

| | | | |
|---------|----------|--|-------------|
| 71-F-67 | 89-69-04 | ST THOMAS EXPWY. & NORTH EDGEWARE RD. | 40114-69 |
| W.O. | W.P. | LOCATION | GEOCRES NO. |

● DATA ON FILE IN SOIL MECHANICS SECTION

REFER TO: W.P. FILE

REMARKS

GEOCRES

INDEXING CARD FOR REPORTS NOT MICROFILMED

GI-20 AUG. 74

SUPER IMPOSED DOCUMENT MAY
APPEAR AS MULTI-FEED ON FILM

MEMORANDUM

To: Mr. A. G. Stenson,
Principal Foundation Engineer,
Brimley, Ontario.

From: Bridge Planning,
Southwestern Region,
London, Ontario.

ATTENTION:

DATE: June 23, 1971.

OUR FILE REF.

IN REPLY TO

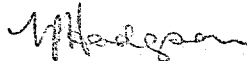
SUBJECT: M.P. 89-69-04, Bridge Site 5-214
North Edgeware B'Pass
St. Thomas Expressway
District 2, London

Attached please find two copies each of part B Plan, B120-21, and profile sketch, plate 17, showing the probable location of the footings for this bridge.

Also enclosed is a field reconnaissance report and general location plan for your information. Engineering Surveys have been provided with all necessary setting out information for this site.

Will you please arrange to have a foundation investigation carried out at the above site.

TPH/rs
Encs.



T. P. Hodgson,
Bridge Location Engineer,
Southwestern Region.

SEPT. 29TH 1971

Ontario
Department of Transportation and Communications
XXXXXXXXXXXXXXXXXXXX

MEMORANDUM

401-69

TO: Mr. A. P. Watt, (2)
Regional Bridge Planning Engineer,
Southwestern Region,
London, Ontario.

FROM: Foundations Office,
Design Services Branch,
Central Bldg., Downsview.

ATTENTION:

DATE: September 22, 1971.

OUR FILE NO.

IN REPLY TO

SEP 28 1971

SUBJECT:

FOUNDATION INVESTIGATION REPORT
For

Proposed Crossing at North
Edgeware Rd. & St. Thomas Expressway
City of St. Thomas - Co. of Elgin
District #2 (London, Ont.)
W.J. 71-11067 --- W.P. 89-69-04

GEOCRE No.

Site 5-214

Attached we are forwarding to you our detailed
foundation investigation report on the subsoil conditions
existing at the above structure site.

We believe that the factual data and recommendations
contained therein, will prove adequate for your design purposes.
Should additional information be required, please feel free to
contact our Office.

AGS/ao
Attach.

A. G. Clermac
A. G. Clermac,
PRINCIPAL FOUNDATION ENGINEER.

cc: Messrs. B. R. Davis
A. Rutka
W. A. Zonnenberg
L. E. Walker
B. J. Giroux
J. R. Roy
G. A. Wrong
B. A. Singh

Foundations Files ✓
Documents

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-

FOUNDATION INVESTIGATION REPORT

For

Proposed Crossing at North
Edgeware Rd. & St. Thomas Expressway
City of St. Thomas - Co. of Elgin
District #2 (London, Ont.)
W.J. 71-11067 - W.P. 89-69-04

1. INTRODUCTION:

A request for a foundation investigation at the crossing of the proposed St. Thomas Expressway and North Edgeware Rd., was received from Mr. T. P. Hodgson, Regional Bridge Location Engineer, in a memorandum dated June 23, 1971.

A field investigation was subsequently carried out by the Foundation Section to determine the subsoil conditions existing at the site. This report contains the results of this investigation and our recommendations pertaining to the design of the proposed structure foundations and approach embankments.

2. DESCRIPTION OF THE SITE:

The site of the proposed underpass structure is situated approximately 0.4 mi. East of Elgin County Road #25 on North Edgeware Rd.

The surrounding area is flat and cultivated farm land.

Physiographically, the site is located in the region referred to as the Mount Elgin Ridges.

3. FIELD AND LABORATORY INVESTIGATION PROCEDURES:

A total of five sampled boreholes was carried out during the course of the field work. Boring was achieved by means of continuous flight auger machines. During the field work, disturbed

3. FIELD AND LABORATORY INVESTIGATION PROCEDURES: (cont'd) ... samples were obtained by means of a standard split-spoon sampler: the energy used in driving it, conformed to the requirements of the Standard Penetration Test.

Dynamic cone penetration tests were carried out adjacent to each borehole. Driving energy to advance the cone was 350 ft.-lbs. per blow. 'Undisturbed' samples were recovered using 2-inch I.D. Shelby Tubes which were pushed into the soil hydraulically or by hand.

All boreholes were surveyed in the field by personnel from London Region Engineering Surveys Section. The locations and elevations of the borings are shown on Drawing No. 71-11067A which accompanies this report.

All samples were visually examined and classified at the site as well as in the laboratory. Following this inspection laboratory tests were carried out on selected samples to determine the following physical properties:

- Atterberg Limits
- Moisture Content
- Grain-Size Distribution
- Undrained Shear Strength
- Bulk Density
- Consolidation Characteristics

The test results are summarized on the Record of Borehole sheets contained in the Appendix of this report.

4. SOIL TYPES AND SOIL CONDITIONS:

4.1) General:

Generally uniform subsoil conditions were found to prevail over the site area. The subsoil consists of a shallow deposit of roadway fill, followed by a deep deposit of cohesive material (silty clay and clayey silt) with sand and traces of gravel. The boundaries between different deposits are shown on the Record of Borehole sheets attached to the Appendix. The estimated stratigraphical profile of Drawing No. 71-11067A is based upon this information.

From ground level downward, the various strata are described in some detail with regard to soil types and soil properties, as follows:

4.2) Fill Material:

This material was encountered in all of the boreholes from the existing roadway level (El. 762) to approx. El. 759.5. The material in the deposit consists of sand and gravel with traces of fines. The relative density is estimated to be compact.

4.3) Silty Clay With Some Sand & Trace of Gravel:

This deposit extends from immediately below the fill material down to approx. El. 757. The material in the deposit consists of silty clay with some sand and trace of gravel. The natural moisture content was found to be 30%. Based on the obtained 'N' values, the consistency of the deposit may be described as firm, the undrained shear strength being in the order of 700 p.s.f.

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

4.h) Clayey Silt with Sand & Trace of Gravel:

This deposit was intersected in all borings and is the main subsoil stratum at the site. It extends from El. 757 to the depth of exploration (El. 680). The material in the deposit consists of clayey silt with sand and traces of gravel. Occasional layers, seams and pockets of silt and silty clay were also discovered within the deposit. A plot of Plasticity Index versus Liquid Limit (Figure 1) shows the majority of points to fall within the CL zone. In general, the undrained shear strength of the overall deposit is in excess of 2,000 PSF, and appears to be highly overconsolidated due to desiccation.

Physical properties of the deposit, as determined from field and laboratory tests, are as follows:

| | | <u>Min.</u> | <u>Max.</u> | <u>Average</u> |
|-----------------------------|-------|-------------|-------------|----------------|
| Natural Moisture Content | (%) | 8 | 33 | 18.5 |
| Liquid Limit | (%) | 19 | 32 | 27.2 |
| Plastic Limit | (%) | 11 | 18 | 14.7 |
| Unconfined Compression Test | (PSF) | 1680 | 7600 | 3857 |
| Bulk Density | (PSF) | 123 | 128 | 133.2 |
| 'N' Values (blows/ft.) | | 14 | 80 | 36 |

Grain-size distribution curves are included in the Appendix of this report. (Figure 2)

The consistency of the overall deposit may be described as stiff to hard.

5. GROUNDWATER CONDITIONS:

The following groundwater levels were observed during the field investigation:

| | | | |
|------------|---|-----------|--------|
| Borehole # | 1 | Elevation | 721.6' |
| | 2 | | 736.4' |
| | 3 | | 733.7' |
| | 4 | | 729.6' |
| | 5 | | 727.9' |

It is pointed out, that the foregoing quoted figures may not represent the true groundwater levels, due to the relatively impermeable nature of the subsoil and the short duration of the field work.

6. DISCUSSION AND RECOMMENDATIONS:

6.1) General:

It is proposed to build a four-span (42'-91'-81'-42') underpass structure at the crossing of St. Thomas Expressway and North Edgeware Road. The proposed profile grade of North Edgeware Road will be approximately 23 ft. above the proposed expressway grade of elevation 760.

As described in the previous paragraphs of this report, the subsoil at the site consists of a surficial deposit of fill material, followed by a shallow layer of silty clay, followed by a deep deposit of stiff to hard clayey silt containing sand and traces of gravel. The shear strength of the clayey silt deposit is such, that it will be suitable for spread footing type foundations.

Because of the compressible nature of the subsoil, it is inevitable that consolidation settlements will occur over a

6. DISCUSSION AND RECOMMENDATIONS: (cont'd) ...

6.1) General: (cont'd) ...

long-term period due to the imposed loads of structure and embankment. Past experience, however, indicates that these settlements will be of a minor nature.

6.2) Foundations:

(a) Spread Footings in Original Ground:

The entire structure may be supported on spread footings placed within the stiff to hard desiccated clayey silt deposit at or below El. 757. A safe net pressure of 3.0 TSF may be assumed for design purposes.

The stiff to hard clayey silt deposit is susceptible to softening on contact with water, therefore, it is recommended that the base of the footing excavations be protected by a concrete working slab, immediately on exposure.

All foundations should be protected against frost action by at least 4 feet of earth cover. No dewatering problems are anticipated.

The estimated maximum settlement will be in the order of 1.0 and 1.5 inches under the pier footings.

(b) Spread Footings on Connected Fill:

As an alternative, the abutments may be supported on spread footings placed on well compacted, suitable granular material within the approach fills. A safe design load of 2.0 TSF may be assumed. The granular material should consist of G.B.C. Class 'A' and should be fully compacted according to the current Standards. A detailed construction scheme is outlined on Figure 3 of the Appendix.

6. DISCUSSION AND RECOMMENDATIONS: (cont'd) ...

6.1) General: (cont'd) ...

(c) Perched Abutments on Short Piles:

As a second alternative, the abutments may be constructed within the approach fills and supported on short piles driven through the fill and some 10.0 ft. into the original deposit. In the case of 12-3/4" O.D. and 1/4" thick wall steel tube piles, a safe design load of 25 tons per pile may be used.

It should be pointed out, that this latter proposal is based on experience with similar structures and similar subsoil conditions in the general area.

Regardless of which method is adopted, the structure should be built to accommodate 3.0 to 3.5 inches differential settlement between the abutments and piers.

6.3) Approach Embankments:

The shear strength of the subsoil is such that it will be able to safely support the 23-ft. high approach embankments constructed with 2:1 side slopes. The fill should consist of well compacted acceptable material. Care should be taken to ensure that no bouldery fill is placed within the approaches through which piles have to be driven, and it is recommended that this portion of the fill contain no larger grain sizes than 3 inches.

Based on the performance of structures and embankments built in the same general area and under somewhat similar subsoil conditions, it is our opinion that a maximum settlement of 3 to 4 inches will occur over a longterm period. To minimize the effect of differential settlements between the abutments and pier footings,

6. DISCUSSION AND RECOMMENDATIONS: (cont'd) ...

6.3) Approach Embankments: (cont'd) ...

it is recommended that the approach embankments be built in advance of the structure for as long a period as possible. The topsoil and the soft organic material should be removed in accordance with the pertinent Standards within the construction area.

7. MISCELLANEOUS:

The field investigation was carried out during the period July 16 - 20, 1971, under the supervision of Mr. P. Payer, Project Foundation Engineer, who also prepared this report.

Equipment was owned and operated by P.V.K. and Sons Drilling Co.

This report was reviewed by Mr. K. G. Selby, Supervising Foundation Engineer.

August, 1971

APPENDIX

Oversized Drawings

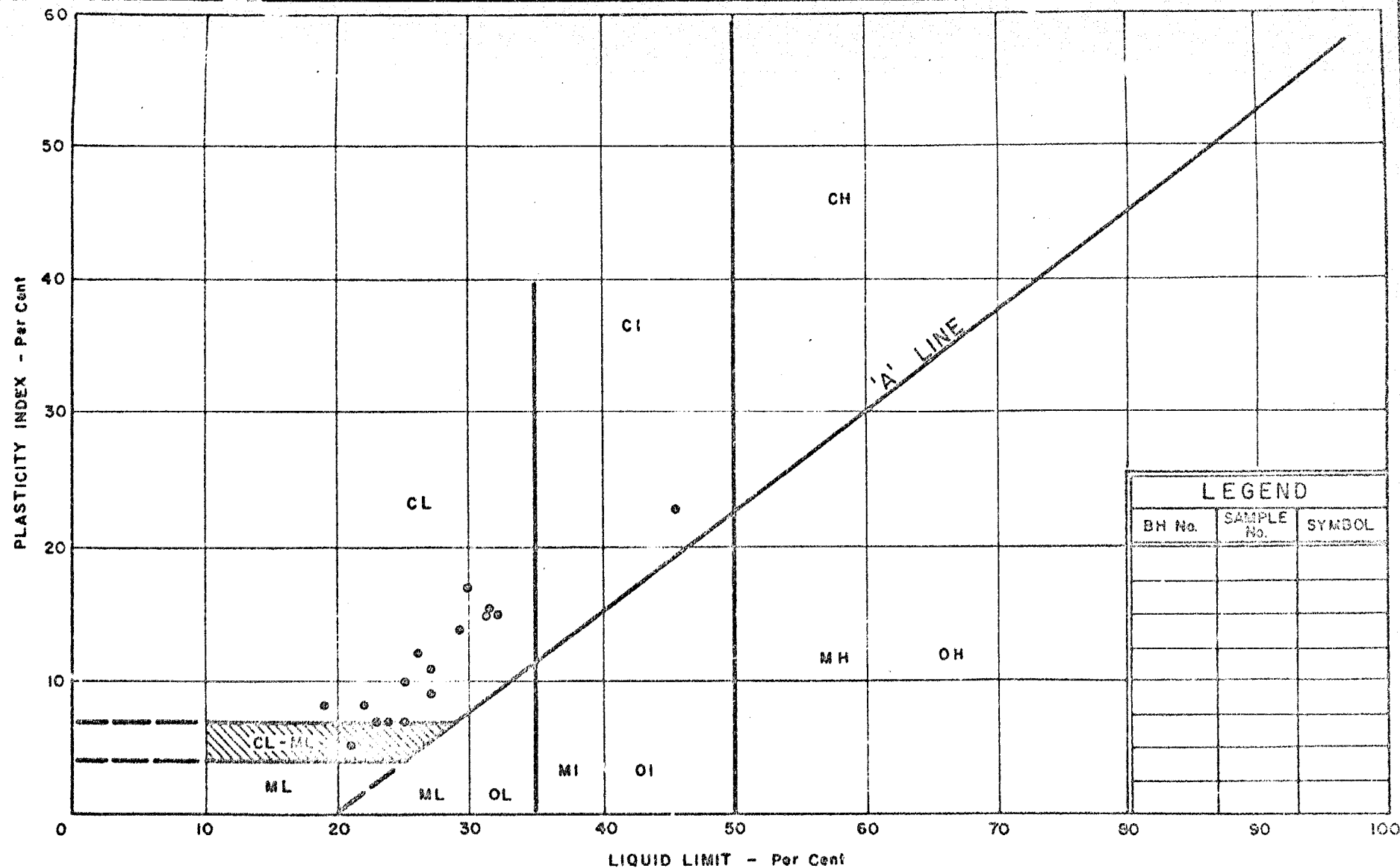
records of borehole no. 1

2

3

4

5



DEPARTMENT OF HIGHWAYS
MATERIALS and
TESTING
DIVISION

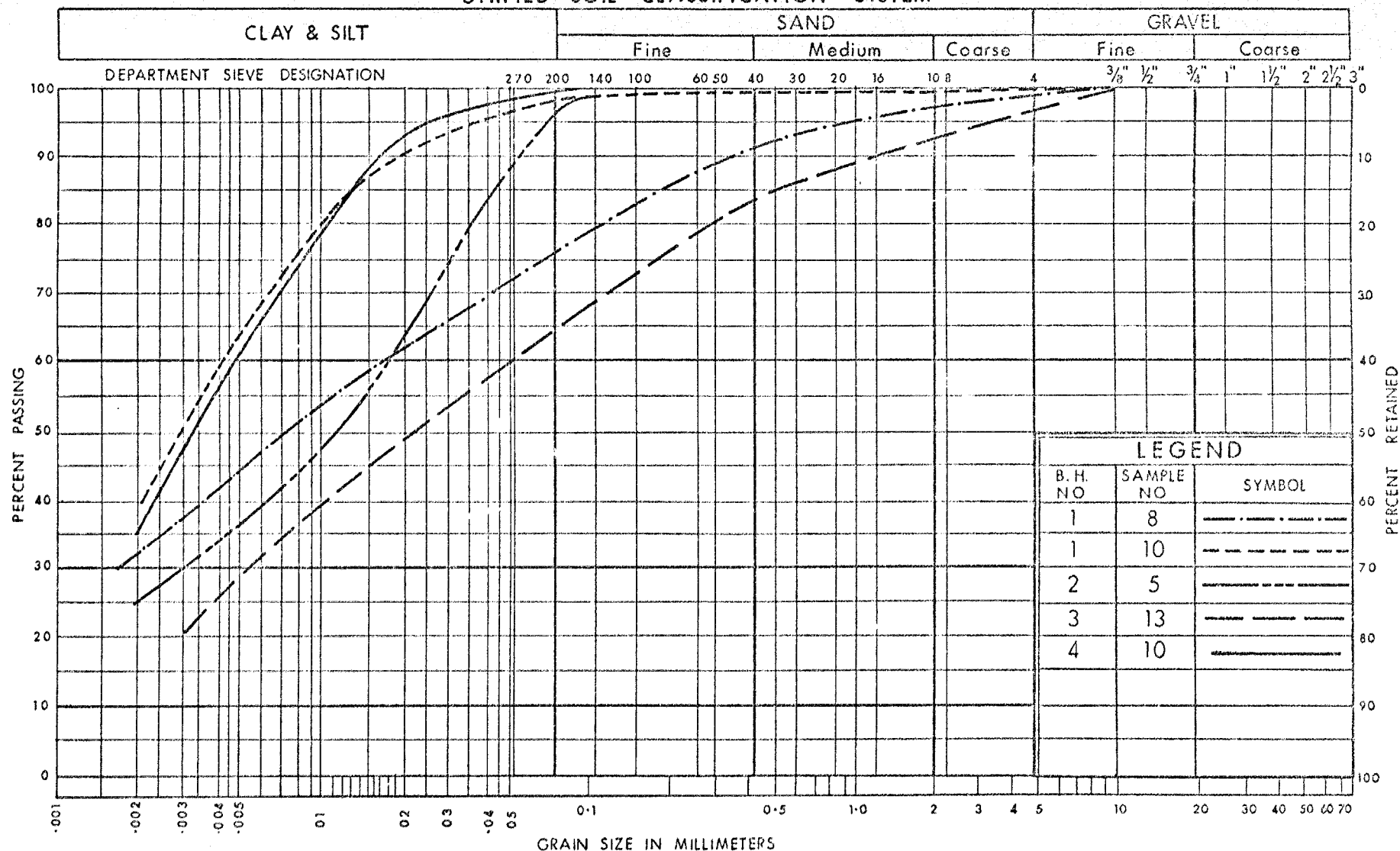
PLASTICITY CHART CLAYEY SILT

W.P. No. 89-69-04

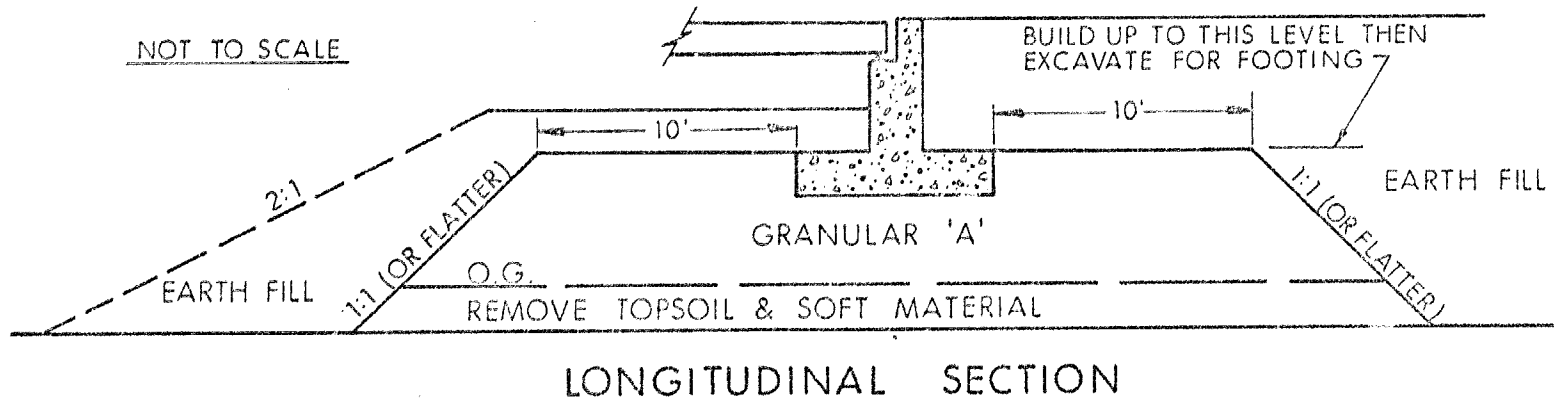
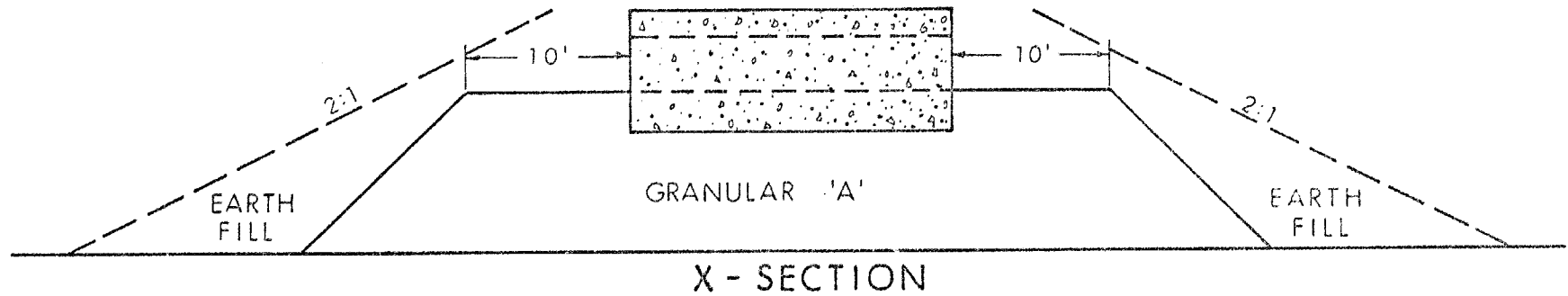
JOB No. 71-11067

FIG. 1

UNIFIED SOIL CLASSIFICATION SYSTEM



ABUTMENT ON COMPACTED FILL SHOWING GRANULAR 'A' CORE



NOTES

- 1 - REMOVE TOPSOIL & /OR SOFT SUBSOIL UNDER AREA OF COMPACTED GRANULAR 'A'.
- 2 - PLACE GRANULAR 'A' TO TOP OF FOOTING LEVEL, COMPACTED ACCORDING TO CURRENT D.H.O. STANDARDS
- 3 - EXCAVATE COMPACTED GRANULAR 'A' MATERIAL FOR FOOTING.

ABBREVIATIONS USED IN THIS REPORT

SOIL PROPERTIES

| | |
|------------|--|
| γ | UNIT WEIGHT OF SOIL (BULK DENSITY) |
| γ_s | UNIT WEIGHT OF SOLID PARTICLES |
| γ_w | UNIT WEIGHT OF WATER |
| γ_d | UNIT DRY WEIGHT OF SOIL (DRY DENSITY) |
| γ' | UNIT WEIGHT OF SUBMERGED SOIL |
| G | SPECIFIC GRAVITY OF SOLID PARTICLES $G = \frac{\gamma_s}{\gamma_w}$ |
| e | VOID RATIO |
| n | POROSITY |
| w | WATER CONTENT |
| S_r | DEGREE OF SATURATION |
| w_L | LIQUID LIMIT |
| w_p | PLASTIC LIMIT |
| I_p | PLASTICITY INDEX |
| s | SHRINKAGE LIMIT |
| I_L | LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$ |
| I_c | CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$ |
| e_{max} | VOID RATIO IN LOOSEST STATE |
| e_{min} | VOID RATIO IN DENSEST STATE |
| I_D | DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$ |
| | RELATIVE DENSITY D_r IS ALSO USED |
| h | HYDRAULIC HEAD OR POTENTIAL |
| q | RATE OF DISCHARGE |
| v | VELOCITY OF FLOW |
| i | HYDRAULIC GRADIENT |
| k | COEFFICIENT OF PERMEABILITY |
| j | SEEPAGE FORCE PER UNIT VOLUME |
| m_v | COEFFICIENT OF VOLUME CHANGE = $\frac{-\Delta e}{(1+e)\Delta\sigma}$ |
| C_v | COEFFICIENT OF CONSOLIDATION |
| C_c | COMPRESSION INDEX = $\frac{\Delta e}{\Delta \log_{10} \sigma}$ |
| T_v | TIME FACTOR = $\frac{c_v t}{d^2}$ (d, DRAINAGE PATH) |
| U | DEGREE OF CONSOLIDATION |
| τ_f | SHEAR STRENGTH |
| c' | EFFECTIVE COHESION INTERCEPT |
| ϕ' | EFFECTIVE ANGLE OF SHEARING RESISTANCE, OR FRICTION |
| c_u | APPARENT COHESION |
| ϕ_u | APPARENT ANGLE OF SHEARING RESISTANCE, OR FRICTION |
| μ | COEFFICIENT OF FRICTION |
| S_t | SENSITIVITY |

GENERAL

| | |
|---------------------------|-----------------------------------|
| π | = 3.1416 |
| e | BASE OF NATURAL LOGARITHMS 2.7183 |
| $\log_e a$ OR $\ln a$ | NATURAL LOGARITHM OF a |
| $\log_{10} a$ OR $\log a$ | LOGARITHM OF a TO BASE 10 |
| t | TIME |
| g | ACCELERATION DUE TO GRAVITY |
| V | VOLUME |
| W | WEIGHT |
| M | MOMENT |
| F | FACTOR OF SAFETY |

STRESS AND STRAIN

| | |
|------------|--|
| u | PORE PRESSURE |
| σ | NORMAL STRESS |
| σ' | NORMAL EFFECTIVE STRESS ($\bar{\sigma}$ IS ALSO USED) |
| τ | SHEAR STRESS |
| ϵ | LINEAR STRAIN |
| γ | SHEAR STRAIN |
| ν | POISSON'S RATIO (μ IS ALSO USED) |
| E | MODULUS OF LINEAR DEFORMATION (YOUNG'S MODULUS) |
| G | MODULUS OF SHEAR DEFORMATION |
| K | MODULUS OF COMPRESSIBILITY |
| η | COEFFICIENT OF VISCOSITY |

EARTH PRESSURE

| | |
|----------|---|
| d | DISTANCE FROM TOP OF WALL TO POINT OF APPLICATION OF PRESSURE |
| δ | ANGLE OF WALL FRICTION |
| K | DIMENSIONLESS COEFFICIENT TO BE USED WITH VARIOUS SUFFIXES IN EXPRESSIONS REFERRING TO NORMAL STRESS ON WALLS |
| K_0 | COEFFICIENT OF EARTH PRESSURE AT REST |

FOUNDATIONS

| | |
|-------|--|
| B | BREADTH OF FOUNDATION |
| L | LENGTH OF FOUNDATION |
| D | DEPTH OF FOUNDATION BENEATH GROUND |
| N | DIMENSIONLESS COEFFICIENT USED WITH A SUFFIX APPLYING TO SPECIFIC GRAVITY, DEPTH AND COHESION ETC. IN THE FORMULA FOR BEARING CAPACITY |
| k_s | MODULUS OF SUBGRADE REACTION |

SLOPES

| | |
|---------|--|
| H | VERTICAL HEIGHT OF SLOPE |
| D | DEPTH BELOW TOE OF SLOPE TO HARD STRATUM |
| β | ANGLE OF SLOPE TO HORIZONTAL |

ABBREVIATIONS USED IN THIS REPORT

PENETRATION RESISTANCE

STANDARD PENETRATION RESISTANCE 'N' - THE NUMBER OF BLOWS REQUIRED TO ADVANCE A STANDARD SPLIT SPOON SAMPLER 12 INCHES INTO THE SUBSOIL, DRIVEN BY MEANS OF A 140 POUND HAMMER FALLING FREELY A DISTANCE OF 30 INCHES.

DYNAMIC PENETRATION RESISTANCE - THE NUMBER OF BLOWS REQUIRED TO ADVANCE A 2 INCH, 60 DEGREE CONE, FITTED TO THE END OF DRILL RODS, 12 INCHES INTO THE SUBSOIL, THE DRIVING ENERGY BEING 350 FOOT POUNDS PER BLOW.

DESCRIPTION OF SOIL

THE CONSISTENCY OF COHESIVE SOILS AND THE RELATIVE DENSITY OR DENSENESS OF COHESIONLESS SOILS ARE DESCRIBED IN THE FOLLOWING TERMS:-

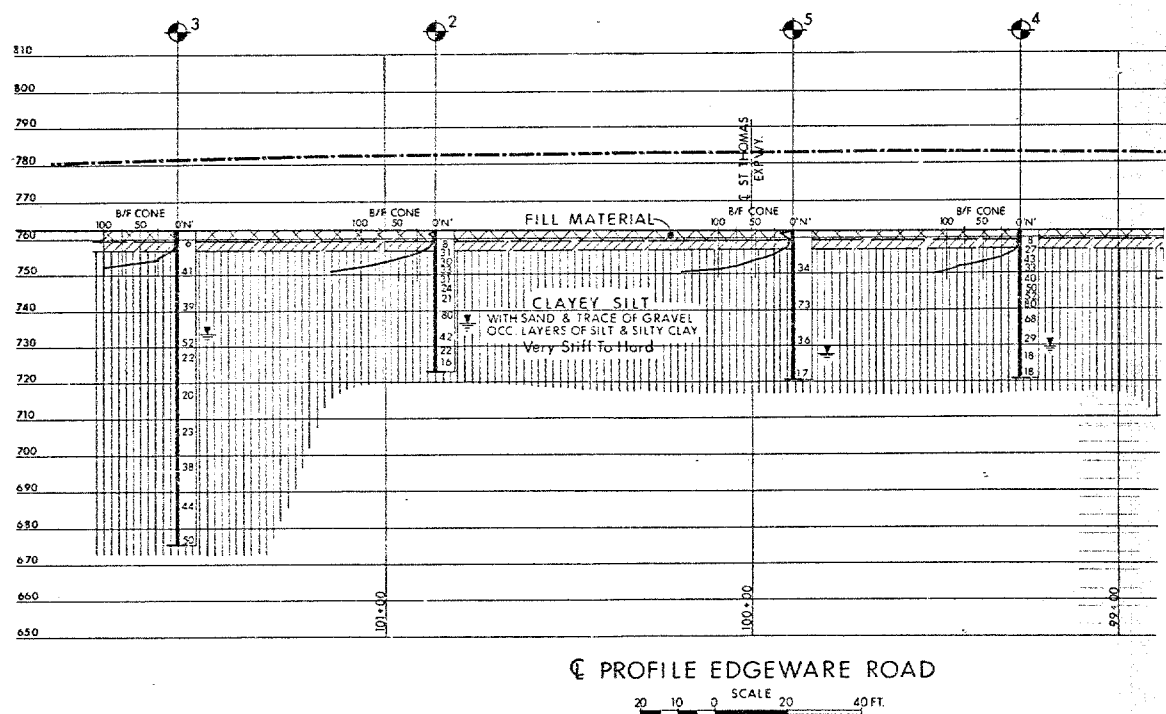
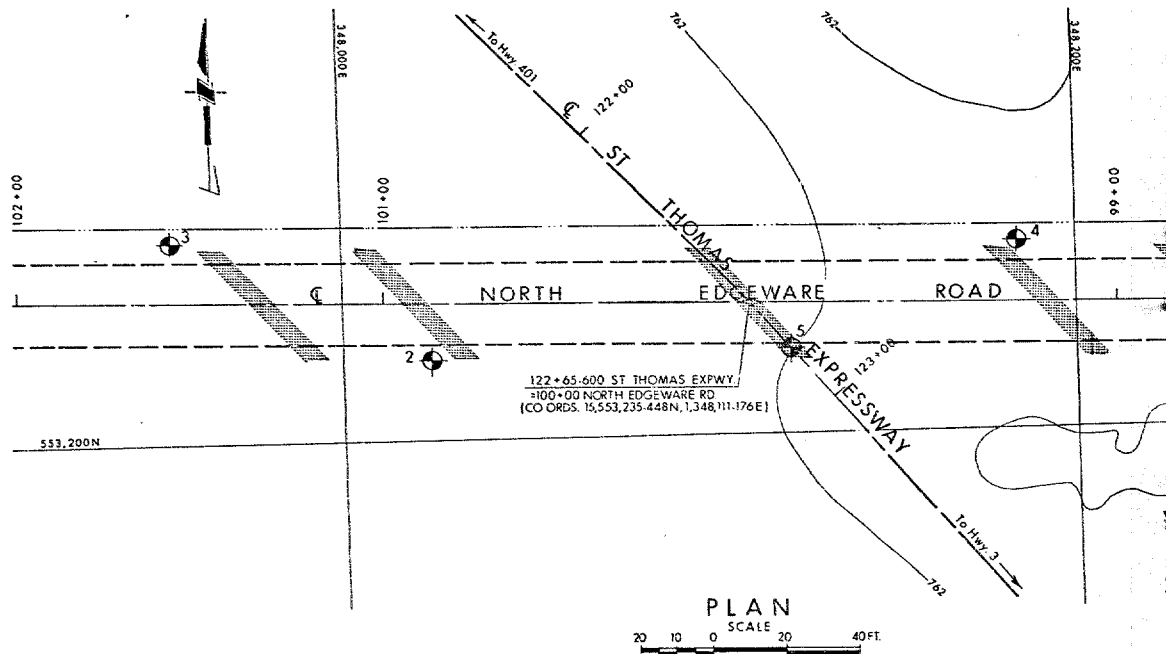
| <u>CONSISTENCY</u> | <u>'N' BLOWS/FT.</u> | <u>c LB./ SQ. FT.</u> | <u>DENSENESS</u> | <u>'N' BLOWS / FT.</u> |
|--------------------|----------------------|-----------------------|------------------|------------------------|
| VERY SOFT | 0 - 2 | 0 - 250 | VERY LOOSE | 0 - 4 |
| SOFT | 2 - 4 | 250 - 500 | LOOSE | 4 - 10 |
| FIRM | 4 - 8 | 500 - 1000 | COMPACT | 10 - 30 |
| STIFF | 8 - 15 | 1000 - 2000 | DENSE | 30 - 50 |
| VERY STIFF | 15 - 30 | 2000 - 4000 | VERY DENSE | > 50 |
| HARD | > 30 | > 4000 | | |

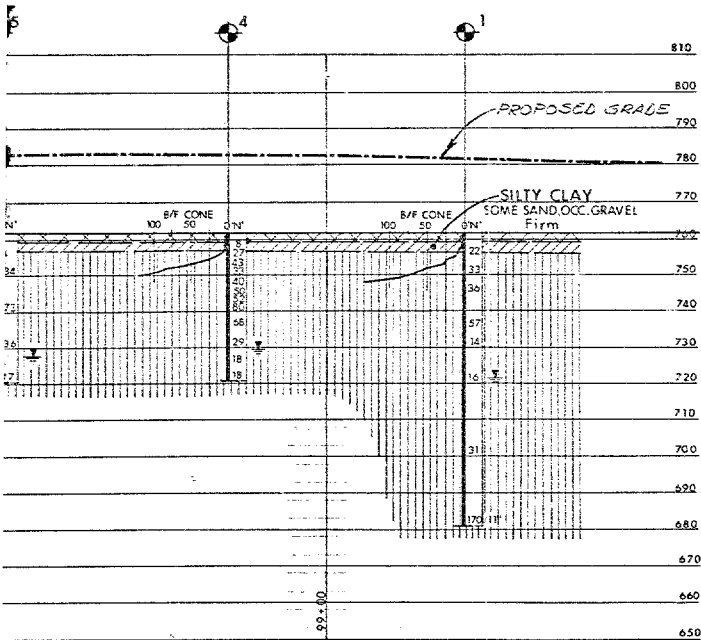
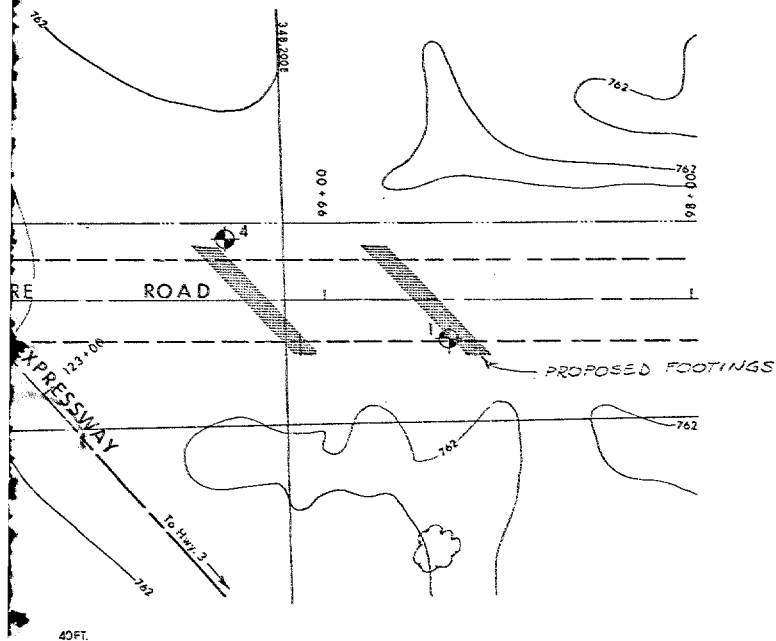
TYPE OF SAMPLE

| | | | |
|------|------------------------------------|------|-------------------|
| S.S. | SPLIT SPOON | T.W. | THINWALL OPEN |
| W.S. | WASHED SAMPLE | T.P. | THINWALL PISTON |
| S.B. | SCRAPER BUCKET SAMPLE | O.S. | OESTERBERG SAMPLE |
| A.S. | AUGER SAMPLE | F.S. | FOIL SAMPLE |
| C.S. | CHUNK SAMPLE | R.C. | ROCK CORE |
| S.T. | SLOTTED TUBE SAMPLE | | |
| | P.H. SAMPLE ADVANCED HYDRAULICALLY | | |
| | P.M. SAMPLE ADVANCED MANUALLY | | |

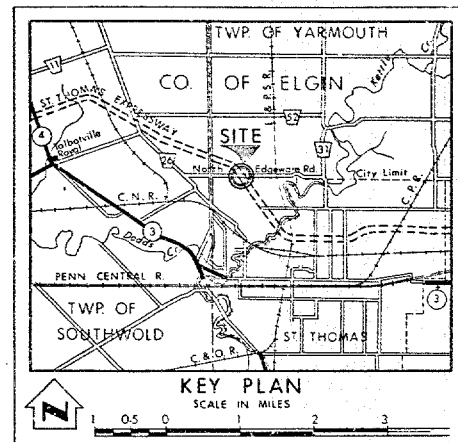
SOIL TESTS

| | | | |
|-----------------|---------------------------------|------|-----------------|
| Q _u | UNCONFINED COMPRESSION | L.V. | LABORATORY VANE |
| Q | UNDRAINED TRIAXIAL | F.V. | FIELD VANE |
| Q _{cu} | CONSOLIDATED UNDRAINED TRIAXIAL | C | CONSOLIDATION |
| Q _d | DRAINED TRIAXIAL | S | SENSITIVITY |





ARE ROAD



| LEGEND | | | |
|--------|---|--|--|
| | Bore Hole | | |
| | Cone Penetration Test | | |
| | Bore Hole & Cone Test | | |
| | Water Levels established at time of field investigation, JULY, 1971 | | |

| NO. | ELEVATION | CO-ORDINATES | |
|-----|-----------|--------------|---------|
| | | NORTH | EAST |
| 1 | 761.8 | 553,223 | 348,245 |
| 2 | 761.9 | 553,222 | 348,024 |
| 3 | 762.0 | 553,255 | 347,954 |
| 4 | 762.0 | 553,251 | 348,184 |
| 5 | 761.9 | 553,223 | 348,122 |

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.

| REVISIONS | | DATE | | BY | | DESCRIPTION | |
|-----------|--|------|--|---|--|-------------|--|
| OCT. 71 | | E.D. | | INTERSECTION, EQUATION & EAST CO-ORDINATES ADJUSTED | | | |

DEPARTMENT OF TRANSPORTATION & COMMUNICATIONS
DESIGN SERVICES BRANCH — FOUNDATION OFFICE

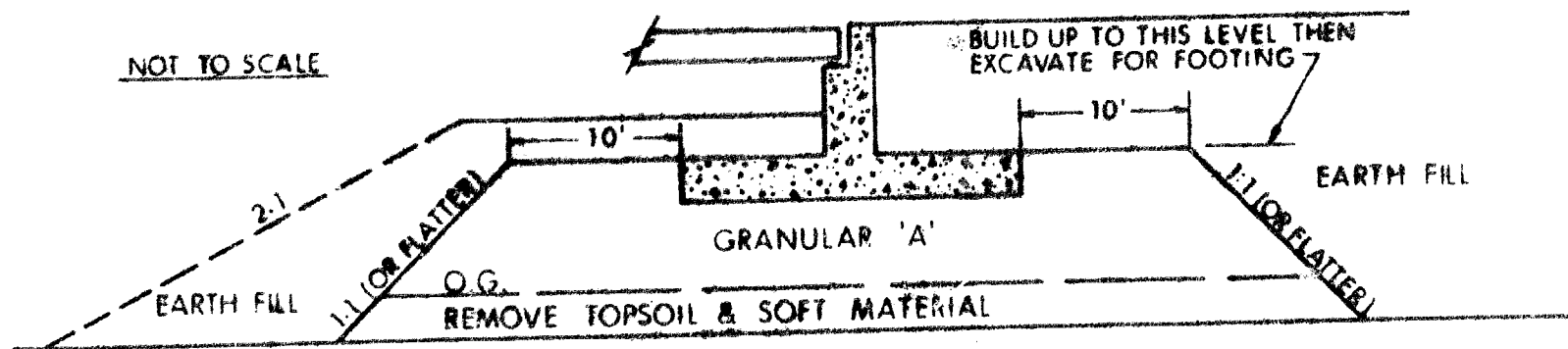
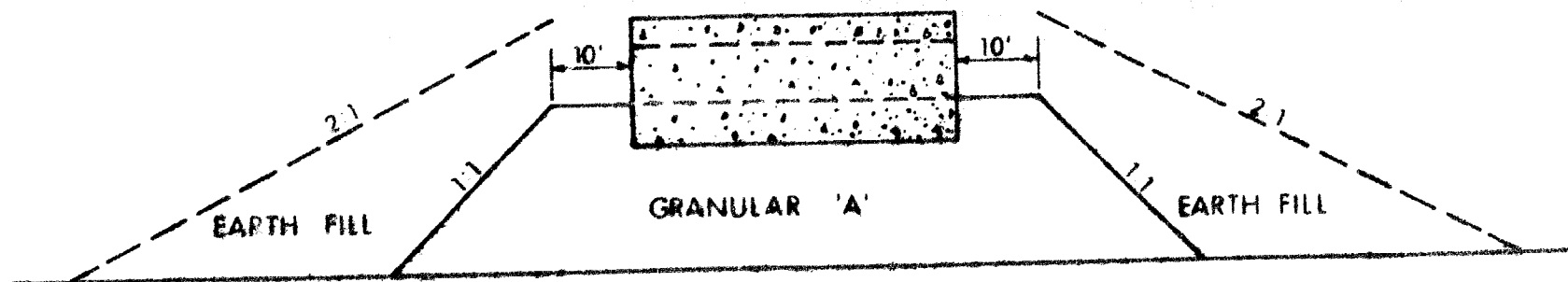
NORTH EDGEWARE ROAD

HIGHWAY NO. ST. THOMAS EXPWY. DIST. NO. 2
CO. ELGIN
TWP. YARMOUTH LOT CON.

BORE HOLE LOCATIONS & SOIL STRATA

| | | | |
|---------------------|-----------|--------------------|-------------|
| SUBMIT P.P. | CHECKED | W.P. NO. 89-69-04 | DRAWING NO. |
| DRAWN | CHECKED | JOB NO. 71-11067 | 71-11067A |
| DATE SEPT. 22, 1971 | SITE NO. | BRIDGE DRAWING NO. | |
| APPROVED | CONT. NO. | | |

ABUTMENT ON COMPACTED FILL SHOWING GRANULAR 'A' CORE



LONGITUDINAL SECTION

NOTES

- 1- REMOVE TOPSOIL &/OR SOFT SUBSOIL UNDER AREA OF COMPACTED GRANULAR 'A'
- 2- PLACE GRANULAR 'A' TO TOP OF FOOTING LEVEL, COMPACTED ACCORDING TO CURRENT D.H.O STANDARDS
- 3- EXCAVATE COMPACTED GRANULAR 'A' MATERIAL FOR FOOTING

DEPARTMENT OF TRANSPORTATION AND COMMUNICATIONS

DEPARTMENT OF HIGHWAYS, ONTARIO

MEMORANDUM

To: Mr. A. G. Stermac,
Principal Foundation Engineer,
Foundations Office,
Design Services Branch,
Attention: West Bldg., DOWNSVIEW, Ont.

FROM: Bridge Planning,
Southwestern Region,
London, Ontario.

DATE: September 24, 1971.

OUR FILE REF.

IN REPLY TO

SUBJECT: W.P. 89-69-04, Bridge Site 5-214
North Edgeware Road Underpass
St. Thomas Expressway
District 2, London

Further to our foundation investigation request of June 23, 1971, please find attached a sepia of plan B-120-21 showing the field values for the intersection of the St. Thomas Expressway and North Edgeware Road.

E.G.: Sta. 122 + 65.600 Expressway = 100 + 00
Gravel Road
co-ordinates (N 15,553,235.448
(E 1,348,111.176

Attached please find a copy of the field notes of the North Edgeware Road Underpass showing changes in the offset distance of approximately 2' from the County Road # 29 for the boreholes. These changes resulted from using existing centre line of County Road # 29 as centre line of construction.

Please make the necessary changes on your drawing for the borehole locations.

A. P. Watt

APW/fs
Encls.

A. P. Watt,
Regional Bridge Planning Engineer,
Southwestern Region.

cc: Mr. C. Grebski
Mr. H. R. McIntyre

*Intersection separation
and last 1/2 mile also indicated on original drawing
see also section 1/2 mile drawing
JH*

Ontario
Department of Transportation and Communications
~~OFFICE OF THE CHIEF ENGINEER~~
MEMORANDUM

TO: Mr. A. P. Watt, (2)
Regional Bridge Planning Engineer,
Southwestern Region,
London, Ontario.

FROM: Foundations Office,
Design Services Branch,
Central Bldg., Downsview.

ATTENTION: DATE: October 18, 1971.

OUR FILE REF. IN REPLY TO

SUBJECT: Foundation Report W.O. 71-11067, North Edgeware
Rd. & St. Thomas Expressway, W.P. 89-69-04,
District No. 2 (London).

Enclosed please find Drawing 71-11076A (Revised October 1971) of the above-mentioned foundation report. You are requested to destroy the original Drawing 71-11076A which is contained in your copy of the report and insert the new one.

KGS/ao
Encl.

K. G. Selby
K. G. Selby,
SUPERVISING FOUNDATION ENGINEER.

cc: Messrs. B. R. Davis
A. Rutka
W. A. Zonnenberg
L. E. Walker
B. J. Giroux
J. R. Roy
G. A. Wrong
B. A. Singh

Foundations Files ✓
Documents

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT 71-11067 SITE _____ BOREHOLE No. 1 GROUND ELEVATION _____

| SAMPLE NO. | DEPTH | GRAIN SIZE DISTRIBUTION | | | | | DRY STRENGTH | SHINE | DIALATANCY | TOUGHNESS | ODOR | COLOUR | ACID TEST | CONSISTENCY OR UNDRAINED SHEAR STRENGTH | CLASSIFICATION WITH DESCRIPTION | SYMBOL |
|------------|---------|-------------------------|---------------------|------------|------|-------------|--------------|---------------|--------------|-----------|--------|-------------|-----------|---|---|--------|
| | | LARGEST GRAIN SIZE | SHAPE | PERCENTAGE | | | | | | | | | | | | |
| | | | | GRAVEL | SAND | SILT & CLAY | | | | | | | | | | |
| 1 | 5-6.5 | 3/4" | SUBANG | 5 | 5 | 90 | MED | SHINE TO DULL | None to SLOW | MED | EARTHY | BROWN | MED | | CLAYEY SILT WITH TRACES OF SA. & G. | |
| 2 | 10-11 | 1/2" | SUBANG | 5 | 5 | 90 | MED | SHINE | None | MED | EARTHY | BROWN | SLIGHT | | SILTY CLAY WITH TRACES OF SA. & GR. | |
| 3 | 15-18 | 1/2" | | | 5 | 95 | MED | DULL | SLOW | MED | EARTHY | LIGHT BROWN | MED | | CLAYEY SILT WITH TRACES OF SA. | |
| 5 | 25-26.5 | | | | | 100 | | SHINE DULL | SLOW | | EARTHY | LIGHT GREY | SLIGHT | | CLAYEY SILT | |
| 6 | 30-31.5 | | | | | 100 | MED | DULL | SLOW | SLIGHT | EARTHY | LIGHT BROWN | MED | | CLAYEY SILT | |
| 8 | 40-41.5 | 1/4" | SUBANG | 5 | 10 | 85 | MED | DULL | SLOW | SLIGHT | EARTHY | LIGHT BROWN | MED | | CLAYEY SILT WITH SOME SA. & TRACES OF GR. | |
| 10 | 50-51.5 | 1/2" | SUBANG | 5 | 5 | 90 | MED | DULL | SLOW | SLIGHT | EARTHY | BROWN | MED | | CLAYEY SILT WITH TRACES OF SA. & GR. | |
| 11 | 50-51.5 | 1/4" | IRREGULAR TO SUBANG | 10 | 15 | 75 | MED | DULL | SLOW | SLIGHT | EARTHY | BROWN | MED | | CLAYEY SILT WITH SOME SA. & GR. | |
| | | | | | | | | | | | | | | | | |

NOTES:- VISUAL CLASSIFICATION MUST BE CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:-

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

PROJECT 71-11067 SITE _____ BOREHOLE No. 5 GROUND ELEVATION _____

| SAMPLE No. | DEPTH | GRAIN SIZE DISTRIBUTION | | | | | DRY STRENGTH | SHINE | DIALATANCY | TOUGHNESS | ODOR | COLOUR | ACID TEST | CONSISTENCY OR UNDRAINED SHEAR STRENGTH | CLASSIFICATION WITH DESCRIPTION | SYMBOL |
|------------|---------|-------------------------|-------|------------|------|-------------|--------------|-------|------------|-----------|--------|------------|------------|---|----------------------------------|--------|
| | | LARGEST GRAIN SIZE | SHAPE | PERCENTAGE | | | | | | | | | | | | |
| | | | | GRAVEL | SAND | SILT & CLAY | | | | | | | | | | |
| 2 | 10-11.5 | - | - | - | - | 100 | MED | DULL | SLOW | SLIGHT | EARTHY | BROWN GREY | MED | | CLAYEY SILT | |
| 4 | 20-21.5 | - | - | - | - | 100 | MED | DULL | SLOW | SLIGHT | EARTHY | GREY | MED | | CLAYEY SILT WITH SEAMS OF SILT | |
| 6 | 30-31.5 | - | - | - | - | 100 | MED | DULL | SLOW | SLIGHT | EARTHY | GREY | MED STRONG | | CLAYEY SILT WITH POCKETS OF SILT | |
| 8 | 40-41.5 | - | - | - | - | 100 | MED | DULL | SLOW | SLIGHT | EARTHY | BROWN GREY | SLIGHT | | CLAYEY SILT | |
| | | | | | | | | | | | | | | | | |
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NOTES:- VISUAL CLASSIFICATION MUST BE CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:-

VISUAL CLASSIFICATION SHEET

7

PROJECT 71-11067 SITE _____ BOREHOLE No. 4 GROUND ELEVATION _____

| SAMPLE NO. | DEPTH | GRAIN SIZE DISTRIBUTION | | | | | DRY STRENGTH | SHINE | DIALATANCY | TOUGHNESS | ODOR | COLOUR | ACID TEST | CONSISTENCY OR UNDRAINED SHEAR STRENGTH | CLASSIFICATION WITH DESCRIPTION | SYMBOL |
|------------|---------|-------------------------|------------|------------|------|-------------|--------------|-------|------------|-----------|-------|--------|-----------|---|---------------------------------|--------|
| | | LARGEST GRAIN SIZE | SHAPE | PERCENTAGE | | | | | | | | | | | | |
| | | | | GRAVEL | SAND | SILT & CLAY | | | | | | | | | | |
| 1 | 0-4 | 3/4" | Subangular | 5 | 15 | 80 | MED DULL | Slow | Slip | Earthy | Brown | MED | | Clayey SILT with traces of sand. | | |
| 2 | 5-6.5 | 1/2" | Subangular | 5 | 5 | 90 | MED DULL | Slow | Slip | Earthy | Brown | MED | | Clayey SILT " " " " | | |
| 3 | 6.5-9 | 1/2" | Subangular | | 5 | 95 | MED DULL | Slow | Slip | Earthy | Brown | MED | | " " " " | | |
| 4 | 9-10.5 | 1/2" | Subangular | 5 | 5 | 90 | MED DULL | Slow | Slip | Earthy | Brown | MED | | " " " " | | |
| 5 | 10.5-14 | - | - | - | - | 100 | MED DULL | Slow | Slip | Earthy | Brown | MED | | Clayey SILT | | |
| 6 | 14-15.5 | - | - | - | - | 100 | MED DULL | Slow | Slip | Earthy | Brown | MED | | Clayey SILT with pockets of SILT | | |
| 7 | 15.5-19 | - | - | - | - | 100 | MED DULL | Slow | Slip | Earthy | Brown | MED | | Clayey SILT with pockets of SILT | | |
| 8 | 20-21 | - | - | 6 | 10 | - | - | Quick | - | Earthy | Brown | MED | | SILT F. SAND | | |
| 9 | 21-25 | - | - | - | - | 100 | MED DULL | Slow | Slip | Earthy | Brown | MED | | Clayey SILT with pockets of SILT | | |

NOTES:- VISUAL CLASSIFICATION MUST BE CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:-

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

2

PROJECT 71-11067 SITE _____ BOREHOLE No. 4 GROUND ELEVATION _____

| SAMPLE No. | DEPTH | GRAIN SIZE DISTRIBUTION | | | | | DRY STRENGTH | SHINE | DIALATANCY | TOUGHNESS | ODOR | COLOUR | ACID TEST | CONSISTENCY OR UNDRAINED SHEAR STRENGTH | CLASSIFICATION WITH DESCRIPTION | SYMBOL |
|------------|---------|-------------------------|--------|------------|------|-------------|--------------|---------------|--------------|-----------|--------|------------|-----------|---|---|--------|
| | | LARGEST GRAIN SIZE | SHAPE | PERCENTAGE | | | | | | | | | | | | |
| | | | | GRAVEL | SAND | SILT & CLAY | | | | | | | | | | |
| 1 | 32-31.5 | - | - | - | - | 100 | MED | DULL | SLOW | 210 | EARTHY | GREY BROWN | MED | | CLAYEY SILT WITH SEAMS OF SALT | |
| 11 | 35-36.5 | - | - | - | - | 100 | MED | DULL | SLOW | MED | EARTHY | BROWN | SLIGHT | | CLAYEY SILT | |
| 12 | 40-41.1 | 1/4" | SUBANG | 5 | 5 | 90 | MED | SHINE TO DULL | SLOW TO NAME | MED | EARTHY | BROWN | SLIGHT | | CLAYEY SILT TO SILTY CLAY WITH TRACE OF SA & G. | |
| | | | | | | | | | | | | | | | | |
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NOTES:— VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:—

VISUAL CLASSIFICATION SHEET

PROJECT 71-11067 SITE _____ BOREHOLE No. 3 GROUND ELEVATION _____

| SAMPLE No. | DEPTH | GRAIN SIZE DISTRIBUTION | | | | | DRY STRENGTH | SHINE | DIALATANCY | TOUGHNESS | ODOR | COLOUR | ACID TEST | CONSISTENCY OR UNDRAINED SHEAR STRENGTH | CLASSIFICATION WITH DESCRIPTION | SYMBOL |
|------------|------------|-------------------------|---------|------------|------|-------------|--------------|-------|------------|-----------|--------|--------|-----------|---|--|--------|
| | | LARGEST GRAIN SIZE | SHAPE | PERCENTAGE | | | | | | | | | | | | |
| | | | | GRAVEL | SAND | SILT & CLAY | | | | | | | | | | |
| 1 | 0-10 1/2" | — | SUBANG. | 5 | 5 | 90 | MED | DULL | SLOW | SLIGHT | EARTHY | BROWN | SLIGHT | | CLAYEY SILT WITH TRACES OF S&G. | |
| 3 | 10-11 1/2" | — | — | — | 5 | 95 | MED | DULL | SLOW | SLIGHT | EARTHY | BROWN | SLIGHT | | CLAYEY SILT WITH TRACES OF S&G. | |
| 5 | 20-21 1/2" | — | — | — | — | 100 | — | — | QUICK | — | — | — | — | | CLAYEY SILT WITH DOCKETS OF SILT | |
| 7 | 30-31 1/2" | — | — | — | — | 100 | — | — | QUICK | — | — | — | — | | CLAYEY SILT WITH DOCKETS OF SILT | |
| 8 | 35-36 1/2" | — | — | — | — | 100 | — | — | QUICK | — | — | — | — | | CLAYEY SILT WITH DOCKETS OF SILT | |
| 9 | 45-46 1/2" | 1/2" | — | 5 | 10 | 85 | MED | DULL | SLOW | SLIGHT | EARTHY | BROWN | SLIGHT | | CLAYEY SILT WITH SOME S&G & TRACES OF G. | |
| 10 | 55-56 1/2" | 1/2" | ANGUL. | 5 | 10 | 85 | MED | DULL | SLOW | SLIGHT | EARTHY | BROWN | SLIGHT | | CLAYEY SILT. " " " " " " | |
| 11 | 65-66 1/2" | 1/2" | " | 5 | 10 | 85 | MED | DULL | SLOW | SLIGHT | EARTHY | BROWN | SLIGHT | | " " " " " " " " | |
| 12 | 75-76 1/2" | — | — | — | 10 | 90 | MED | DULL | SLOW | SLIGHT | EARTHY | BROWN | SLIGHT | | " " " " " " " " | |

13 85-86 1/2" SUBANG. 10 15 75 MED DULL SLOW SLIGHT EARTHY BROWN SLIGHT " " " " " " GRAVE

NOTES:- VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:-

DEPARTMENT OF HIGHWAYS
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

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| PROJECT <u>71-11067</u> | | SITE _____ | | BOREHOLE No. <u>2</u> | | GROUND ELEVATION _____ | | | | | | | | | | |
|-------------------------|-----------|-------------------------|---------|-----------------------|------|------------------------|--------------|-------|------------|-----------|--------|------------|-----------|---|--|--------|
| SAMPLE No. | DEPTH | GRAIN SIZE DISTRIBUTION | | | | | DRY STRENGTH | SHINE | DIALATANCY | TOUGHNESS | ODOR | COLOUR | ACID TEST | CONSISTENCY OR UNDRAINED SHEAR STRENGTH | CLASSIFICATION WITH DESCRIPTION | SYMBOL |
| | | LARGEST GRAIN SIZE | SHAPE | PERCENTAGE | | | | | | | | | | | | |
| | | | | GRAVEL | SAND | SILT & CLAY | | | | | | | | | | |
| 1 | 2.5-4.0 | 1/4" | SUBANG. | 5 | 10 | 85 | MED | DULL | SLOW | SLIGHT | EARTHY | GREY BROWN | SLIGHT | | CLAYEY SILT WITH TRACES OF SA. & G. | |
| 2 | 5-6.5 | 3/4" | ANGULAR | 5 | 15 | 80 | MED | DULL | SLOW | MED | CLAYEY | BROWN | SLIGHT | | CLAYEY SILT WITH SOME SA. & TRACES OF G. | |
| 3 | 7.5-9.0 | - | - | - | 10 | 90 | MED | DULL | SLOW | MED | EARTHY | BROWN | SLIGHT | | CLAYEY SILT TO SILTY CLAY WITH TRACES OF SA. | |
| 4 | 10-11.5 | - | - | - | - | 100 | MED | DULL | SLOW | SLIGHT | EARTHY | BROWN | SLIGHT | | CLAYEY SILT WITH SEAMS OF SILT | |
| 5 | 12.5-14 | - | - | - | - | 100 | MED | DULL | SLOW | SLIGHT | EARTHY | BROWN | MED | | CLAYEY SILT WITH SEAMS OF SILT | |
| 6 | 15-16.5 | - | - | - | - | 100 | MED | DULL | SLOW | SLIGHT | EARTHY | BROWN | MED | | CLAYEY SILT | |
| 7 | 17.5-19.0 | - | - | - | 8 | 20 | - | - | QUICK | - | - | BROWN | MED | | CLAYEY SILT WITH POCKETS OF SILTY F SAND | |
| 8 | 20.5-24.0 | - | - | - | - | 100 | MED | DULL | SLOW | SLIGHT | EARTHY | BROWN | MED | | CLAYEY SILT WITH POCKETS OF SILT | |
| 9 | 27.5-29 | - | - | - | - | 100 | MED | DULL | SLOW | SLIGHT | EARTHY | BROWN | MED | | CLAYEY SILT WITH POCKETS OF SILT | |

NOTES:- VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:-

DEPARTMENT OF HIGHWAYS — ONTARIO
MATERIALS AND TESTING OFFICE
VISUAL CLASSIFICATION SHEET

2

PROJECT 71-11067 SITE _____ BOREHOLE No. 2 GROUND ELEVATION _____

| SAMPLE No. | DEPTH | GRAIN SIZE DISTRIBUTION | | | DRY STRENGTH | SHINE | DIALATANCY | TOUGHNESS | ODOR | COLOUR | ACID TEST | CONSISTENCY OR UNDRAINED SHEAR STRENGTH | CLASSIFICATION WITH DESCRIPTION | SYMBOL |
|------------|---------|-------------------------|-------|-------------------------------|--------------|-------|------------|-----------|--------|--------|-----------|---|-------------------------------------|--------|
| | | LARGEST GRAIN SIZE | SHAPE | PERCENTAGE | | | | | | | | | | |
| | | | | GRAVEL SAND SILT & CLAY | | | | | | | | | | |
| 10 | 32.5-34 | — | — | — | 100 | — | — | — | — | — | — | — | CLAYEY SILT WITH FLOCCULETS OF SILT | |
| 11 | 37-41 | — | — | — | 100 | RED | SPRINT | RED | SPRINT | BROWN | RED | — | SILT CLAY | |
| | | | | | | | | | | | | | | |
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NOTES:— VISUAL CLASSIFICATION MUST BY CARRIED OUT ON ALL SAMPLES BY THE ENGINEER AS SOON AS POSSIBLE AFTER THE SAMPLES REACH THE LABORATORY.

REMARKS:—

DOCUMENT MICROFILMING IDENTIFICATION

GEOCRES No. 40214-69

DIST. 2 REGION SOUTHWESTERN

W.P. No. 89-69-04

CONT. No. N.A. PROJECT CANCELLED

W. O. No. 71-F-67

STR. SITE No. 5-214

HWY. No. _____

LOCATION ST. THOMAS EXPY. - NORTH
EDGEWARE RD.

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT 5

REMARKS: DOCUMENTS TO BE UNFOLDED
BEFORE MICROFILMING

40114-69
GEOCRES No.

| | | | | | | | | | | | |
|--|---|-----------------------------------|--------|--------------------------------|------------|---------------|---------------|--------------------|---------------|---------------|-----------|
| DEPARTMENT OF HIGHWAYS-ONTARIO MATERIALS & TESTING OFFICE | | | | RECORD OF BOREHOLE No. 2 | | | | FOUNDATION SECTION | | | |
| JOB: 71-11067 | | LOCATION: 553,222 H; 31,000 E. | | ORIGINATED BY: JP | | | | | | | |
| W.P. 80-00-01 | | BORING DATE: July 21, 1971 | | COMPILED BY: JP | | | | | | | |
| DATUM: Geodetic | | BOREHOLE TYPE: Cont. Flight Auger | | CHECKED BY: | | | | | | | |
| SOIL PROFILE | | SAMPLES | | DYNAMIC PENETRATION RESISTANCE | | LIQUID LIMIT | | PLASTIC LIMIT | | REMARKS | |
| ELEV. DEPTH | DESCRIPTION | STAY FOOT | NUMBER | TYPE | BLOWS/FOOT | WATER CONTENT | WATER CONTENT | WATER CONTENT | WATER CONTENT | WATER CONTENT | |
| 761.9 | Ground Level | | | | | | | | | | |
| 756.5 | 0.0 Fill Material, Compact | | 1 | SS | 5 | | | | | | |
| 750.5 | 5.0 Silty Clay, Firm | | 2 | SS | 31 | | | | | | |
| | | | 3 | SS | 30 | | | | | | |
| | | | 4 | SS | 33 | | | | | | |
| | Clayey silt with some sand & trace gravel | | 5 | SS | 31 | | | | | | 0.5 to 25 |
| | | | 6 | SS | 24 | | | | | | |
| | | | 7 | SS | 21 | | | | | | |
| | one layers of silt and silty clay | | 8 | SS | 30 | | | | | | 75%L |
| | | | 9 | SS | 22 | | | | | | |
| | Very Stiff to Hard | | 10 | SS | 22 | | | | | | |
| 722.9 | | | 11 | SS | 16 | | | | | | |
| 39.0 | End of Borehole | | | | | | | | | | |

20
10-5 % STRAIN AT FAILURE
in

40714-69
GEORES No.

| DEPARTMENT OF HIGHWAYS - ONTARIO | | | | RECORD OF BOREHOLE No. 3 | | | | FOUNDATION SECTION | | | | | |
|----------------------------------|-----------------------------|----------|---------------------------|----------------------------------|--------------|--------------------------------|----|--------------------|----|--------------|-----|---------|---------------|
| MATERIALS & TESTING OFFICE | | | | LOCATION 553,255 N; 317,950 E. | | | | ORIGINATED BY TP | | | | | |
| JOB T1-11097 | | | | BORING DATE July 21 & 22, 1971 | | | | COMPILED BY TP | | | | | |
| W.P. Bradburn | | | | BOREHOLE TYPE Cont. Flight Auger | | | | CHECKED BY | | | | | |
| DATUM Geodetic | | | | | | | | | | | | | |
| ELEV DEPTH | SOIL PROFILE DESCRIPTION | START NO | SAMPLES NUMBER TYPE | BLOWS/FOOT | ELEV FOOT | DYNAMIC PENETRATION RESISTANCE | | | | LIQUID LIMIT | | REMARKS | |
| | | | | | | BLOWS/FOOT | 25 | 50 | 75 | 100 | 125 | | PLASTIC LIMIT |
| 662.0 | Ground Level | | | | | | | | | | | | |
| 660.0 | Fill Material | | 1 | SS | 6 | | | | | | | | 1 8 12 13 |
| 659.0 | Stiff clay, some sand | | 2 | SS | 11 | | | | | | | | |
| 658.0 | occ. gravel | | 3 | SS | 11 | | | | | | | | |
| 657.0 | Clayey silt with sand | | 4 | SS | 11 | | | | | | | | |
| 656.0 | and trace of gravel | | 5 | SS | 32 | | | | | | | | |
| 655.0 | | | 6 | SS | 36 | | | | | | | | |
| 654.0 | occ. layers of silt | | 7 | SS | 22 | | | | | | | | |
| 653.0 | and silty clay | | 8 | SS | 25 | | | | | | | | |
| 652.0 | Very stiff to hard | | 9 | SS | 20 | | | | | | | | |
| 651.0 | | | 10 | SS | 23 | | | | | | | | |
| 650.0 | | | 11 | SS | 38 | | | | | | | | |
| 649.0 | | | 12 | SS | 14 | | | | | | | | |
| 648.0 | | | 13 | SS | 50 | | | | | | | | 3 38 50 15 |
| 647.5 | End of Borehole | | | | | | | | | | | | |

20
10-3 % STRAIN AT FAILURE
10

4014-69
GEODESIC No.

| DEPARTMENT OF HIGHWAYS - ONTARIO | | | | RECORD OF BOREHOLE No. 4 | | | | FOUNDATION SECTION | | | |
|----------------------------------|--|---|--|--------------------------------|--|---------------|--|--------------------|--|---------|--|
| MATERIALS & TESTING OFFICE | | | | | | | | | | | |
| JOB 71-1107 | | LOCATION 553,252 N; 300,100 E. | | ORIGINATED BY | | | | COMPILED BY | | | |
| W.P. 50-0-0 | | BORING DATE July 21, 1971 | | CHECKED BY | | | | | | | |
| DATUM Geodetic | | BOREHOLE TYPE Cont. Flight Auger | | | | | | | | | |
| SOIL PROFILE | | SAMPLES | | DYNAMIC PENETRATION RESISTANCE | | LIQUID LIMIT | | PLASTIC LIMIT | | REMARKS | |
| ELEV. DEPTH | | STRETCH | | BLOWS/FOOT | | WATER CONTENT | | WATER CONTENT | | | |
| 762.0 | | Ground Level | | 2000 | | 1000 | | 10 | | | |
| 6.0 | | Fill Material - Gravel | | 760 | | | | | | | |
| 2.5 | | Silty Clay - Firm | | 755 | | | | | | | |
| 5.0 | | Clayey silt with sand and trace of gravel | | 750 | | | | | | | |
| | | one layer of silt | | 745 | | | | | | | |
| | | Stiff to Hard | | 740 | | | | | | | |
| 730.5 | | End of Borehole | | 730 | | | | | | | |
| 11.5 | | | | 725 | | | | | | | |

20
10-3 % STRAIN AT FAILURE
10

| DEPARTMENT OF HIGHWAYS-ONTARIO | | | | | | | | | | RECORD OF BOREHOLE No. 5 | | | | | | | | | | FOUNDATION SECTION | | | | | | | | | |
|--------------------------------|-----------------------------|------------|--------|--------------------------------|------------|--------------|----|---------------|-----|------------------------------------|---|----------------|-----|------------|---|------------|---|----------|---|---------------------|---|--------------|---|---------|--|--|--|--|--|
| MATERIALS & TESTING OFFICE | | | | | | | | | | LOCATION: 553,283 E. 340,115 E. | | | | | | | | | | ORIGINATED BY: J.P. | | | | | | | | | |
| JOB: 71-11067 | | | | | | | | | | BORING DATE: July 23, 1971 | | | | | | | | | | COMPILED BY: J.P. | | | | | | | | | |
| W.P. 80-6-70 | | | | | | | | | | BOREHOLE TYPE: Const. Flight Auger | | | | | | | | | | CHECKED BY: J.P. | | | | | | | | | |
| DATUM: Gendatic | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SOIL PROFILE | | SAMPLES | | DYNAMIC PENETRATION RESISTANCE | | LIQUID LIMIT | | PLASTIC LIMIT | | WATER CONTENT | | SHEAR STRENGTH | | UNCONFINED | | FIELD VANE | | LAB VANE | | WATER CONTENT | | BULK DENSITY | | REMARKS | | | | | |
| ELEV. DEPTH | DESCRIPTION | STRAT. NO. | NUMBER | TYPE | BLOWS/FOOT | ELEV. SCALE | 75 | 100 | 125 | W | W | W | PSF | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | Q | | | | | |
| 763.0 | Ground Level | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 762.0 | C.C. Fill Material, Grommet | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 756.0 | Stiff Clay, some sand | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 750.0 | Clayey sil. with sand | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | and trace of gravel | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Shift to Hard | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 720.0 | End of Borehole | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

20
10-5 % STRAIN AT FAILURE
10