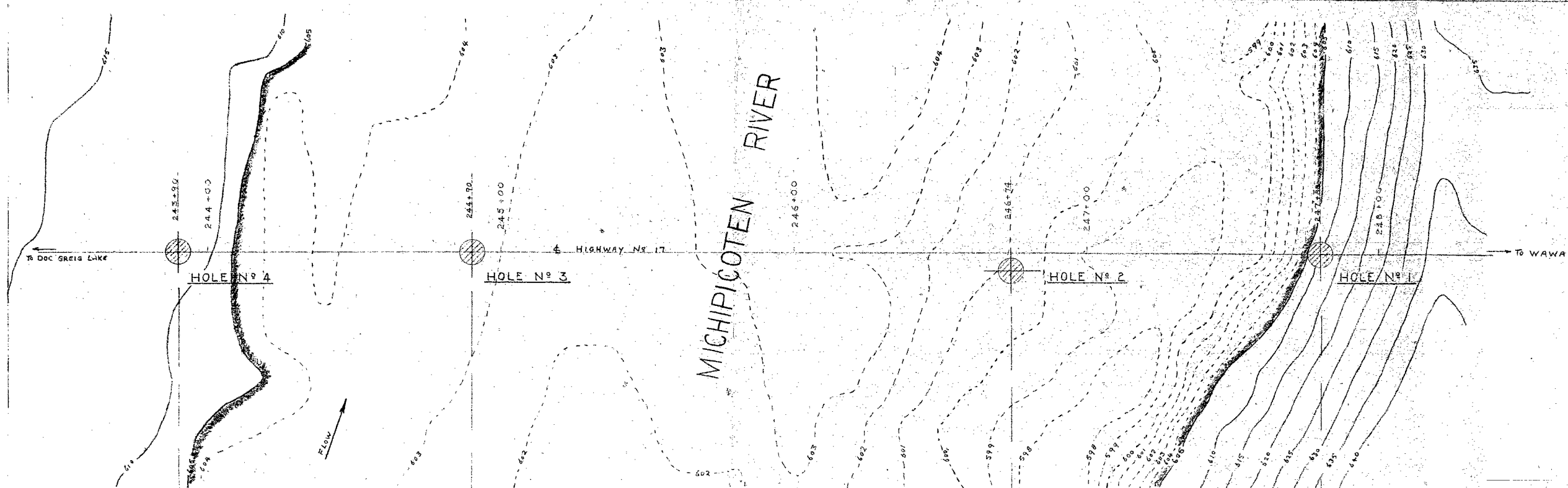


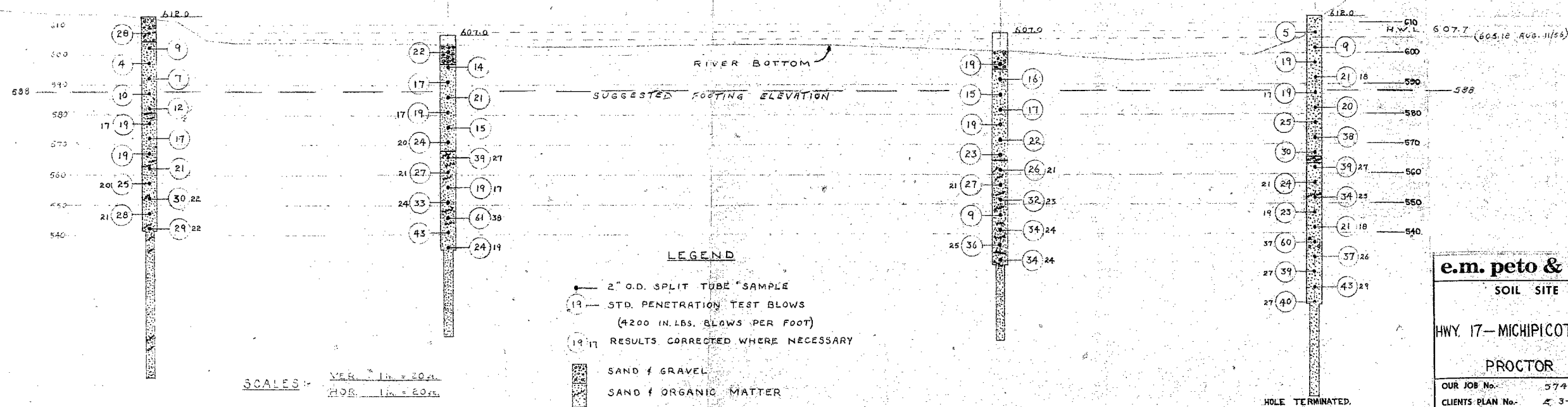
57-F-238M

Hwy. # 17

MICHIPICOTEN RIVER



1.43 %  
PROPOSED GRADE



**e.m. peto & associates ltd.**  
SOIL SITE INVESTIGATION  
AT  
HWY. 17-MICHIPICOTEN RIVER BRIDGE  
FOR  
PROCTOR & REDFERN  
OUR JOB No. 5744 DATE July 5/57  
CLIENTS' PLAN No. E-3-89-1 PER. *lmd*

## e. m. peto associates ltd.

YOUR REFERENCE:-

OUR REFERENCE:- 5744

850 roselawn avenue,  
TORONTO, ONTARIO.  
RUssell 1 - 4955.

57-F-238 M

### SOIL SITE INVESTIGATION REPORT

at

MICHIPICOTEN RIVER BRIDGE - HIGHWAY 17

for

PROCTOR & REDFERN

#### TERMS OF REFERENCE:

It was originally proposed that a variable number of test holes would be performed as indicated on the site plan or as otherwise set out on the site after examination of the general bridge area. Sampling was to be performed as per the Wawa Creek Bridge site. This crossing is proposed as a multi-span bridge and sampling was to be performed to indicate the depth to bedrock or to refusal.

As a result of a visit to the site prior to the commencement of work, it was agreed after discussion with the Client that approximately 5 test holes were to be driven along the proposed new centre line at approximately 100 ft. intervals. Each hole was to be driven to rock if not more than 25 ft. below surface and if rock was found at less than 25 ft. beneath the surface, at least 10 ft. of rock core was to be recovered at each test hole. It was suggested that the holes should be staggered alternatively at opposite ends of the proposed pier locations with probe holes being put down at the opposite ends of the pier locations if necessary.

In order to avoid duplication of cost and expense, the Client's representatives in the area were to locate the chainages at each test hole location and were to provide ground elevations as required.

#### METHOD OF OPERATIONS:

This investigation was performed by our number 3 unit, a skid-mounted Sullivan "12" diamond drill rig, which was moved to the site from the Wawa Creek crossing on May 17th. A local bulldozer was used in order to cut a trail into the proposed bridge site and to cut a ramp down the stream bank to enable the equipment to be moved to the location of test hole number 1.

METHOD OF OPERATIONS: (Cont'd)

Due to the nature of the river and the general uniformity of the initial test results in the field, only 4 test holes were performed at this crossing. Each test hole was performed by driving and cleaning BX drill casing, sampling ahead of the casing with the 2" O.D. split tube sampler. The standard penetration test results were recorded when sampling, these being the number of blows of a 140 lbs. hammer falling 30" required to drive the sampling tube a distance of one foot. Samples were recovered at 5 ft. intervals at each test hole for the depth of each casing. Since no cohesive strata were encountered, no Shelby tube samples were recovered on this site.

Since no bedrock was encountered within the depth of each test hole, no diamond drill core was recovered from this site.

The water table levels were recorded at each test hole and were found to compare with the existing stream level.

All samples obtained in the field were shipped to our laboratory in Toronto and carefully examined. Complete borehole logs were prepared and are included at the rear of this report.

A cross sectional view of the boreholes performed along the centre line of the proposed crossing are shown as part of the site plan. Ground elevations at each test hole were supplied to us by the Client and are referred to Geodetic datum.

GENERAL OBSERVATIONS:

The Michipicoten River is a wide, shallow, relatively fast flowing stream which flows almost due West into Michipicoten Bay on Lake Superior. The River at the proposed bridge site is approximately 360 ft. wide. The bank on the North side rises at an angle of almost 45 degrees to a height some 35 ft. above the rivers edge. The South bank is much more flat for some distance back from the rivers edge. The flow of water can be regulated to some extent by the Great Lakes Power Corporation dam and the water level was adjusted with their cooperation to some extent during the performance of the field work. They are, of course, unable to regulate the water level during the drier months of the year when water conservation is a necessity.

As may be seen from the site plan, the deeper channel of the river exists at the North side of the crossing. There is a sand bar which occupies approximately one-quarter of the centre section of the river. This sand bar occasioned considerable difficulties in movement of the floating equipment between hole 2 and hole 3.

### SOIL CONDITIONS:

This site is entirely sand, at least for the depth investigated, except for the river bottom and the South bank where gravel and sand is encountered to a depth of between 4 and 7 ft. Below elevation 568, there exists a considerable amount of fibrous organic matter. There was some traces of organic matter as high as elevation 580 at test hole number 4 only.

It is clear that the sand at this site has been deposited by water action of a fast flowing nature since there appears to be a complete absence of clay and silt content. As might be expected under the circumstances, there is considerable variation from test hole to test hole with regard to the particle size of the sand encountered at various elevations and there is also considerable variation in the densities at each test hole with the odd pocket of loose sand being encountered as at test hole number 2, and occasionally very dense results being obtained as at test holes 1 and 3 at depth. All the samples recovered were either very wet or saturated as is to be expected on a sand site of this nature.

The borehole logs attached at the rear of this report give the individual results obtained at each test hole. The standard penetration test results are uncorrected for saturated condition as shown on the borehole logs. The profile which forms part of the site plan also indicate the standard penetration test results and the corrected values are also shown on the profile where corrections are necessary.

The standard penetration test results at test holes 1, 2 and 3 indicate a generally compact sand to approximately elevation 570 with average penetration results of 17 to 19 blows. The results below elevation 570 are generally somewhat more variable and the results are generally somewhat higher. At test hole number 4, the sand is generally loose at least to elevation 585 and becomes compact only below elevation 580 with results averaging 18 blows to elevation 563 where the density increased somewhat. The results at this test hole also indicated a generally somewhat more coarse sand to elevation 580 than the samples obtained from test holes 1 to 3 and this coarseness may partially account for the much less dense results obtained.

It is apparent from the high water level elevation supplied with the Department of Highways site plan, the mid August water elevation of last year and our own observations at the time of this work, that the variation in water level is only approximately 3 ft. at this site. This may be attributable to the Great Lakes Power Corporation dam which lies upstream from the site.

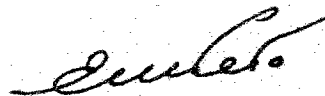
GENERAL CONCLUSIONS:

1. In view of the relatively shallow flood crest at this site, it is unlikely that scour will occur more than 12 ft. below existing river bottom. We therefore suggest that the bridge pier foundations and the abutment foundations may be placed as high as elevation 588.
2. If caisson piers are used, then a load bearing value of the order of 1.1 tons per sq. ft. may be used with a total settlement not exceeding 1", taking into consideration the saturated sand condition. Should you wish to design your structure to tolerate a settlement of perhaps 2" (which will occur of course principally during the construction period) then a design load of the order of 2.2 tons per sq. ft. can be used.
3. The North abutment will be founded on somewhat more compact sand at elevation 588 and loads of the order of 1.6 tons per sq. ft. can be used with a maximum of 1" of settlement and this load value can be doubled if up to 2" of settlement can be tolerated.
4. The south abutment will be located on somewhat less compact sand and the load values at this abutment location are only of the order of 0.8 tons per sq. ft. for a maximum of 1" of settlement and this load bearing value can also be doubled if some 2" of settlement can be tolerated.
5. Should your final design incorporate the use of piles as the base for your bridge piers and abutments, then these piles will probably be based at elevation 575 for the North abutment, at about elevation 565 for the North pier, at elevation 568 for the South pier, and as low as elevation 560 for the South abutment. It will be difficult to drive a normal displacement pile of large diameter below these depths and if large diameter poured in place column piles are contemplated, there may be some difficulty in driving such piles to anything like the depths suggested above without jetting.
6. Should your final design incorporate the use of open caissons or sheet piled caissons, then it should be possible to excavate inside the caissons by clam to elevation 588 although considerable sand flow will occur. It would be advisable to maintain a hydrostatic head inside the caisson during the dredging operation in order to eliminate to some

GENERAL CONCLUSIONS: (Cont'd)

6. extent the extra excavation which will occur as a result of the sand flow. Due to the disturbance to the sand base at which your pier would then be placed, some additional settlement is liable to occur during the construction phase if the design loads suggested above are used.

E. M. PETO ASSOCIATES LTD.,



E. M. Peto, P. Eng.

EMP:sb

July 9th, 1957.

Job No. ....3744

Borehole No. ....

Casing.....BX

Boring Date MAY 14-23/57

Compiled By E.M.P

Checked By D.H.H.

**SAMPLE TYPE**

### ABBREVIATIONS

S. S. 2" STANDARD SPLIT TUBE SAMPLE  
S. L. SPLIT BARREL WITH LINERS  
S. T. THIN-WALLED SHELBY TUBE SAMPLE  
W. S. WASH SAMPLE  
R. C. ROCK CORE

**ABBREVIATIONS**

V.T. IN SITU VANE SHEAR TEST  
Q/u UNCONFINED COMPRESSIVE STRENGTH  
W.L. WATER LEVEL IN CASING  
W.T. GROUND WATER TABLE IN SOIL

[illegible]



## BOREHOLE LOG

Borehole No. 2  
Boring Date MAY 7-29-61  
Checked By D. H. H.

**ABBREVIATIONS**

V.T. IN SITU VANE SHEAR TEST  
Q/u UNCONFINED COMPRESSIVE STRENGTH  
W.L. WATER LEVEL IN CASING  
W.T. GROUND WATER TABLE IN SOIL

| SOIL DESCRIPTION   | COLOR        | Density or Consistency | Depth Elevation | Legend | Sample No. and Location | Sample Type | No. of Blows per Ft. | WATER LEVELS, SOIL MOISTURE & REMARKS     |
|--|--------------|------------------------|-----------------|--------|-------------------------|-------------|----------------------|---|
| RIVER SURFACE  |              |                        | 0'-0"<br>60'-0" |        |                         |             |                      |   |
| RIVER BOTTOM   |              |                        | 5'-0"           |        |                         |             |                      |   |
| COARSE SAND & GRAVEL                                     |              |                        | 19'-0"          |        |                         |             |                      | COARSE SAND & GRAVEL<br>SAND & GRAVEL     |
| COARSE SAND & FINE GRAVEL                                | RED TO BROWN | COMPACT                | 15'-0"          |        | 1                       | 5.3         | 17                   |   |
|  |              |                        | 15'-0"          |        |                         |             |                      |   |
| MEDIUM TO COARSE SAND                                    | LT. BROWN    | COMPACT                | 20'-0"          |        | 2                       | 5.3         | 16                   |   |
|  |              |                        | 20'-0"          |        |                         |             |                      |   |
| " " "  | " "          | COMPACT                | 25'-0"          |        | 3                       | 3.3         | 15                   |   |
|  |              |                        | 25'-0"          |        |                         |             |                      |   |
| " " "  | " "          | COMPACT                | 30'-0"          |        | 4                       | 5.3         | 17                   |   |
|  |              |                        | 30'-0"          |        |                         |             |                      |   |
| " " "  | " "          | COMPACT                | 35'-0"          |        | 5                       | 5.3         | 19                   |   |
|  |              |                        | 35'-0"          |        |                         |             |                      |   |
| " " "  | " "          | COMPACT                | 40'-0"          |        | 6                       | 5.3         | 20                   |   |
| & ODD PEBBLE   |              |                        | 40'-0"          |        |                         |             |                      |   |
| MEDIUM SAND, SOME COARSE SAND                            | BROWN & GRAY | COMPACT                | 45'-0"          |        | 7                       | 5.3         | 23                   |   |
|  |              |                        | 45'-0"          |        |                         |             |                      |   |
| FINE SAND, LAYERS OF ORGANIC MATTER                      | GRAY         | COMPACT                | 50'-0"          |        | 8                       | 5.3         | 26                   |   |
|  |              |                        | 50'-0"          |        |                         |             |                      |   |
| " " "  | " "          | COMPACT                | 55'-0"          |        | 9                       | 5.3         | 27                   |   |
|  |              |                        | 55'-0"          |        |                         |             |                      |   |
| " " "  | " "          | DENSE                  | 60'-0"          |        | 10                      | 5.3         | 32                   |   |
| FIBROUS ORGANIC MATTER                                   |              |                        | 60'-0"          |        |                         |             |                      |   |
| FINE TO MEDIUM SAND, LAYERS OF ORGANIC MATTER            | "            | LOOSE                  | 65'-0"          |        | 11                      | 5.3         | 9                    |   |
|  |              |                        | 65'-0"          |        |                         |             |                      | DENSE AGAIN AT 63'                        |
| " " "  | "            | DENSE                  | 70'-0"          |        | 12                      | 5.3         | 34                   |   |
| SILTY VERY FINE SAND, FIBROUS ORGANIC MATTER, ODD PEBBLE | "            | DENSE                  | 75'-0"          |        | 13                      | 5.3         | 36                   |   |
| " " "  | "            | DENSE                  | 75'-0"          |        | 14                      | 5.3         | 34                   |   |
| COARSE SAND  | "            |                        | 80'-0"          |        | 15                      | W.S.        |                      | DENSE SANDS FROM 77' TO 132'. NO REFUSAL. |
| COARSE SAND  | "            |                        | 85'-0"          |        | 16                      | W.S.        |                      |   |
| FINE TO MEDIUM SAND                                      | "            |                        | 90'-0"          |        | 17                      | W.S.        |                      | LOST WASH WATER                           |
| " " "  | "            |                        | 95'-0"          |        | 18                      | W.S.        |                      |   |
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| " " "  | "            |                        | 378'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 380'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 382'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 384'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 386'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 388'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 390'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 392'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 394'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 396'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 398'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 400'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 402'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 404'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 406'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 408'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 410'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 412'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 414'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 416'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 418'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 420'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 422'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 424'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 426'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 428'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 430'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 432'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 434'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 436'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 438'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 440'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 442'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 444'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 446'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 448'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 450'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 452'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 454'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 456'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 458'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 460'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 462'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 464'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 466'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 468'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 470'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 472'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 474'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 476'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 478'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 480'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 482'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 484'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 486'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 488'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 490'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 492'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 494'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 496'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 498'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 500'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 502'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 504'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 506'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 508'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 510'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 512'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 514'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 516'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 518'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 520'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 522'-0"         |        |                         |             |                      |   |
| " " "  | "            |                        | 524'-0"         |        |                         |             |                      |   |

Job No. 5744

Borehole No. 3

Casing..... 14 X

Boring Date MAY 24 - 1966 6/59

Compiled By ..... E. H. S.

Checked By ..... D.H.H.

**SAMPLE TYPE**

### ABBREVIATIONS

5.5. 2" STANDARD SPLIT TUBE SAMPLE

### 5. L. SPLIT BARREL WITH LINERS

### S. T. THIN-WALLED SHELBY TUBE SAMPLE

R. C. ROCK CORE

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### V.T. IN SITU VANE SHEAR TEST

Q/N UNCONFINED COMPRESSIVE STRENGTH

W. L. WATER LEVEL IN CASING

W. T. GROUND WATER TABLE IN SOIL

| SOIL DESCRIPTION                             | COLOR      | Density or Consistency | Elev. Elevation | Legend | Sample No. and Condition | Sample Type | No. of Blows per ft. | WATER LEVEL, SOIL MOISTURE & REMARKS   |
|--|------------|------------------------|-----------------|--------|--------------------------|-------------|----------------------|--|
| RIVER SAND                                   |            |                        | 0'-0"<br>607.6  |        |                          |             |                      |  |
| RIVER MUD                                    |            |                        | 5'-0"<br>609.6  |        |                          |             |                      | THIN SILTY CLAY IN S.S. SAMPLES        |
| COARSE SAND & GRAVEL                         | BROWN-GREY | COMPACT                | 10'-0"          |        | 1                        | S.S.        | 22                   |  |
| MEDIUM & COARSE SAND                         | LT. BROWN  | COMPACT                | 15'-0"          |        | 2                        | S.S.        | 14                   |  |
| " "  | "          | COMPACT                | 20'-0"          |        | 3                        | S.S.        | 17                   |  |
| COARSE SAND & SOME MEDIUM SAND               | "          | COMPACT                | 25'-0"          |        | 4                        | S.S.        | 21                   |  |
| FINE TO MEDIUM SAND                          | GREY       | COMPACT                | 30'-0"          |        | 5                        | S.S.        | 19                   |  |
| " " "  | "          | COMPACT                | 35'-0"          |        | 6                        | S.S.        | 15                   |  |
| " " "  | GRY-BROWN  | COMPACT                | 40'-0"          |        | 7                        | S.S.        | 24                   | DENSE AT 38'                           |
| " " "  | GREY       | DENSE                  | 45'-0"          |        | 8                        | S.S.        | 39                   |  |
| FIBROUS ORGANIC MATTER                       |            |                        | 45'-0"          |        |                          |             |                      |  |
| FINE SAND, SLIGHT ORGANIC CONTENT            | "          | COMPACT                | 50'-0"          |        | 9                        | S.S.        | 27                   |  |
| " " "  | "          | COMPACT                | 55'-0"          |        | 10                       | S.S.        | 19                   |  |
| VERY FINE TO FINE SILT, SOME ORGANIC CONTENT | "          | DENSE                  | 60'-0"          |        | 11                       | S.S.        | 33                   | VERY DENSE AT 57'                      |
| FINE TO MEDIUM SAND, SLIGHT ORGANIC CONTENT  | "          | VERY DENSE             | 65'-0"          |        | 12                       | S.S.        | 51                   | LEAD WEIGHT AT 65'                     |
| MEDIUM SAND                                  | "          | DENSE                  | 70'-0"          |        | 13                       | S.S.        | 43                   |  |
| VERY FINE TO FINE SILT, SLIGHTLY SILTY       | "          | COMPACT                | 75'-0"          |        | 14                       | S.S.        | 24                   | DROVE RODS FROM 71' TO 100' NO REFUSAL |
| SILT FINE TO MEDIUM SAND                     | "          |                        | 80'-0"          |        | 15                       | W.B.        |                      |  |
| MEDIUM SAND                                  | "          |                        | 85'-0"          |        | 16                       | W.S.        |                      |  |
| MEDIUM SAND                                  | "          |                        | 90'-0"          |        | 17                       | W.S.        |                      |  |
|  |            |                        | 100'-0"         |        |                          |             |                      | HOLE TERMINATED                        |

**e. m. peto associates ltd.**  
 SOIL ENGINEERING SERVICE - TORONTO, ONTARIO  
**BOREHOLE LOG**

Job Name MICHIE SCOTCH CREEK  
 Client PROCTER & KEMPER  
 Datum D.H.S.

Job No. 5744  
 Casing B.S.  
 Compiled By E.A.P.

Borehole No. 4  
 Boring Date JUNE 9-12/56  
 Checked By P.J.

**SAMPLE CONDITION**  
☒ UNDISTURBED  
☐ FAIR  
☒ DISTURBED  
☐ LOST

**SAMPLE TYPE**  
 S.S. 2" STANDARD SPLIT TUBE SAMPLE  
 S.L. SPLIT BARREL WITH LINERS  
 S.T. THIN-WALLED SHELBY TUBE SAMPLE  
 W.S. WASH SAMPLE  
 R.C. ROCK CORE

**ABBREVIATIONS**  
 V.T. IN SITU VANE SHEAR TEST  
 Q/U UNCONFINED COMPRESSIVE STRENGTH  
 W.L. WATER LEVEL IN CASING  
 W.T. GROUND WATER TABLE IN SOIL

| SOIL DESCRIPTION  | COLOR      | Density or Consistency | Depth Elevation | Legend | Sample No. and Condition | Sample Type                         | No. of Blows per Ft. | WATER LEVEL, SOIL MOISTURE, & REMARKS                          |
|---|------------|------------------------|-----------------|--------|--------------------------|-------------------------------------|----------------------|--|
| ORGANIC LOAM (TOP SOIL)                                   |            |                        | 0'-0"           |        |                          |                                     |                      |  |
|   |            |                        | 1'-0"           |        |                          |                                     |                      | DRY, VIBR. TEST 11'  |
|   |            |                        | 2'-0"           |        |                          |                                     |                      |  |
| COARSE SAND, SOME GRAVEL                                  | LT. BROWN  | COMPACT                | 3'-0"           |        | 1                        | <input checked="" type="checkbox"/> | 9.9                  | 25 *<br>* STONE INTERFERENCE &<br>RESID. BELOW 25'             |
|   |            |                        | 4'-0"           |        |                          |                                     |                      |  |
|   |            |                        | 5'-0"           |        |                          |                                     |                      | LOOSE AT 5'  |
| COARSE SAND & FINE GRAVEL                                 | " "        | LOOSE                  | 10'-0"          |        | 2                        | <input checked="" type="checkbox"/> | 5.5                  | 9  |
|   |            |                        | 15'-0"          |        |                          |                                     |                      |  |
| COARSE SAND   | " "        | VERY LOOSE             | 15'-0"          |        | 3                        | <input checked="" type="checkbox"/> | 3.5                  | 4  |
|   |            |                        | 20'-0"          |        |                          |                                     |                      |  |
| " "   | GREY-BROWN | LOOSE                  | 20'-0"          |        | 4                        | <input checked="" type="checkbox"/> | 5.5                  | 7<br>LOST SOME CASING<br>WASH WATER TO 32'                     |
|   |            |                        | 25'-0"          |        |                          |                                     |                      |  |
| " "   | " "        | LOOSE TO COMPACT       | 25'-0"          |        | 5                        | <input checked="" type="checkbox"/> | 3.5                  | 10   |
|   |            |                        | 30'-0"          |        |                          |                                     |                      |  |
| " "   | " "        | LOOSE TO COMPACT       | 30'-0"          |        | 6                        | <input checked="" type="checkbox"/> | 3.5                  | 12   |
| 5" LAYER OF MEDIUM SAND WITH ORGANIC MATTER               |            |                        | 35'-0"          |        |                          |                                     |                      |  |
| FINE TO MEDIUM SAND, SOME ORGANIC MATTER                  | BROWN-GRAY | COMPACT                | 35'-0"          |        | 7                        | <input checked="" type="checkbox"/> | 5.5                  | 19   |
|   |            |                        | 40'-0"          |        |                          |                                     |                      |  |
| MEDIUM TO COARSE SAND                                     | GREY-BROWN | COMPACT                | 40'-0"          |        | 8                        | <input checked="" type="checkbox"/> | 5.5                  | 17   |
|   |            |                        | 45'-0"          |        |                          |                                     |                      |  |
| MEDIUM SAND   | GRAY       | COMPACT                | 45'-0"          |        | 9                        | <input checked="" type="checkbox"/> | 5.5                  | 19   |
|   |            |                        | 50'-0"          |        |                          |                                     |                      | RESID. BELOW TO CASING<br>INCREASING BELOW 46'                 |
| VERY FINE SAND WITH SOME ORGANIC MATTER                   |            |                        | 50'-0"          |        |                          |                                     |                      |  |
| MEDIUM SAND   | "          | COMPACT                | 50'-0"          |        | 10                       | <input checked="" type="checkbox"/> | 5.5                  | 21   |
|   |            |                        | 55'-0"          |        |                          |                                     |                      |  |
| FINE TO MEDIUM SAND                                       | "          | COMPACT                | 55'-0"          |        | 11                       | <input checked="" type="checkbox"/> | 5.5                  | 25   |
|   |            |                        | 60'-0"          |        |                          |                                     |                      |  |
| FINE SAND, LAYER OF VERY FINE SAND WITH ORGANIC MATTER    | "          | COMPACT TO DENSE       | 60'-0"          |        | 12                       | <input checked="" type="checkbox"/> | 5.5                  | 30   |
|   |            |                        | 65'-0"          |        |                          |                                     |                      |  |
| FINE SAND   | "          | COMPACT TO DENSE       | 65'-0"          |        | 13                       | <input checked="" type="checkbox"/> | 5.5                  | 28   |
|   |            |                        | 70'-0"          |        |                          |                                     |                      |  |
| FINE TO MEDIUM SAND & CONSIDERABLE FIBROUS ORGANIC MATTER | "          | COMPACT TO DENSE       | 70'-0"          |        | 14                       | <input checked="" type="checkbox"/> | 5.5                  | 29   |
|   |            |                        | 75'-0"          |        |                          |                                     |                      | REMOVE RODS FROM 71'<br>TO 120', NO REFUSEL                    |
|   |            |                        | 80'-0"          |        |                          |                                     |                      |  |
| MEDIUM SAND, SOME FIBROUS ORGANIC MATTER                  | "          |                        | 80'-0"          |        | 15                       | <input checked="" type="checkbox"/> | W.S.                 |  |
|   |            |                        | 85'-0"          |        |                          |                                     |                      |  |
|   |            |                        | 90'-0"          |        |                          |                                     |                      |  |
| FINE SAND   | "          |                        | 90'-0"          |        | 16                       | <input checked="" type="checkbox"/> | W.S.                 |  |
|   |            |                        | 95'-0"          |        |                          |                                     |                      |  |
|   |            |                        | 100'-0"         |        |                          |                                     |                      |  |
| FINE SAND   | "          |                        | 100'-0"         |        | 17                       | <input checked="" type="checkbox"/> | W.S.                 |  |
|   |            |                        | 105'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 110'-0"         |        |                          |                                     |                      |  |
| FINE TO MEDIUM SAND                                       | "          |                        | 110'-0"         |        | 18                       | <input checked="" type="checkbox"/> | W.S.                 |  |
|   |            |                        | 115'-0"         |        |                          |                                     |                      | LOST WASH WATER BELOW<br>115' & UNABLE TO OBTAIN<br>ANY SAMPLE |
|   |            |                        | 120'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 125'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 130'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 135'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 140'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 145'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 150'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 155'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 160'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 165'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 170'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 175'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 180'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 185'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 190'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 195'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 200'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 205'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 210'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 215'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 220'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 225'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 230'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 235'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 240'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 245'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 250'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 255'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 260'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 265'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 270'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 275'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 280'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 285'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 290'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 295'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 300'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 305'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 310'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 315'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 320'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 325'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 330'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 335'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 340'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 345'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 350'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 355'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 360'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 365'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 370'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 375'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 380'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 385'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 390'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 395'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 400'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 405'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 410'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 415'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 420'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 425'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 430'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 435'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 440'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 445'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 450'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 455'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 460'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 465'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 470'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 475'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 480'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 485'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 490'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 495'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 500'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 505'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 510'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 515'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 520'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 525'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 530'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 535'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 540'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 545'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 550'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 555'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 560'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 565'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 570'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 575'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 580'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 585'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 590'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 595'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 600'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 605'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 610'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 615'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 620'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 625'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 630'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 635'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 640'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 645'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 650'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 655'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 660'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 665'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 670'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 675'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 680'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 685'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 690'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 695'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 700'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 705'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 710'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 715'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 720'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 725'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 730'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 735'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 740'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 745'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 750'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 755'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 760'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 765'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 770'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 775'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 780'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 785'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 790'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 795'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 800'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 805'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 810'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 815'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 820'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 825'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 830'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 835'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 840'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 845'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 850'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 855'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 860'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 865'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 870'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 875'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 880'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 885'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 890'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 895'-0"         |        |                          |                                     |                      |  |
|   |            |                        | 900'-0"         |        |                          |                                     |                      |  |