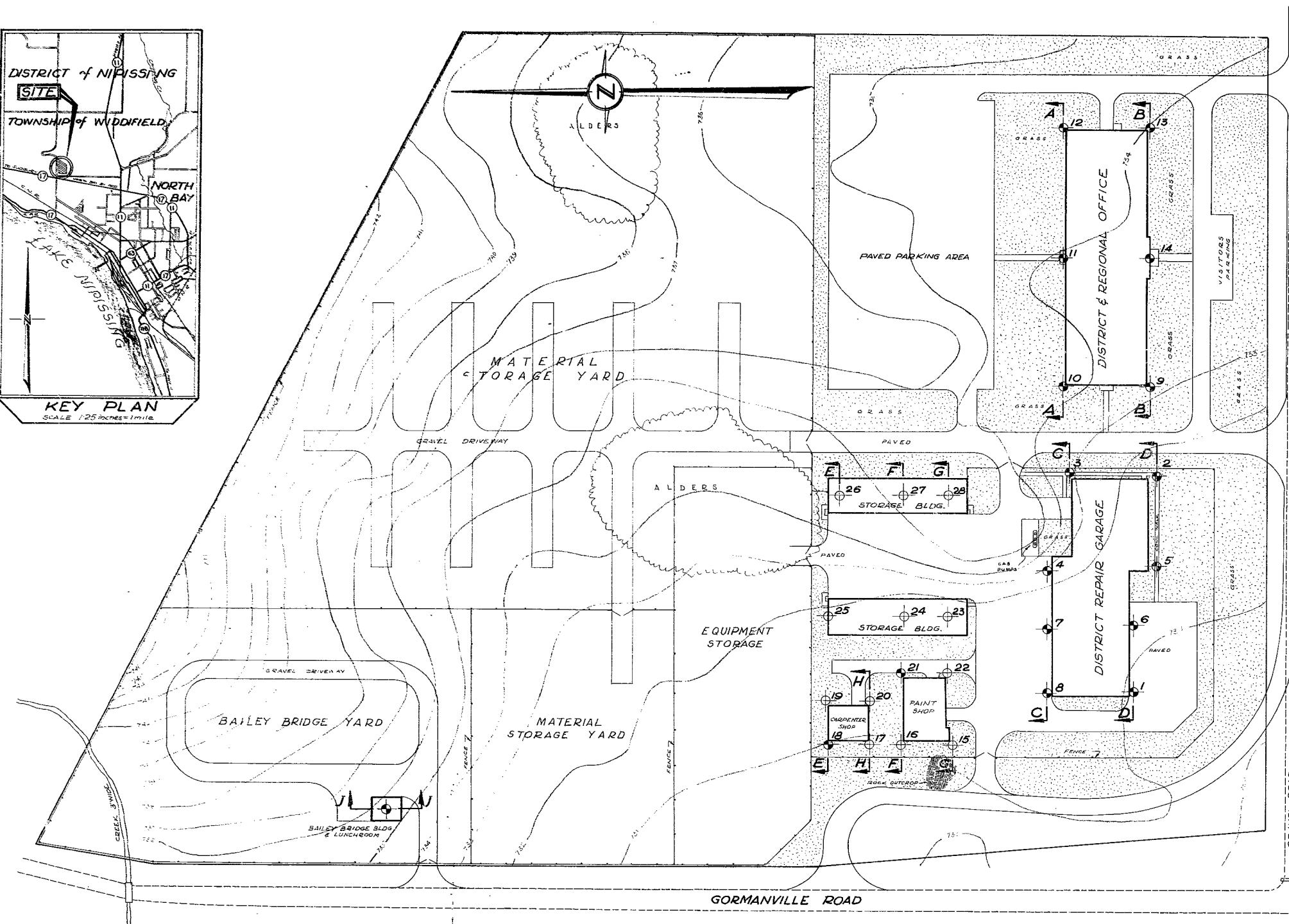
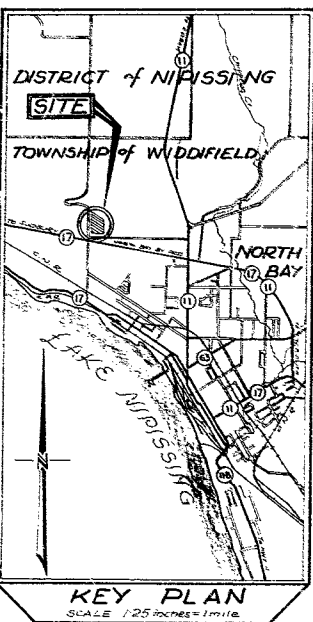
P. Korogian  
Project Engineer,

For: K.G. Selby,  
Supervising Engineer.

PK/mj  
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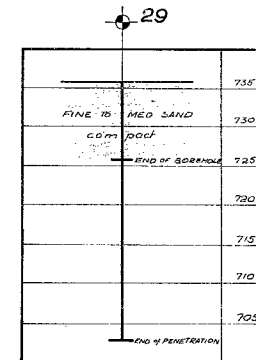
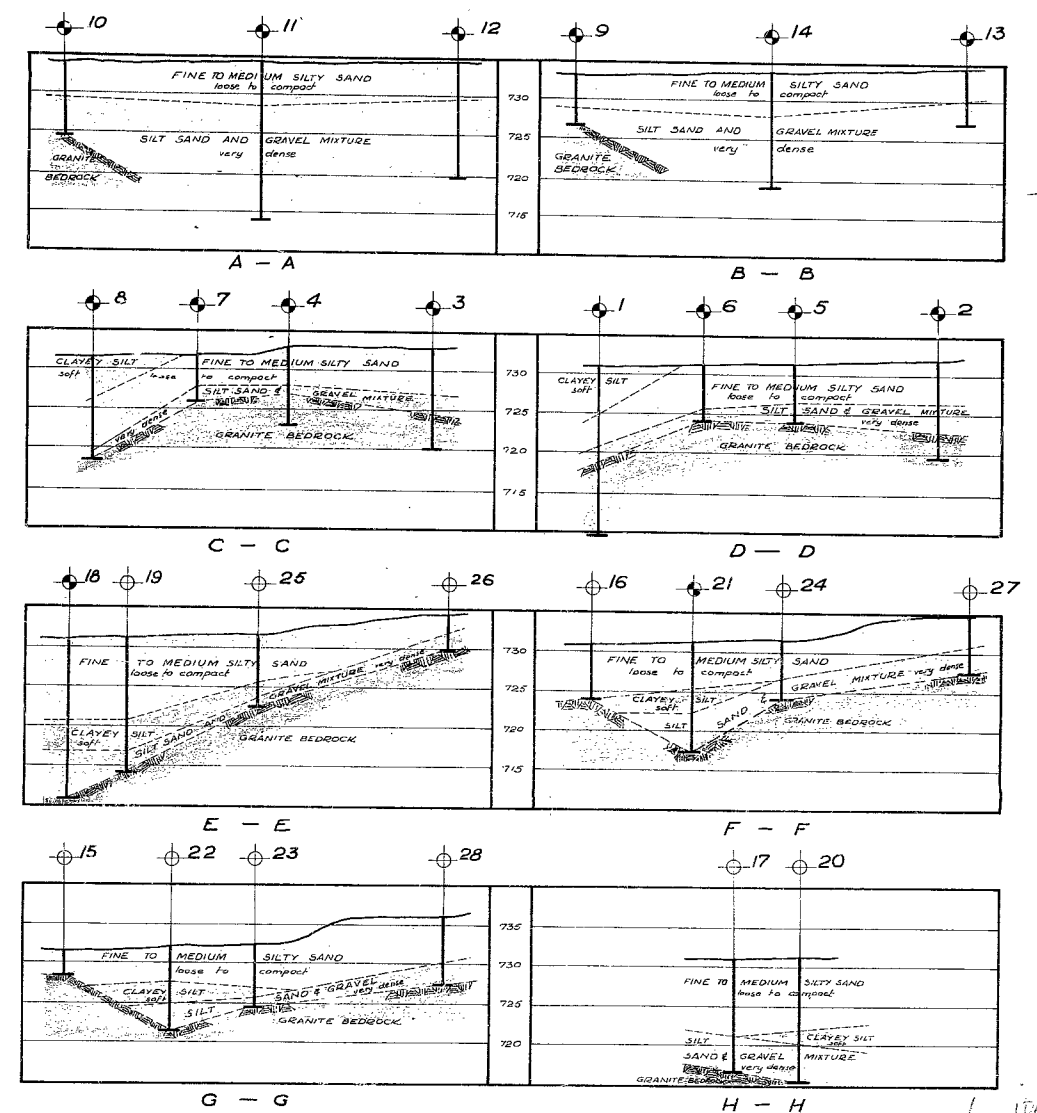
#61-F-37

PROP. NEW  
DISTRICT YARD  
AT NORTH BAY



PLAN  
SCALE 1" = 60'-0"

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.



NOTE  
BEDROCK ELEVATIONS IN BORE HOLES 1, 2, 3 & 4 ARE PROVIDED BY ROCK CORE SAMPLES. ALL REMAINING BEDROCK ELEVATIONS SHOWN ARE ASSUMED FROM PENETRATION & CASING REFUSAL. SOIL STRATIGRAPHY IN HOLES 15, 16, 17, 19, 20, 22, 23, 24, 25, 26, 27, 28 ESTIMATED BY INTERPRETING DYNAMIC CONE TEST RESULTS.

LEGEND  
● BORE & PENETRATION HOLE  
○ PENETRATION HOLE

DEPARTMENT OF HIGHWAYS - ONTARIO			
MATERIALS & RESEARCH SECTION			
PROPOSED NORTH BAY DISTRICT YARD			
ORIGINATED HEN SELBY	DISTRICT NO. 13	DATE 17 MAY 1961	
DRAWN J. J. J.	W.P. NO. 61-F-37 A	JOB NO. 61-F-37 A	
CHECKED J. J. J.	SCALE AS SHOWN	DRAWING NO. 61-F-37 A	
APPROVED			