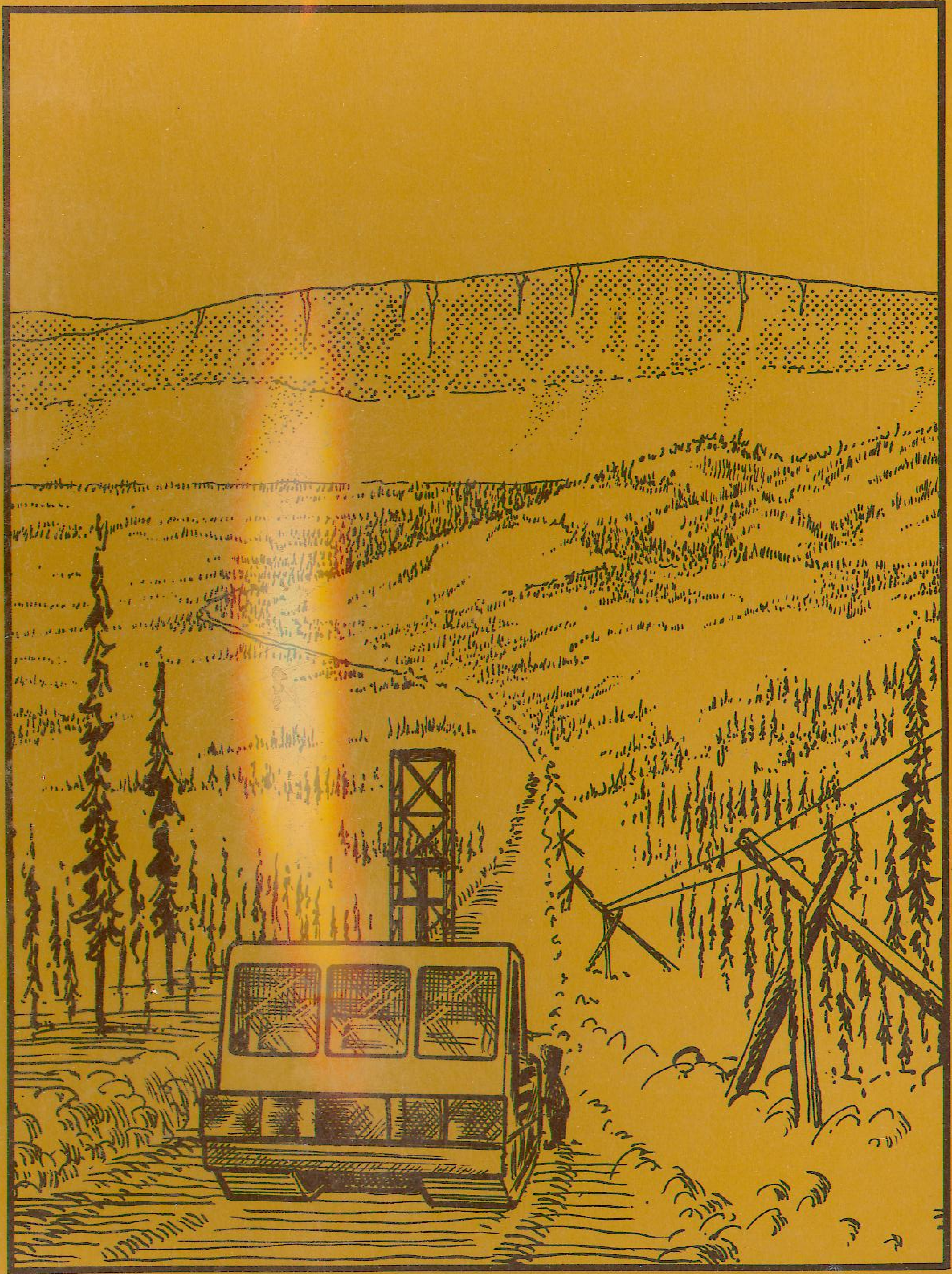


# MACKENZIE HIGHWAY GEOTECHNICAL EVALUATION

VOLUME XII

BORROW BOREHOLE LOGS,

MOSAICS AND BORROW PROFILES

BORROW AREA SUMMARY TABLE

SECTION IV

MILE 668 TO MILE 649

eba Engineering Consultants Ltd.

130

ISSUE #3

130

THE ASSOCIATION OF
PROFESSIONAL ENGINEERS
OF ALBERTA
PERMIT NUMBER
P245
ELMER W. BROOKER
& ASSOCIATES LTD.

# VOLUME XII

# BORROW BOREHOLE LOGS,
# MOSAICS AND BORROW PROFILES
# BORROW AREA SUMMARY TABLE

## SECTION IV

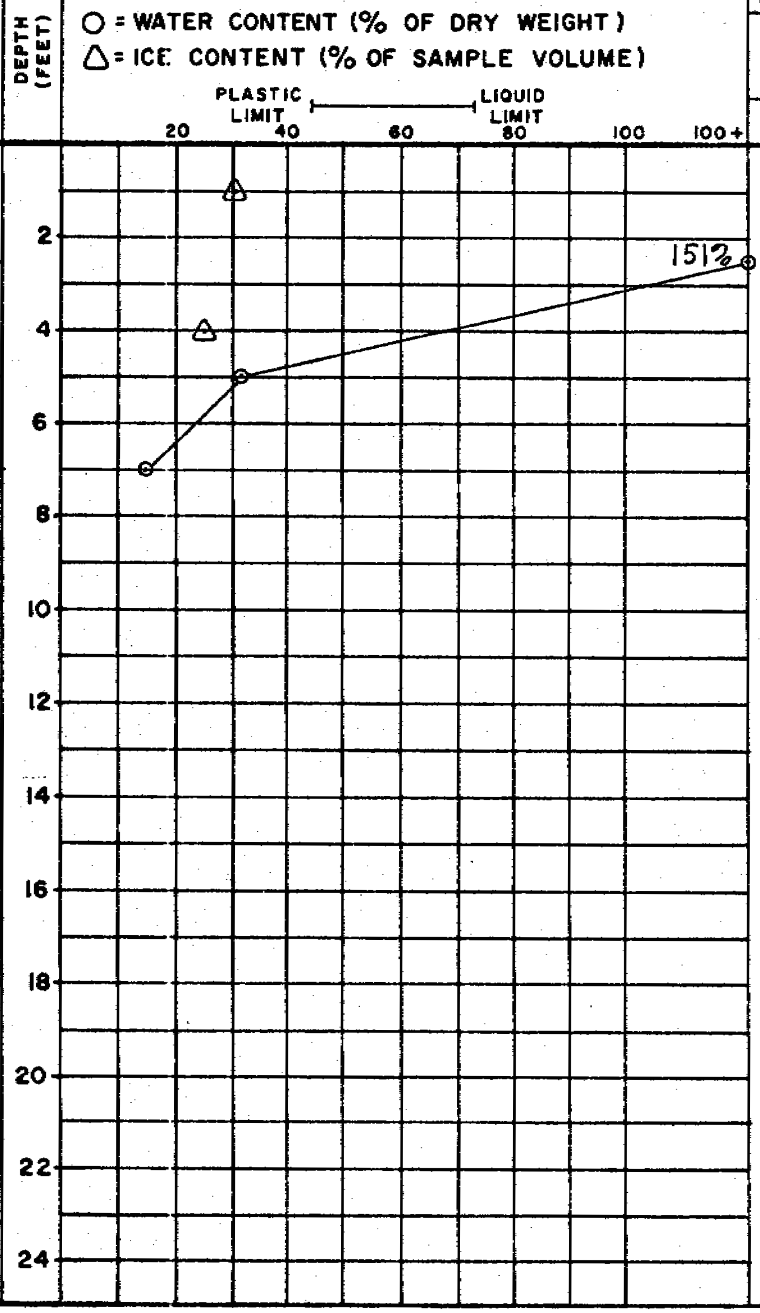
## MILE 668 TO MILE 649

**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 21/2/73
RIG: Texoma
AIRPHOTO NO: A22763 - 46
SURFACE DRAINAGE: Well Drained
CHAINAGE:
VEGETATION: Black Spruce
OFFSET
ELEV:

| TEST HOLE BA 63 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 668 | B | 1 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| | | | | | OL | SILT - Organic - Black with Coarse Sand | | V - 30% |
| 2 | 1 | ⧅ | | | --- | | F | |
| 4 | | | | | CL | - Clayey, Low Plasticity, Coarse Sand | | V - 25% |
| | 2 | ⧅ | | | | | | |
| 6 | 3 | ⧅ | | | | | | NB |
| | | | | | LS | LIMESTONE | | |
| 8 | | | | | | END OF HOLE 7' | | |
| 10 | | | | | | | | |
| 12 | | | | | | | | |
| 14 | | | | | | | | |
| 16 | | | | | | | | |
| 18 | | | | | | | | |
| 20 | | | | | | | | |
| 22 | | | | | | | | |
| 24 | | | | | | | | |



| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY % | SILT % | SAND % | GRAVEL % | | | |

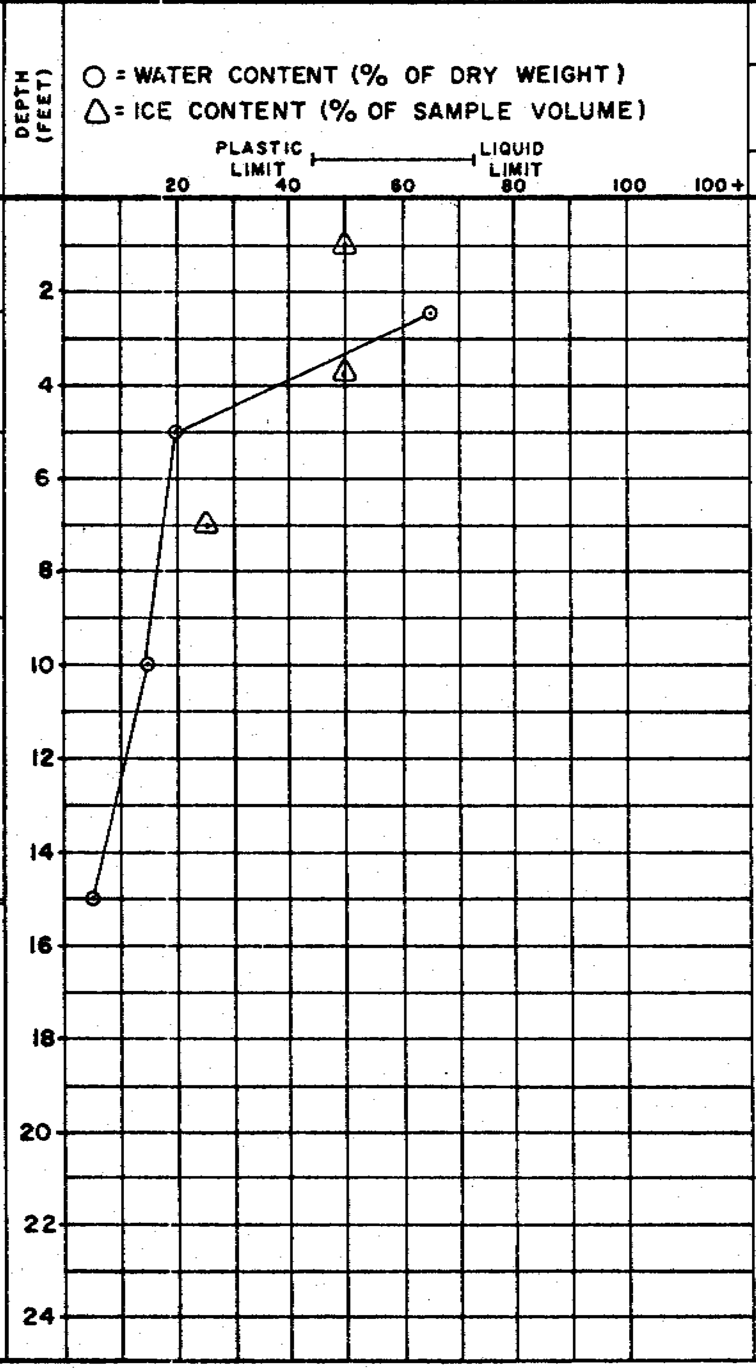
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB | FIELD ENG: NRM | DATE DRILLED 21/2/73 | AIRPHOTO NO: A22860 - 118 | CHAINAGE: | OFFSET
CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Good Drainage | VEGETATION: Black Spruce | ELEV:

TEST HOLE BA 64

| MILE | B,C,S | NUMBER |
|---|---|---|
| 668 | B | 2 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 2 | 1 | ▧ | | | SM | SAND - Black, Silty, Coarse | | V 50% |
| 4 | 2 | ▧ | | | | - Brown | F | V 50% |
| 6<br>8 | | | | | CL - ML | SILT<br>CLAY - Clayey, Lt. Brown, Low Plasticity,<br>(TILL) - Silty, Limestone Fragments | | V 20 - 30% |
| 10 | 3 | ▧ | | | | | U | Unfrozen |
| 12<br>14 | 4 | ▧ | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | |
| 18<br>20<br>22<br>24 | | | | | | | | |



| GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| | | | | | | |

**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

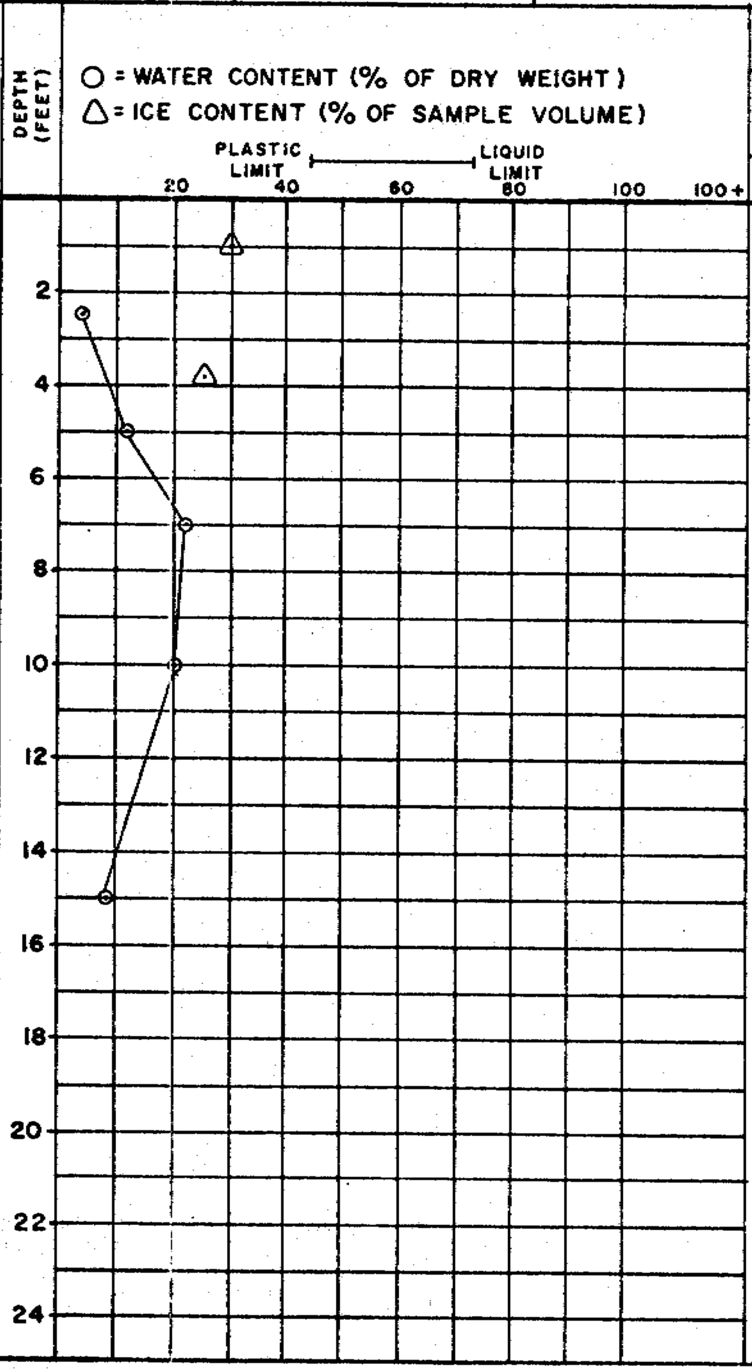
DWN: ALB | FIELD ENG: NRM | DATE DRILLED 21/2/73 | AIRPHOTO NO: A22860 - 118 | CHAINAGE: | OFFSET

CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Good Drainage | VEGETATION: Black Spruce | ELEV:

TEST HOLE BA 64

| MILE | B,C,S | NUMBER |
|---|---|---|
| 668 | B | 3 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| | 1 | | | | GM | GRAVEL<br>- Grey-Brown Trace of Silt | F | V 30%<br>V 20 - 30% |
| | 2<br>3 | | | | | CLAY (TILL) - Silty, Grey-Brown, Low Plasticity | | NB |
| | | | | | | | U | Unfrozen |
| | | | | | CL | | F | NB |
| | 4 | | | | CI | - Med Plasticity | | |
| | 5 | | | | | - Silty, Grey | | |
| | | | | | | END OF HOLE 15' | | |



| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY % | SILT % | SAND % | GRAVEL % | | | |

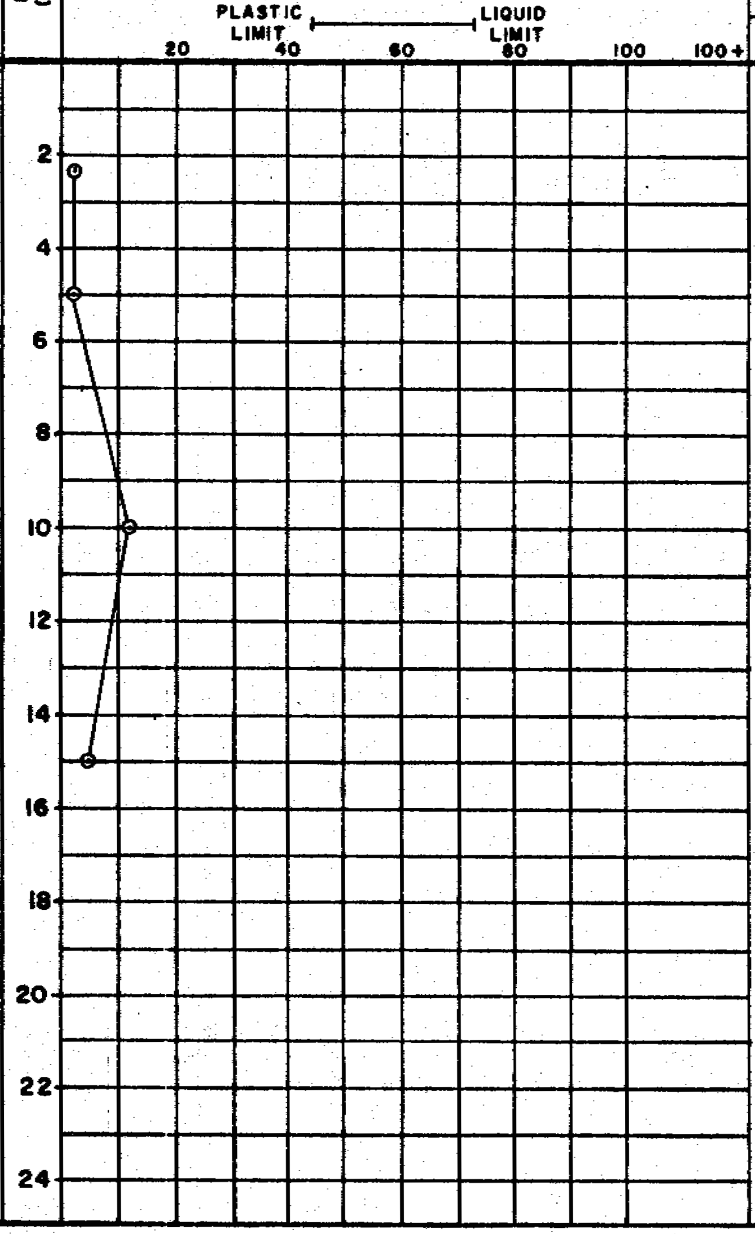
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 21/2/73
RIG: Texoma
AIRPHOTO NO: A22860 - 118
SURFACE DRAINAGE: Good
CHAINAGE:
VEGETATION: Black Spruce
OFFSET
ELEV:

| TEST HOLE BA 64 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 668 | B | 4 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | ⧅ | | | | SAND and SILT (TILL) - Brown, Gravelly with Some Clay | F | NF | | | | | | | |
| 4 | 2 | ⧅ | | | SM to GM | | | | 12 | 35 | 35 | 18 | | | |
| 8 | | | | | CL | CLAY (TILL) - Silty, Low. Plasticity | | NB | | | | | | | |
| 10 | 3 | ⧅ | | | | | U | Unfrozen | | | | | | | |
| 11 | | | | | | | F | NB | | | | | | | |
| 14 | 4 | ⧅ | | | GM | SILT - Brown, Gravelly | | | | | | | | | |
| 15 | | | | | | END OF HOLE 15' | | | | | | | | | |

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



| E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA<br>MACKENZIE HIGHWAY |
|---|---|---|

DWN: ALB
FIELD ENG: NRM
DATE DRILLED 22/2/73
AIRPHOTO NO: A22763-46
CHAINAGE:
OFFSET
CKD: LAB
TECH: JK
RIG:
SURFACE DRAINAGE: Good to West
VEGETATION: Thin Black Spruce
ELEV:

TEST HOLE BA 63

| MILE | B,C,S | NUMBER |
|---|---|---|
| 668 | B | 5 |

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)
PLASTIC LIMIT — LIQUID LIMIT
20 40 60 80 100 100+

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PT | PEAT - Reddish Brown<br>- Fibrous | F | V<br>5 - 10% | | | | | | | |
| | | | | | LS | LIMESTONE<br>- Bedrock | | N/A | | | | | | | |
| | | | | | | END OF HOLE 11' | | | | | | | | | |

DEPTH (FEET): 2 4 6 8 10 12 14 16 18 20 22 24

| E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA<br>MACKENZIE HIGHWAY |
|---|---|---|

DWN: ALB
FIELD ENG: NRM
DATE DRILLED 23/2/73
AIRPHOTO NO A22860 - 111
CHAINAGE:
OFFSET
CKD: LAB
TECH: JK
RIG: Mayhew
SURFACE DRAINAGE Good to N
VEGETATION: Some Birch
ELEV:

TEST HOLE BA 65A

| MILE | B,C,S | NUMBER |
|---|---|---|
| 668 | B | 6 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | DEPTH (FEET) | ○ = WATER CONTENT (% OF DRY WEIGHT)<br>△ = ICE CONTENT (% OF SAMPLE VOLUME)<br>PLASTIC LIMIT ⊢—⊣ LIQUID LIMIT<br>20 40 60 80 100 100+ | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PT | PEAT - Reddish Brown, Fibrous | F | NB. | | | | | | | | | Formerly numbered 668-B-7<br>M/C not available |
| 2 | | | | | | LIMESTONE - Bedrock | | | 2 | | | | | | | | |
| 4 | | | | | LS | | | N/A | 4 | | | | | | | | |
| 6 | | | | | | | | | 6 | | | | | | | | |
| 8 | | | | | | | | | 8 | | | | | | | | |
| 10 | | | | | | END OF HOLE 9' | | | 10 | | | | | | | | |
| 12 | | | | | | | | | 12 | | | | | | | | |
| 14 | | | | | | | | | 14 | | | | | | | | |
| 16 | | | | | | | | | 16 | | | | | | | | |
| 18 | | | | | | | | | 18 | | | | | | | | |
| 20 | | | | | | | | | 20 | | | | | | | | |
| 22 | | | | | | | | | 22 | | | | | | | | |
| 24 | | | | | | | | | 24 | | | | | | | | |

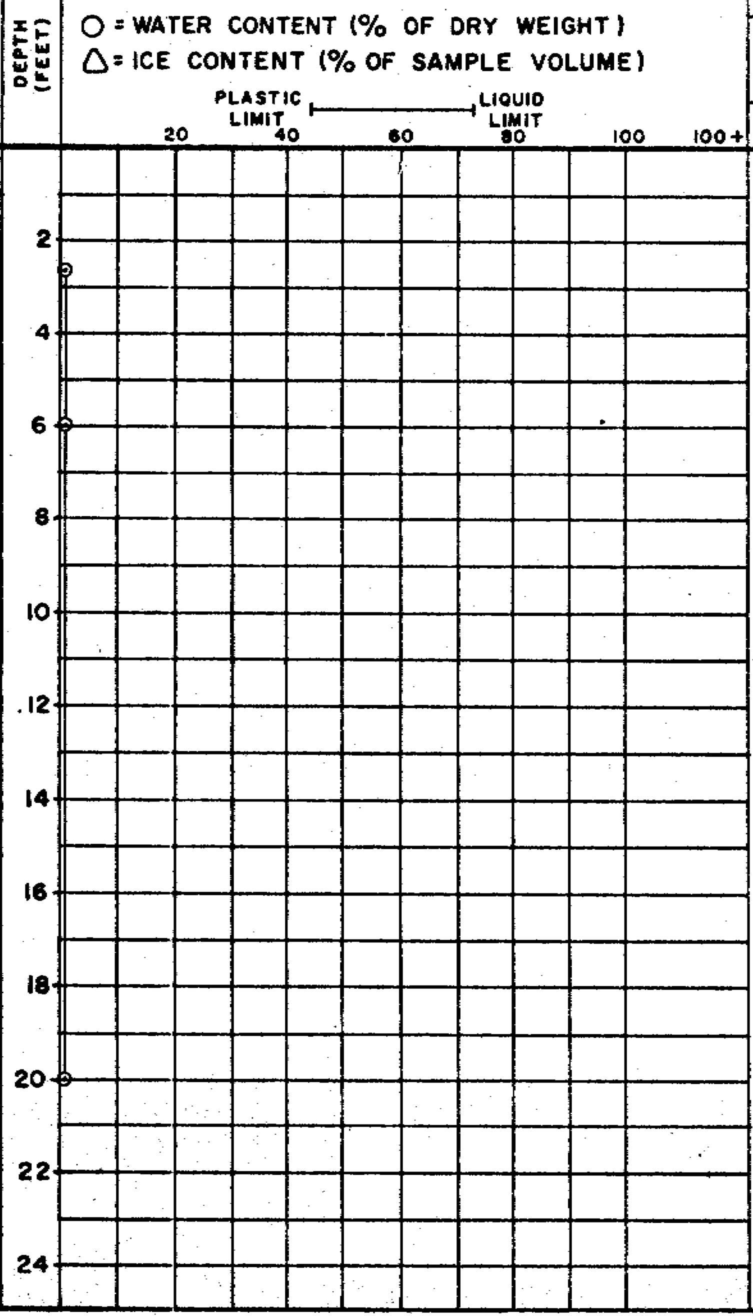
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

| | | | | | |
|---|---|---|---|---|---|
| DWN: ALB | FIELD ENG: NRM | DATE DRILLED 22/2/73 | AIRPHOTO NO: A22880 - 117 | CHAINAGE: | OFFSET |
| CKD: LAB | TECH: JK | RIG: Mayhew | SURFACE DRAINAGE: Good to N & S | VEGETATION: Black Spruce & Birch | ELEV: |

TEST HOLE BA 65A

| MILE | B,C,S | NUMBER |
|---|---|---|
| 667 | B | 1 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PT | PEAT - Reddish Brown, Fibrous F | | V - 15-20% | | | | | | | |
| 2 | | | | | LS | LIMESTONE - Bedrock | | | | | | | | | |
| | 1 | ▧ | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | |
| 6 | 2 | ▧ | | | | | | | | | | | | | |
| 8 | | | | | | | | N/A | | | | | | | |
| 10 | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | 3 | ▧ | | | | | | | | | | | | | |
| 22 | | | | | | END OF HOLE 22' | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |



# E.W. BROOKER & ASSOCIATES LTD.

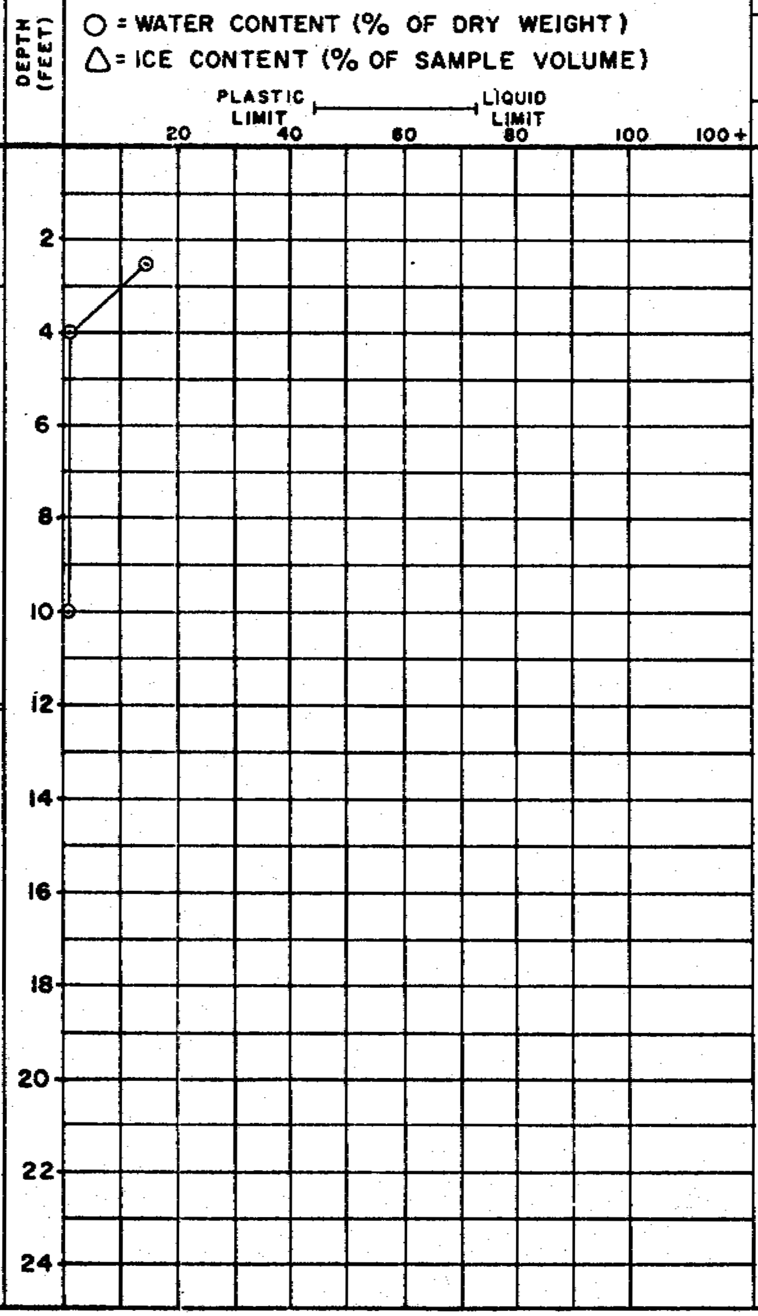
# DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

| | | | | | |
|---|---|---|---|---|---|
| DWN: ALB | FIELD ENG: NRM | DATE DRILLED 22/2/73 | AIRPHOTO NO: A22860 - 117 | CHAINAGE: | OFFSET |
| CKD: NRM | TECH: JK | RIG: Mayhew | SURFACE DRAINAGE: Good to N & S | VEGETATION: Black Spruce & Birch | ELEV: |

| TEST HOLE BA 65B | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 667 | B | 2 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 2 | 1 | ⧅ | | | SM | SAND - Med. Brown<br>- Fine<br>- Dense<br>- Silty | F | NF to NB |
| 4<br>6<br>8<br>10 | 2<br>3 | ⧅<br>⧅ | | | LS | LIMESTONE - Bedrock | | N/A |
| 12<br>14<br>16<br>18<br>20<br>22<br>24 | | | | | | END OF HOLE 12' | | |



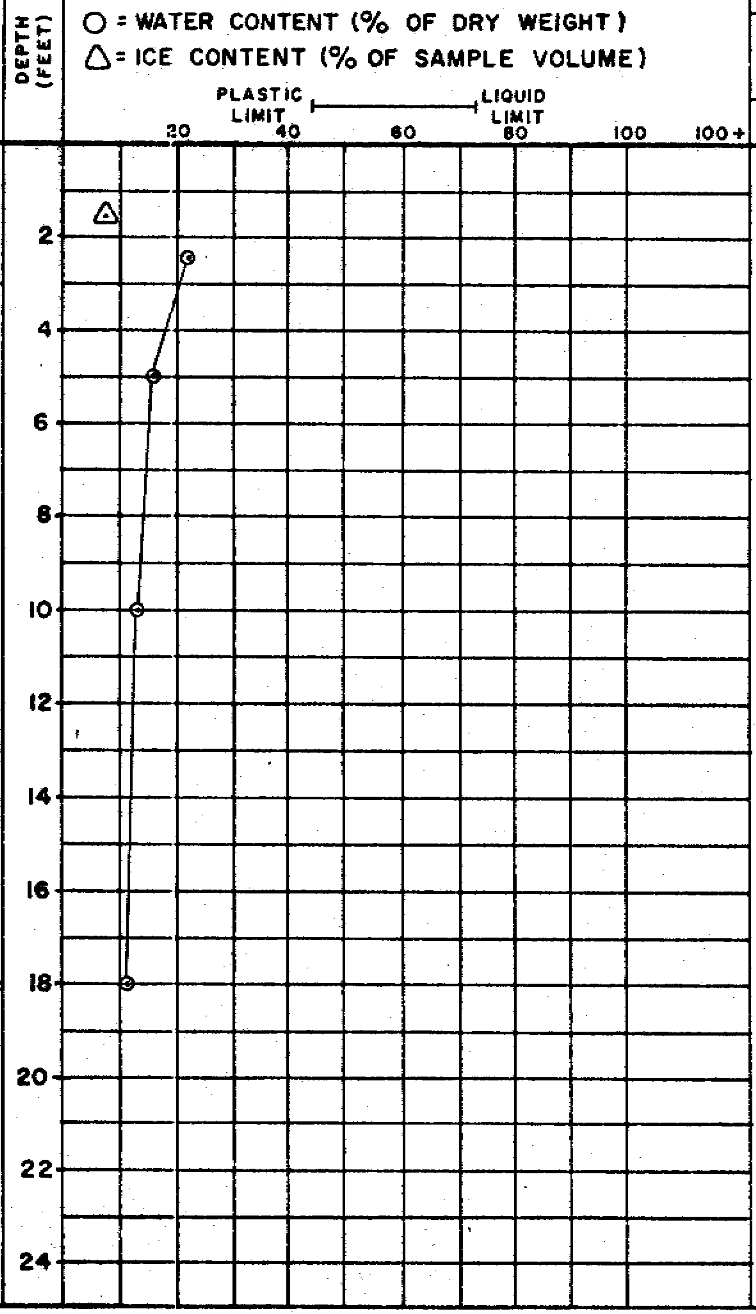
| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY % | SILT % | SAND % | GRAVEL % | | | |

**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
FIELD ENG: NRM
DATE DRILLED 26/2/73
AIRPHOTO NO:
CHAINAGE:
OFFSET
CKD: LAB
TECH: JK
RIG: Texoma
SURFACE DRAINAGE: Good to South
VEGETATION: Black Spruce
ELEV:

| TEST HOLE BA 70A | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 667 | B | 3 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–6 | 1<br>2 | | | | SM | SAND - Med. Brown<br>- Silty<br>- Fine<br>- Trace of Clay | | V<br>5 - 10% | | | | | | | Formerly 667-B-13<br>Temp. @ 5' 31.7 Deg. |
| 6–18 | 3<br>4 | | | | ML | SILT - Med. Brown<br>- Clayey<br>- Low Plasticity<br>- Limestone Fragments | F | NB | | | | | | | |
| 18 | | | | | | END OF HOLE 18' | | | | | | | | | |



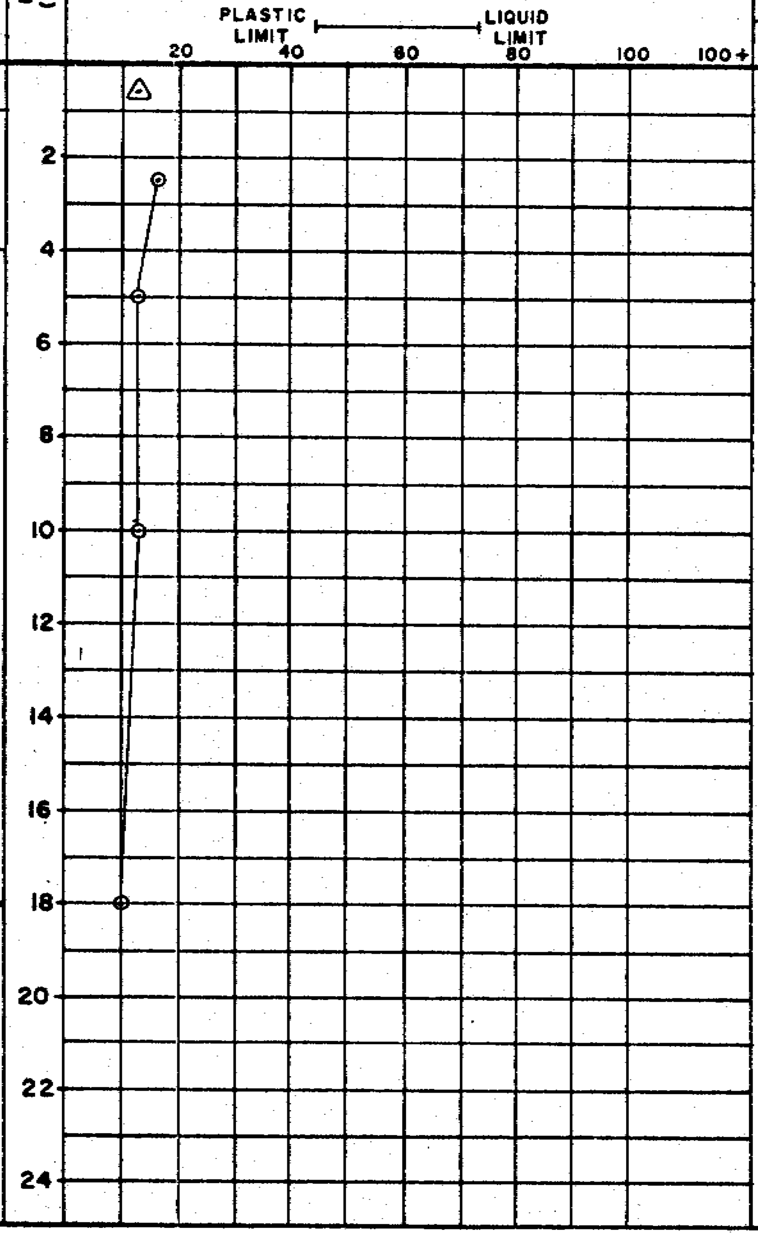
| E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA<br>MACKENZIE HIGHWAY |
|---|---|---|

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: JK
DATE DRILLED 26/2/73
RIG: Mayhew
AIRPHOTO NO:
SURFACE DRAINAGE: Good to S
CHAINAGE:
VEGETATION: Black Spruce
OFFSET
ELEV:

| TEST HOLE BA 70A | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 667 | B | 4 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PT | PEAT - Black, Fibrous | | V - 10-15% | | | | | | | Formerly 667-B-14 |
| 2 | 1 | ⧅ | | | ML | SILT (TILL) - Med. Brown, Clayey, sandy. Low to Med. Plasticity, some gravel | F | NB | | | | | | | |
| 4 | 2 | ⧅ | | | | | | | | | | | | | |
| 10 | 3 | ⧅ | | | | - clay-silt (till), sandy, some gravel. | U | Unfrozen | 20 | 41 | 26 | 13 | | | |
| 14 | | | | | ML | SILT - Trace of Coarse Sand, Grey | | | | | | | | | |
| 18 | 4 | ⧅ | | | | | | | | | | | | | |
| | | | | | | END OF HOLE 18' | | | | | | | | | |

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



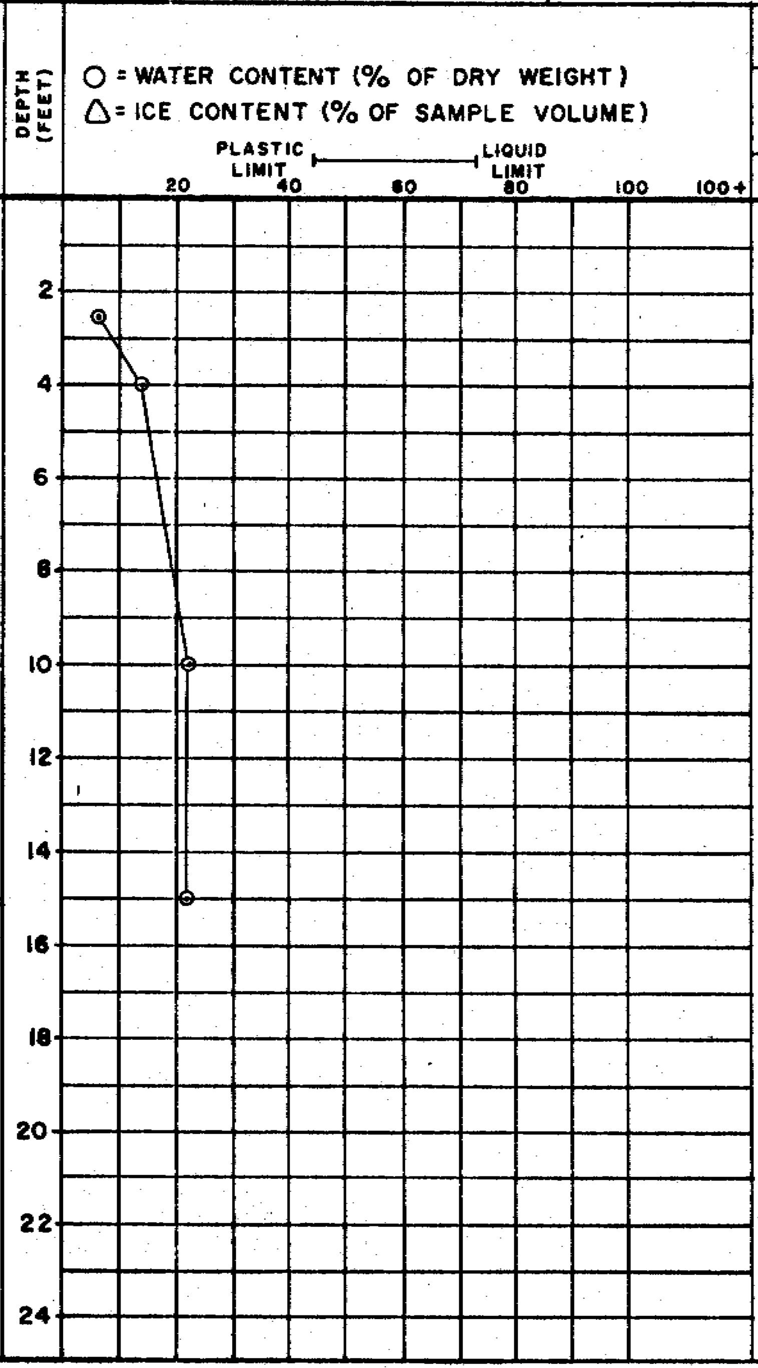
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 22/2/73
RIG: Texoma
AIRPHOTO NO: A22860 - 117
SURFACE DRAINAGE: Good
CHAINAGE:
OFFSET
VEGETATION: Black Spruce
ELEV:

TEST HOLE BA 67

| MILE | B,C,S | NUMBER |
|---|---|---|
| 667 | B | 5 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SILT - Brown | | | | | | | | | Formerly 667-B-12 |
| | 1 | | | | ML | - Sandy<br>- Trace of Clay, Low Plasticity | | | | | | | | | |
| | 2 | | | | | | F | NB | 11 | 57 | 32 | – | | | |
| | 3 | | | | | | | | | | | | | | |
| | | | | | | - Some Fine Sand | U | Unfrozen | | | | | | | |
| | 4 | | | | | END OF HOLE 15' | | | | | | | | | |



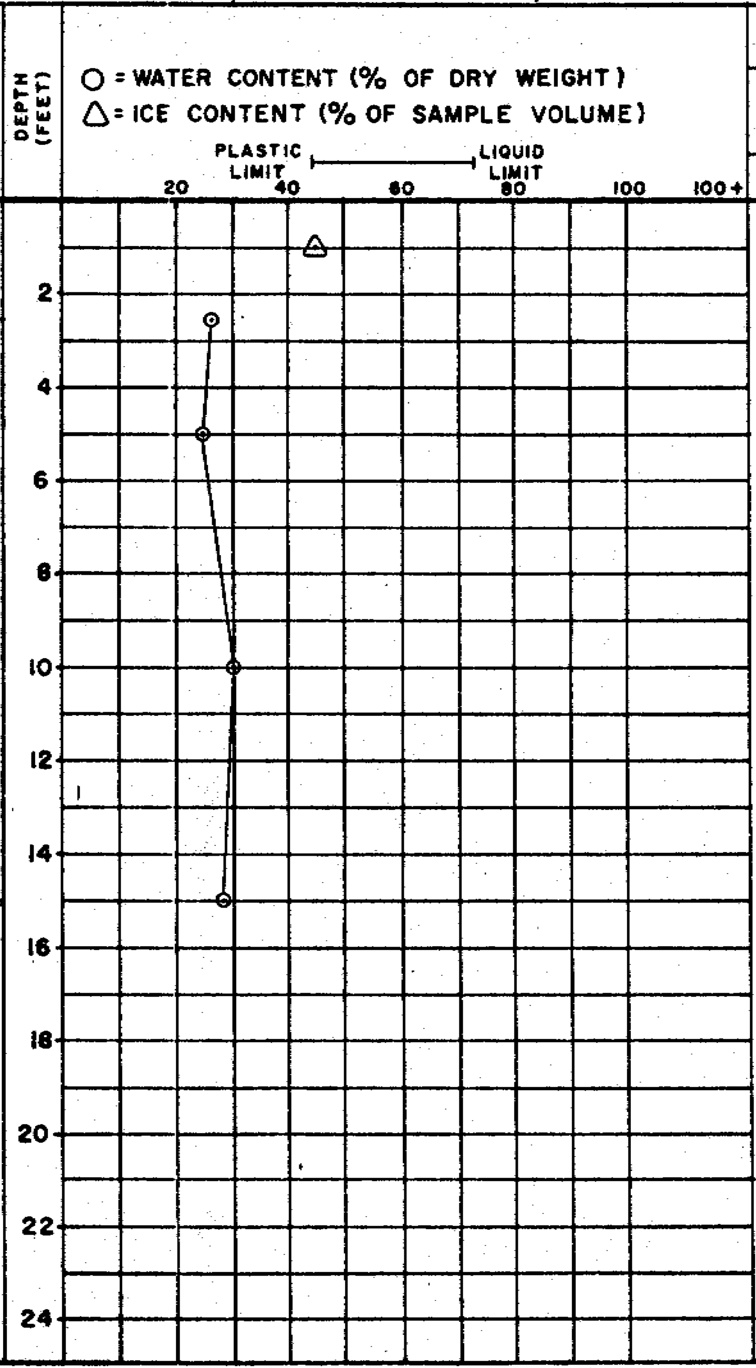
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

| | | | | | |
|---|---|---|---|---|---|
| DWN: ALB | FIELD ENG: NRM | DATE DRILLED 22/2/73 | AIRPHOTO NO: A22860 - 117 | CHAINAGE: | OFFSET |
| CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Good | VEGETATION: Black Spruce | ELEV: |

TEST HOLE BA 67

| MILE | B,C,S | NUMBER |
|---|---|---|
| 667 | B | 6 |

| SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | ML | SILT - Grey-Brown, Trace of Clay, Low Plasticity | F | V. 35% | | | | | | | Formerly 667-B-12A |
| 2 | | | | | | | NB | | | | | | | |
| 3 | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | |
| | | | | | END OF HOLE 15' | | | | | | | | | |

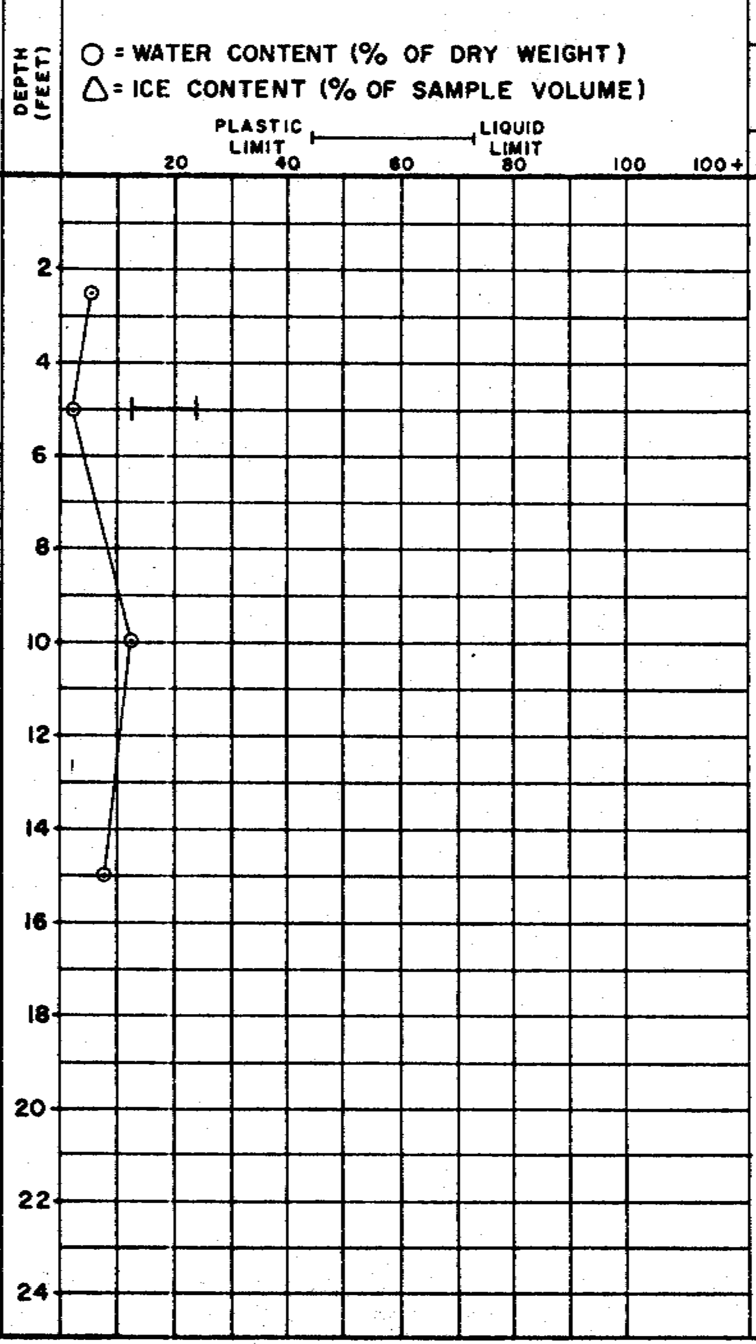


**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 22/2/73
RIG: Texoma
AIRPHOTO NO: A22860 - 117
SURFACE DRAINAGE: Fair to Good
CHAINAGE:
OFFSET
VEGETATION: Black Spruce
ELEV:

| TEST HOLE | | BA 66 |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 667 | B | 7 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PT | PEAT | | | | | | | | | |
| 2 | 1 | | | | GM | GRAVEL (TILL) - Grey to Brown, Sandy, silty Low to Med. Plasticity, - Limestone Fragments - Gravelly Layers | F | NB' | | | | | | | |
| 5 | 2 | | | | | | | | 7 | 23 | 22 | 48 | | | |
| 10 | 3 | | | | | | | | | | | | | | |
| 15 | 4 | | | | | | | | | | | | | | |
| | | | | | | END OF HOLE 15' | | | | | | | | | |

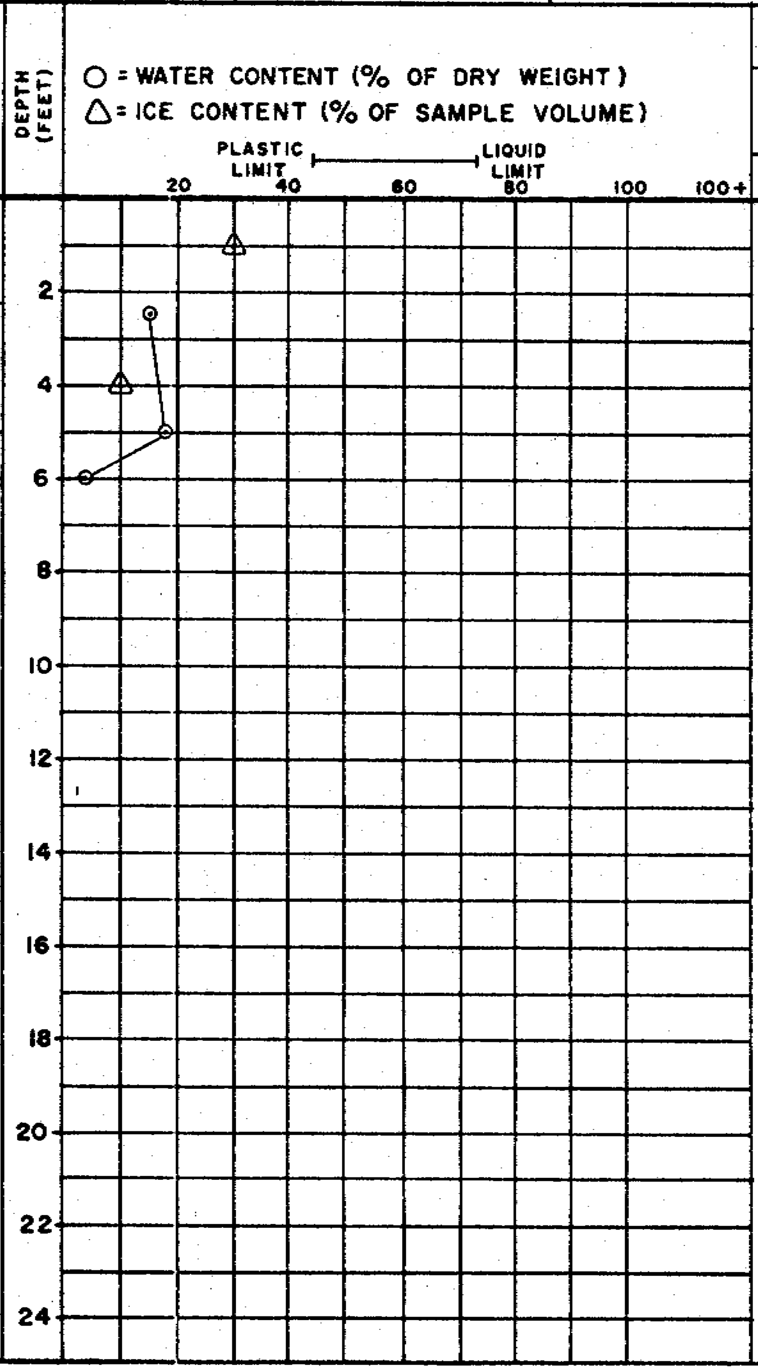


**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 22/2/73
RIG: Texoma
AIRPHOTO NO: A22860 - 117
SURFACE DRAINAGE: Fair to Good
CHAINAGE:
VEGETATION: Black Spruce
OFFSET
ELEV:

| TEST HOLE BA 66 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 667 | B | 8 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | | | | CL<br>to<br>CI | SILT CLAY<br>(TILL) - Coarse Sandy, Some Gravel, Low to Med. Plasticity, Brown | F | V. 25 - 35%<br>VX-10% | | | | | | | |
| 4 | 2 | | | | | - With Coarse Sand at 5 feet | | | | | | | | | |
| 6 | 3 | | | | | | | NB | | | | | | | |
| | | | | | | END OF HOLE 6' | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |



## E.W. BROOKER & ASSOCIATES LTD.

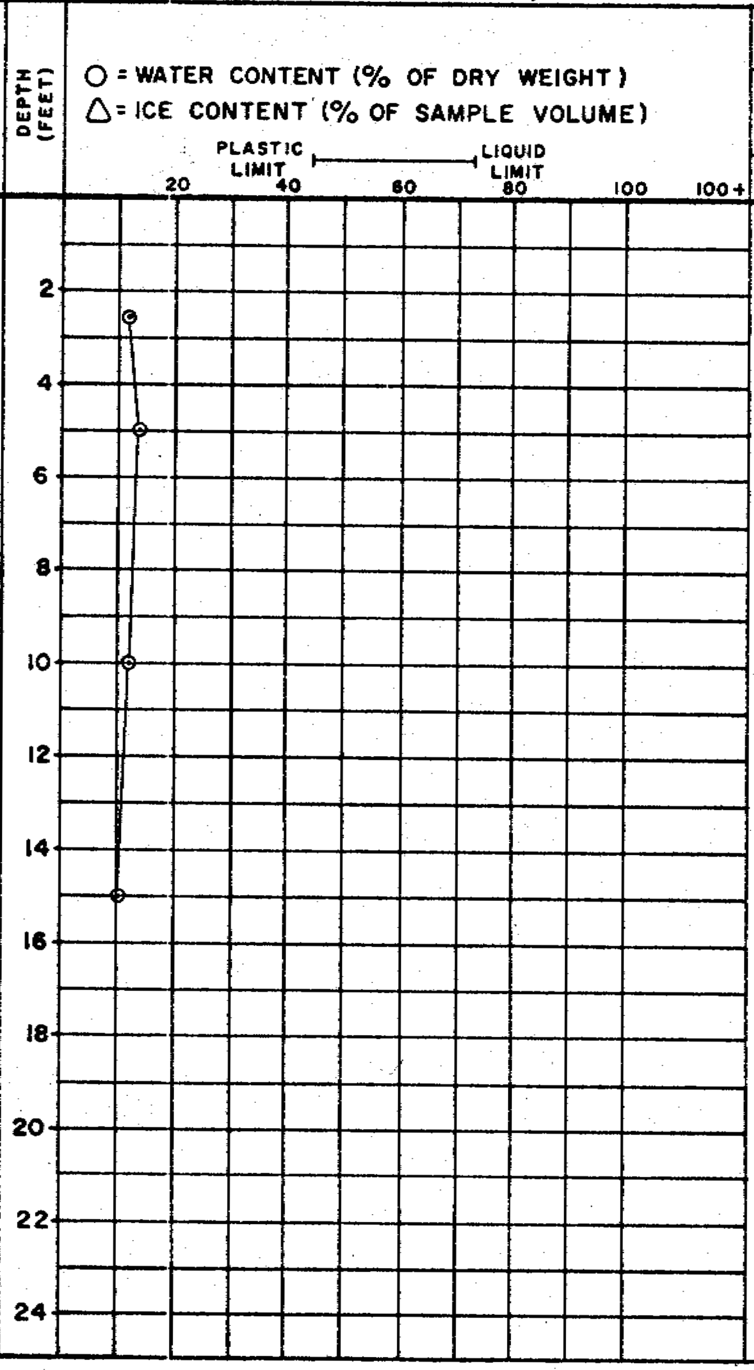
## DRILL HOLE REPORT

## DEPARTMENT OF PUBLIC WORKS, CANADA
## MACKENZIE HIGHWAY

| | | | | | |
|---|---|---|---|---|---|
| DWN: ALB | FIELD ENG: NRM | DATE DRILLED 22/2/73 | AIRPHOTO NO: A22860 - 117 | CHAINAGE: | OFFSET |
| CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Good | VEGETATION: Black Spruce | ELEV: |

| TEST HOLE BA 69 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 667 | B | 9 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | CLAY-SILT<br>(TILL) - With Med. to Coarse Sand<br>- Some Gravel<br>- Low Plasticity | F | NB |
| 2 | 1 | | | | | | | |
| 4 | 2 | | | | CL | | | |
| 6 | | | | | | | | |
| 8 | | | | | | | | |
| 10 | 3 | | | | | | | |
| 12 | | | | | | | U | Unfrozen |
| 14 | 4 | | | | | - Grey | | |
| 16 | | | | | | END OF HOLE 15' | | |
| 18 | | | | | | | | |
| 20 | | | | | | | | |
| 22 | | | | | | | | |
| 24 | | | | | | | | |



| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY | SILT | SAND | GRAVEL | | | |
| % | % | % | % | | | |

**E.W. BROOKER & ASSOCIATES LTD.**

# DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

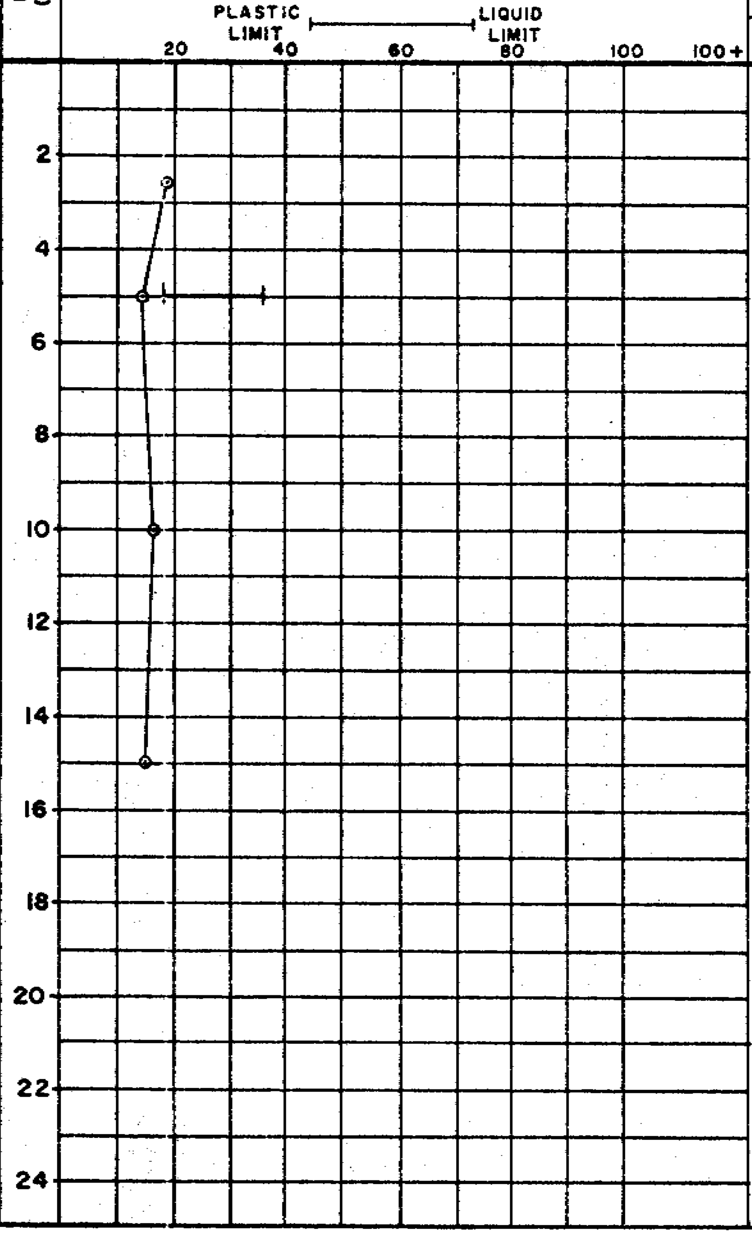
DWN: ALB
CKD:
FIELD ENG. NRM
TECH: DC
DATE DRILLED 22/2/73
RIG: Texoma
AIRPHOTO NO: A22860 - 117
SURFACE DRAINAGE: Good
CHAINAGE:
VEGETATION: Black Spruce
OFFSET
ELEV:

TEST HOLE BA 69

| MILE | B,C,S | NUMBER |
|---|---|---|
| 667 | B | 10 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | | | | | CLAY SILT - Clayey, Low Plasticity, Dk. Grey-Brown, Some Sand | F | NB | | | | | | | |
| 4 | 2 | | | | CL to CI | - Clay silt, some sand; med. plasticity. | | | 24 | 66 | 10 | - | | | |
| 10 | 3 | | | | | | U | Unfrozen | | | | | | | |
| 14 | 4 | | | | | | | | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | | | | | | | | |

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

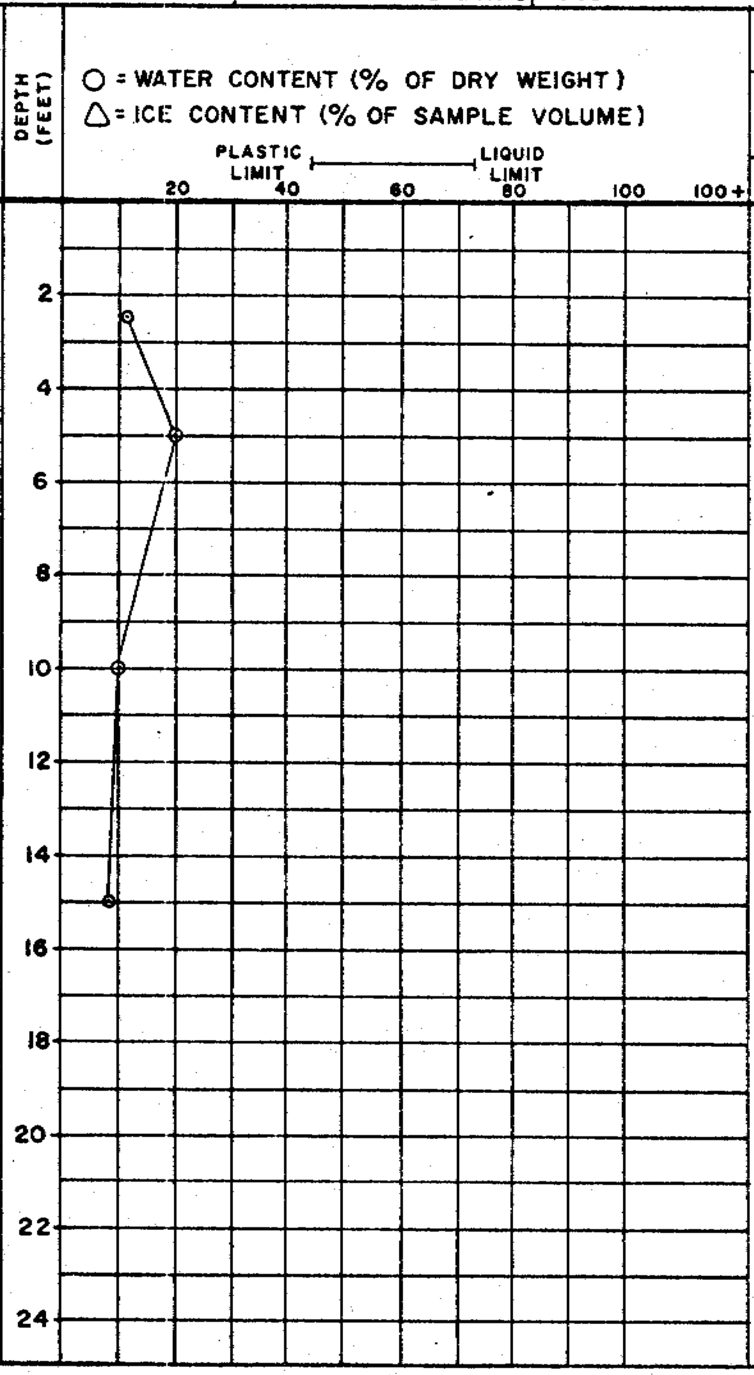


**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB | FIELD ENG: NRM | DATE DRILLED 22/2/73 | AIRPHOTO NO: A22860 - 117 | CHAINAGE: | OFFSET
CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Good | VEGETATION: Black Spruce | ELEV:

| TEST HOLE BA 68 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 667 | B | 11 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SAND - Silty, Fine | | | | | | | | | |
| 2 | 1 | ⧅ | | | | | | | | | | | | | |
| 4 | 2 | ⧅ | | | SM | | F | NB | | | | | | | |
| 6 | | | | | | | | | | | | | | | |
| 8 | | | | | | - Grey-Brown | | | | | | | | | |
| 10 | 3 | ⧅ | | | | | | | | | | | | | |
| 12 | | | | | | - Some Weathered Rock | U | Unfrozen | | | | | | | |
| 14 | 4 | ⧅ | | | | | | | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |



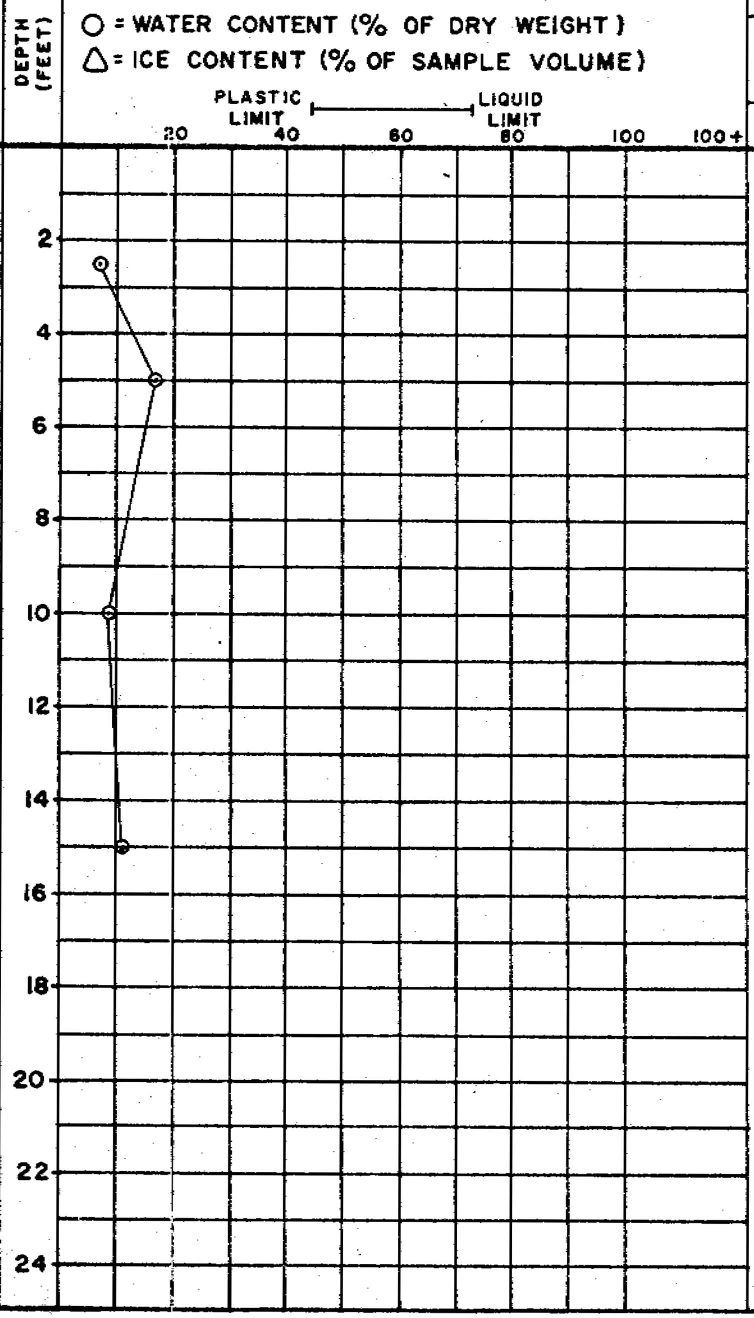
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB | FIELD ENG: NRM | DATE DRILLED 22/2/73 | AIRPHOTO NO: A22860 – 115 | CHAINAGE: | OFFSET

CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Fair | VEGETATION: Black Spruce – Birch | ELEV:

| TEST HOLE | | BA 71 |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 666 | B | 1 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | ▨ | | | PT | PEAT – with black, sandstone, Weathered, Soft. | | | | | | | | | |
| 4<br>6<br>8<br>10<br>12<br>14 | 2<br>3<br>4 | ▨<br>▨<br>▨ | | | SM | SANDSTONE – Brown to Black, Silty, some clay, Weathered | F | NB | 12 | 37 | 51 | 0 | | | |
| 16<br>18<br>20<br>22<br>24 | | | | | | END OF HOLE 15' | | | | | | | | | |



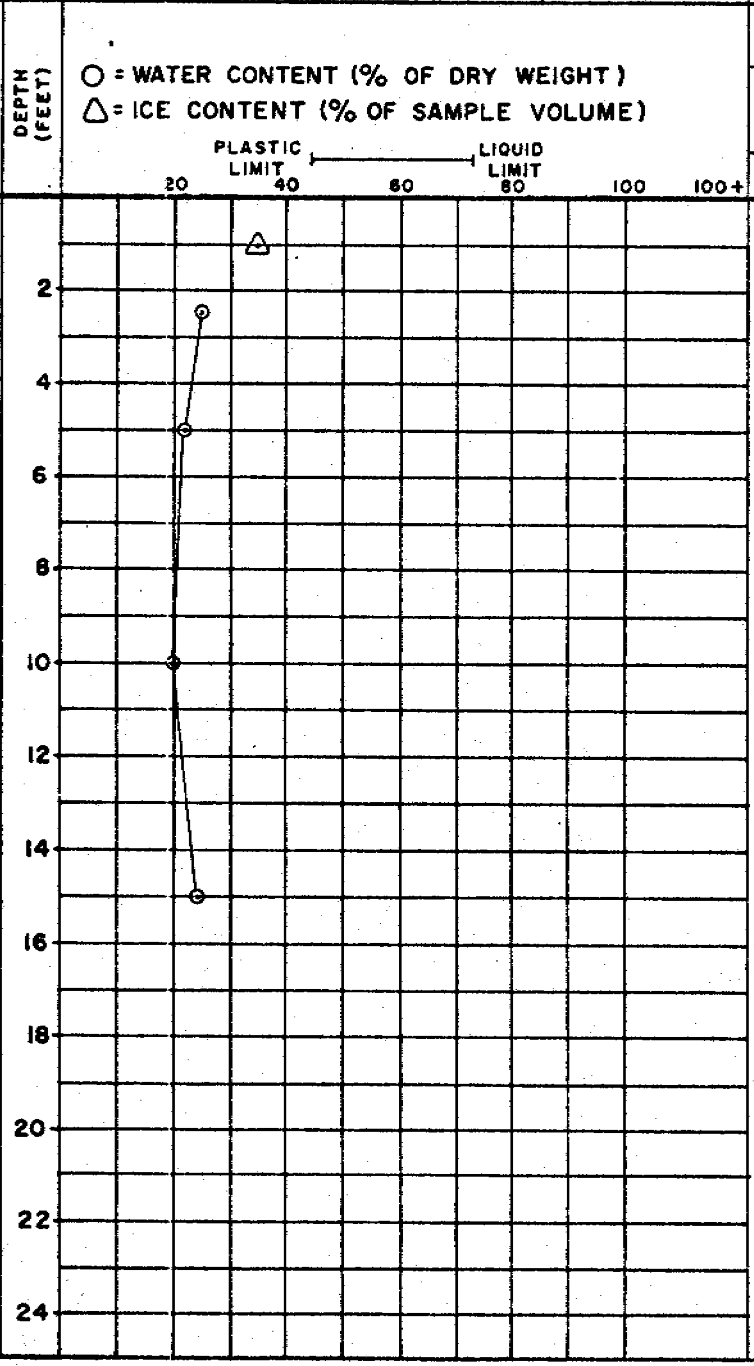
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
FIELD ENG: NRM
DATE DRILLED 22/2/73
AIRPHOTO NO: A22860 - 115
CHAINAGE:
OFFSET
CKD: LAB
TECH: DC
RIG: Texoma
SURFACE DRAINAGE: Good
VEGETATION: Black Spruce - Birch
ELEV:

TEST HOLE BA 71

| MILE | B,C,S | NUMBER |
|---|---|---|
| 666 | B | 2 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 2 | 1 | ▧ | | | CL-ML | CLAY - Grey-Brown With<br>SILT Coarse Sand &<br>Some Gravel | F | V<br>30 - 40% |
| 4 | 2 | ▧ | | | ML | SILT - Sandy, Clayey<br>(TILL) With Fine Gravel,<br>Brown, Non-<br>Plastic | | NB |
| 10 | 3 | ▧ | | | | | | |
| 14 | 4 | ▧ | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | |



| GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| | | | | | | |

**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

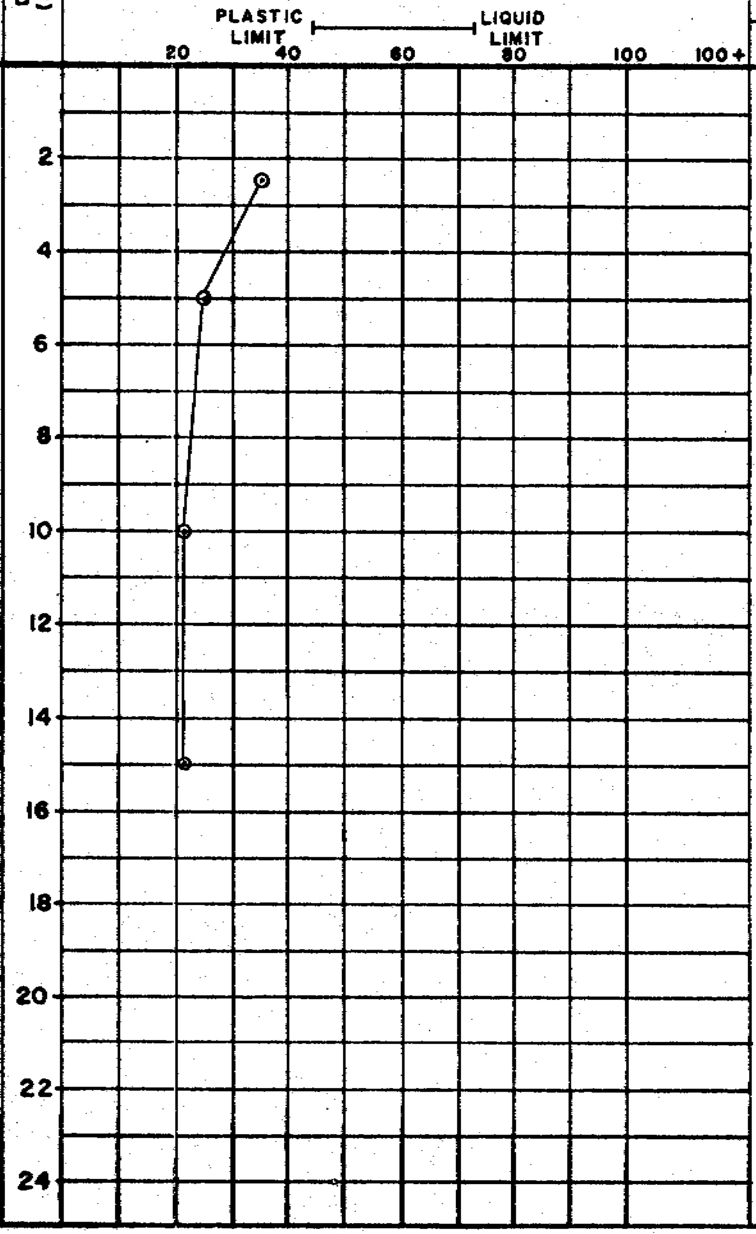
DWN: ALB
FIELD ENG: NRM
DATE DRILLED 22/2/73
AIRPHOTO NO: A22860 - 115
CHAINAGE:
OFFSET
CKD: LAB
TECH: DC
RIG: Texoma
SURFACE DRAINAGE: Fair
VEGETATION: Black Spruce - Birch
ELEV:

TEST HOLE BA 71

| MILE | B,C,S | NUMBER |
|---|---|---|
| 666 | B | 3 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 2 | 1 | | | | CL | CLAY SILT (TILL) - Grey-Brown, Low Plastic, Some Med Sand | | |
| 4 | 2 | | | | | | | |
| 6 | | | | | | | F | NB |
| 8 | | | | | | - Low Plasticity | | |
| 10 | 3 | | | | | | | |
| 12 | | | | | | - Low Plasticity | | |
| 14 | 4 | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | |
| 18 | | | | | | | | |
| 20 | | | | | | | | |
| 22 | | | | | | | | |
| 24 | | | | | | | | |

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY % | SILT % | SAND % | GRAVEL % | | | |

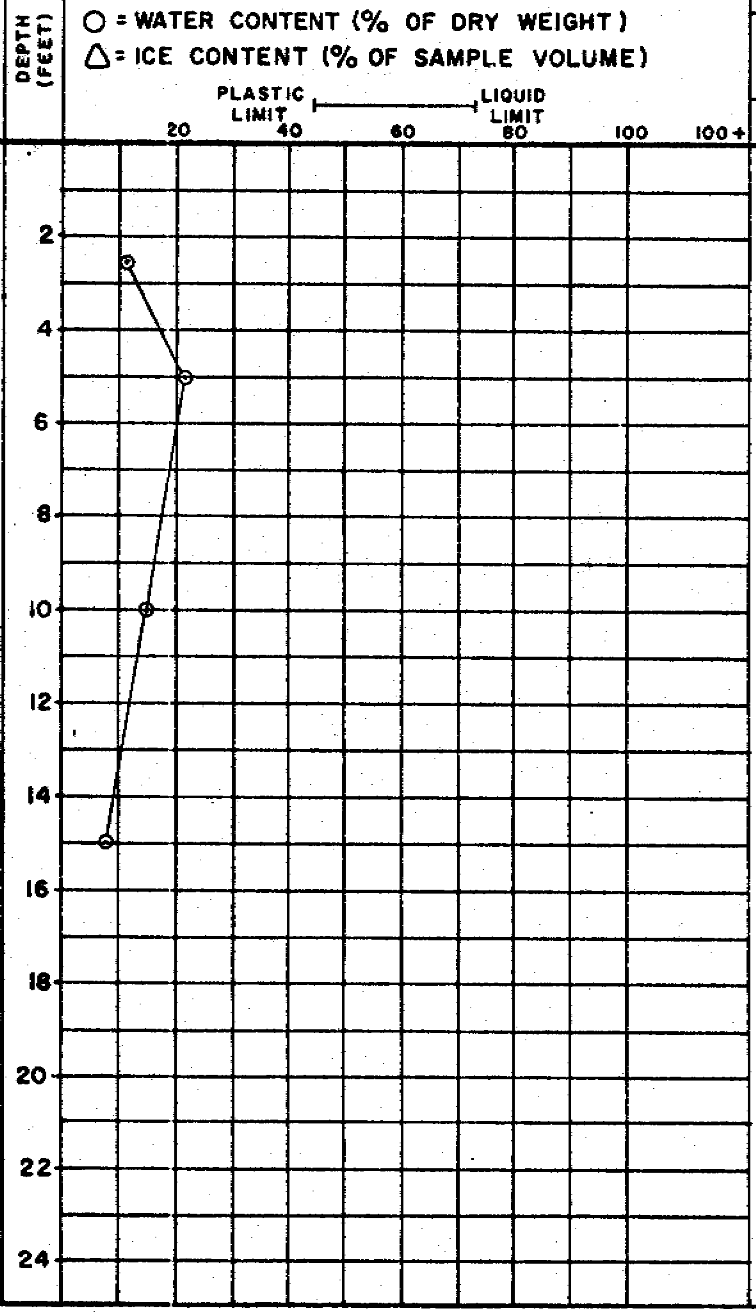
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 22/2/73
RIG: Texoma
AIRPHOTO NO: A22860 - 115
SURFACE DRAINAGE: Good
CHAINAGE:
OFFSET
VEGETATION: Black Spruce - Birch
ELEV:

TEST HOLE BA 71

| MILE | B,C,S | NUMBER |
|---|---|---|
| 666 | B | 4 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SILT - Brown, Trace of Clay | F | NB | | | | | | | |
| 2 | 1 | | | | ML | | | | | | | | | | |
| 4 | 2 | | | | | - Trace of Med. Sand | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | |
| 10 | 3 | | | | CL | CLAY (TILL) - Grey-Brown, Silty, Pebbles | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | |
| 14 | 4 | | | | | - Grey | | | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |



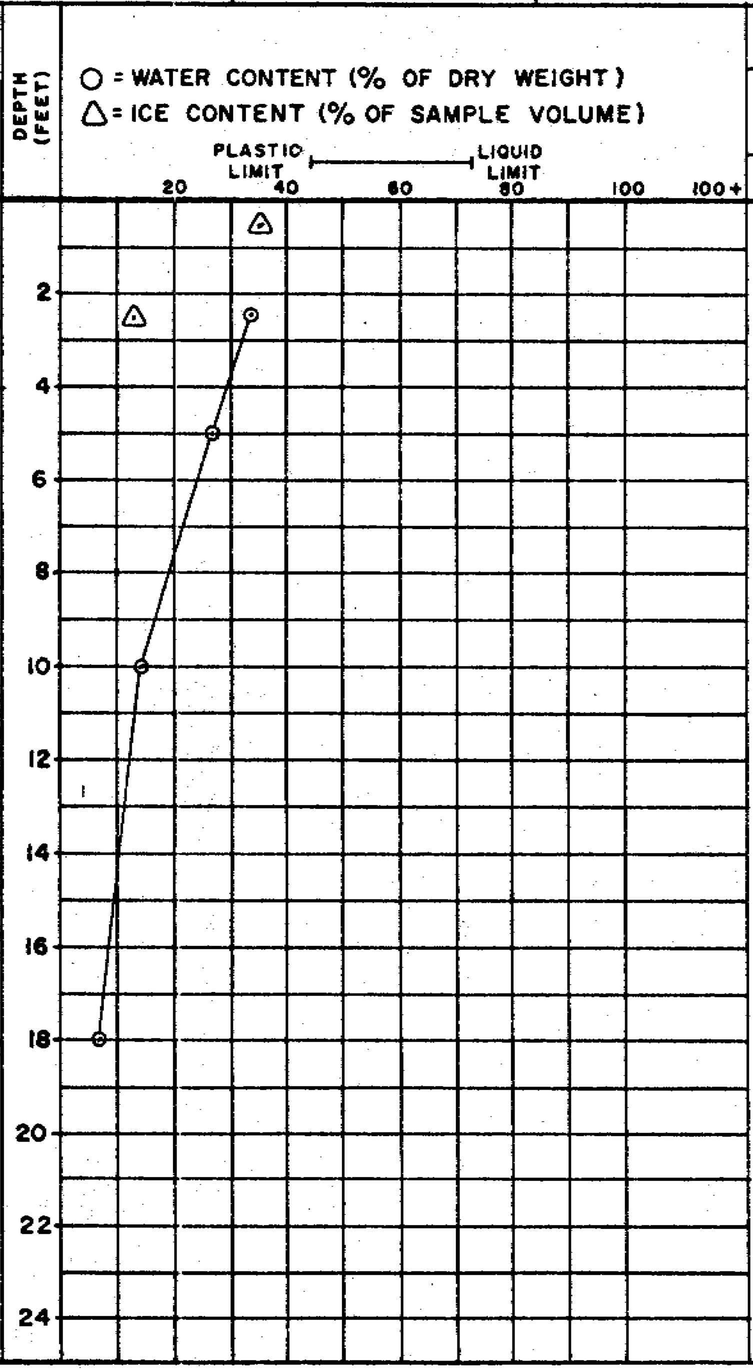
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: JK
DATE DRILLED 24/2/73
RIG: Mayhew
AIRPHOTO NO: A22774 - 63
SURFACE DRAINAGE: Fair to NE
CHAINAGE: 3158 + 50
VEGETATION: Black Spruce
OFFSET
ELEV:

TEST HOLE BA 72

| MILE | B,C,S | NUMBER |
|---|---|---|
| 664 | B | 1 |

| SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PT | PEAT - Black, Fibrous | | V 30 - 40% | | | | | | | |
| 1 | | | | CL | CLAY - Med. Brown<br>- Silty<br>- Low Plasticity | | V 10 - 15% | | | | | | | |
| 2 | | | | ML | SILT - Med. Brown<br>- Trace of Clay @ 5'<br>- Fine<br>- Dense<br>- Uniform<br>- Sandy<br>- Grey<br>- Rock Fragments from 9 - 12' | F | NB | | | | | | | |
| 3 | | | | | | | | 11 | 58 | 31 | — | | | |
| 4 | | | | ML | SILT (TILL) - Grey<br>- Low Plasticity<br>- Some Clay | | | | | | | | | |
| | | | | | END OF HOLE 18' | | | | | | | | | |



**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

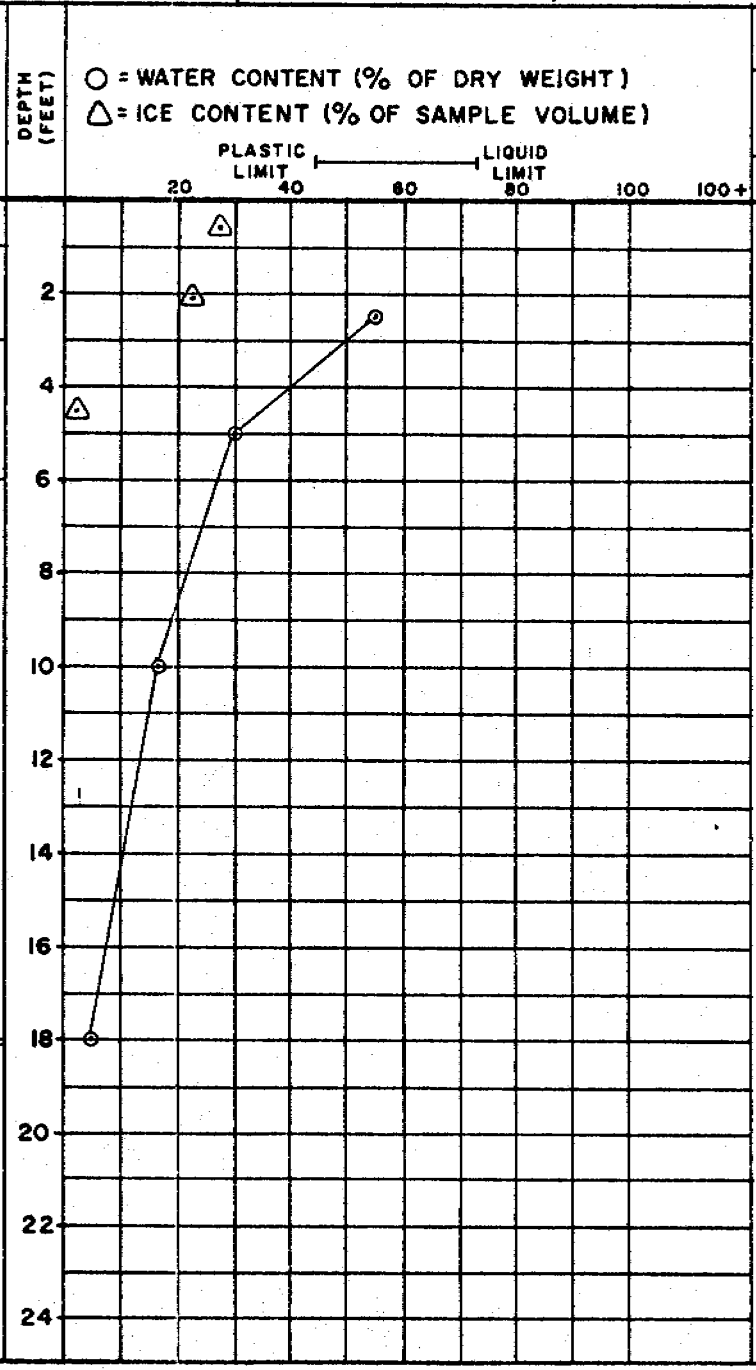
DWN: ALB | FIELD ENG: NRM | DATE DRILLED 24/2/73 | AIRPHOTO NO: A22774 - 63 | CHAINAGE: 3158 + 50 | OFFSET

CKD: LAB | TECH: JK | RIG: Mayhew | SURFACE DRAINAGE: Fair to NE | VEGETATION: Black Spruce | ELEV:

TEST HOLE BA 72

| MILE | B,C,S | NUMBER |
|---|---|---|
| 664 | B | 2 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| | | | | | PT | PEAT - Black, Fibrous | | V 25-30% |
| 2 | 1 | | | | ML | SILT - Med. Brown<br>- Clayey<br>- Low Plasticity | | V 20-25% |
| 4 | 2 | | | | CL | CLAY - Med. Brown<br>- Silty<br>- Med. Plasticity | | V 0 - 5% |
| 8 | | | | | ML | SILT (TILL) - Med. Brown<br>- Clayey<br>- Sandy<br>- Low Plasticity | F | NB |
| 10 | 3 | | | | | | | |
| 12 | | | | | | - Grey | | |
| 16 | | | | | | - Gravelly | | |
| 18 | 4 | | | | | | | |
| | | | | | | END OF HOLE 18' | | |



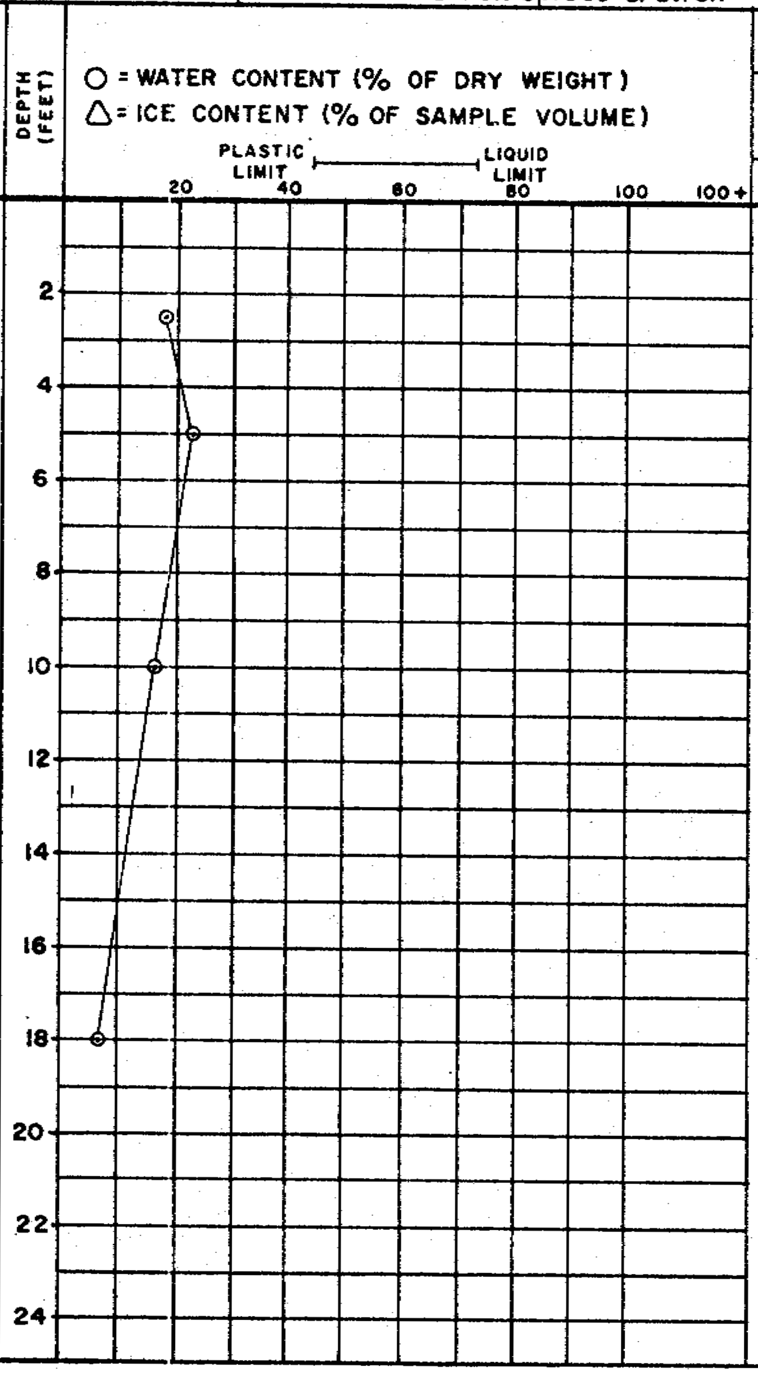
| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY % | SILT % | SAND % | GRAVEL % | | | |

**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: JK
DATE DRILLED 24/2/73
RIG: Mayhew
AIRPHOTO NO: A22774 - 61
SURFACE DRAINAGE: Poor
CHAINAGE: 3189 + 75
VEGETATION: Black Spruce & Birch
OFFSET
ELEV:

| TEST HOLE BA 73A | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 664 | B | 3 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| | 1 | | | | ML | SILT - Med. Brown<br>- Low Plasticity<br>- Clayey<br>- Trace of Sand | F | |
| | 2 | | | | SC | SAND - Med. Brown<br>- Medium<br>- Silty, Clayey<br>- Dense | | |
| | 3<br>4 | | | | CL | CLAY (TILL) - Med. Brown<br>- Silty, Gravelly<br>- Low Plasticity | | NB |
| | | | | | | END OF HOLE 18' | | |



| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY | SILT | SAND | GRAVEL | | | |
| % | % | % | % | | | |

# E.W. BROOKER & ASSOCIATES LTD.

## DRILL HOLE REPORT

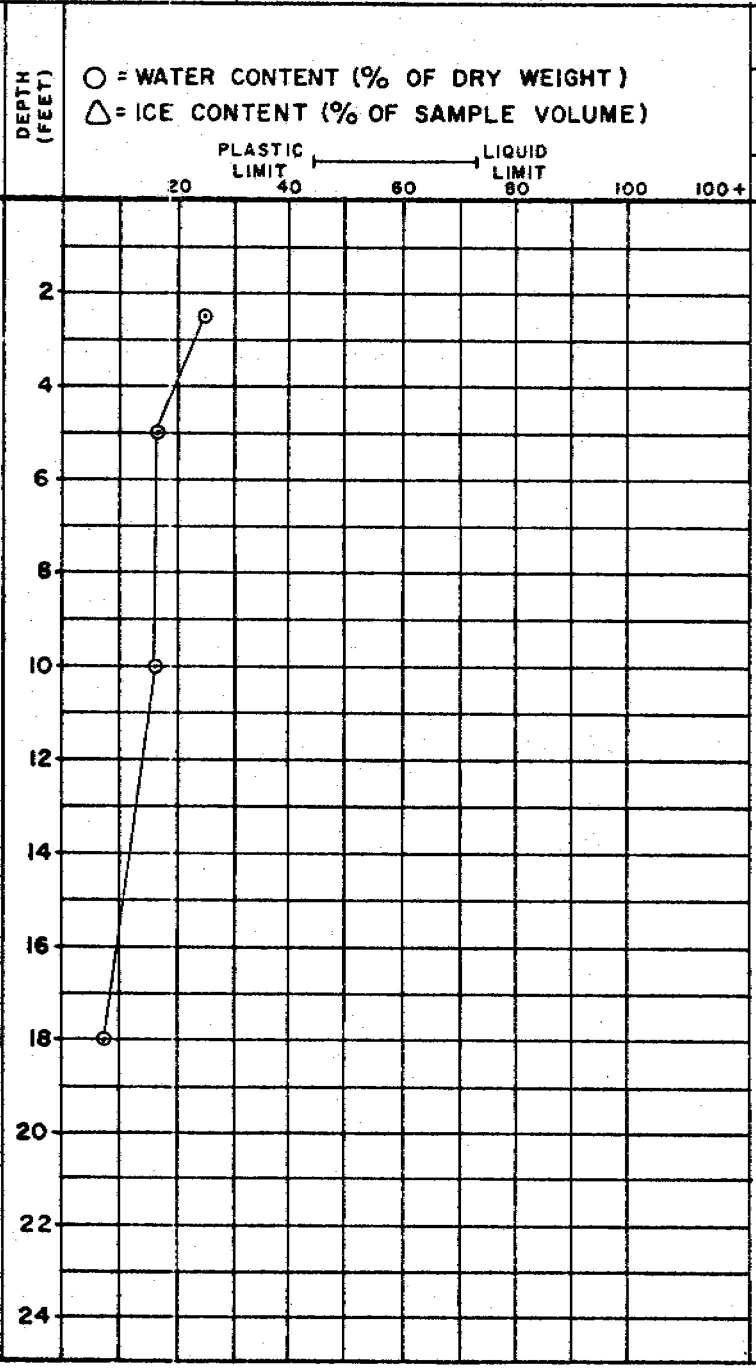
## DEPARTMENT OF PUBLIC WORKS, CANADA
## MACKENZIE HIGHWAY

| | | | | | |
|---|---|---|---|---|---|
| DWN: ALB | FIELD ENG: NRM | DATE DRILLED 24/2/73 | AIRPHOTO NO: A22774 - 61 | CHAINAGE: 3189 + 75 | OFFSET |
| CKD: LAB | TECH: JK | RIG: Mayhew | SURFACE DRAINAGE: Poor | VEGETATION: Black Spruce & Birch | ELEV: |

TEST HOLE BA 73A

| MILE | B,C,S | NUMBER |
|---|---|---|
| 664 | B | 4 |

| SAMPLE NUMBER | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|
| 1 | ML | SILT - Med. Brown<br>- Low Plasticity<br>- Some Clay, Fine Sandy | | |
| 2<br>3<br>4 | ML | SILT (TILL) - Med. Brown<br>- Low Plasticity<br>- Sandy<br>- Grey<br>- Trace of Course Sand | F | NB |
| | | END OF HOLE 18' | | |



| GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| | | | | | | |

# E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT

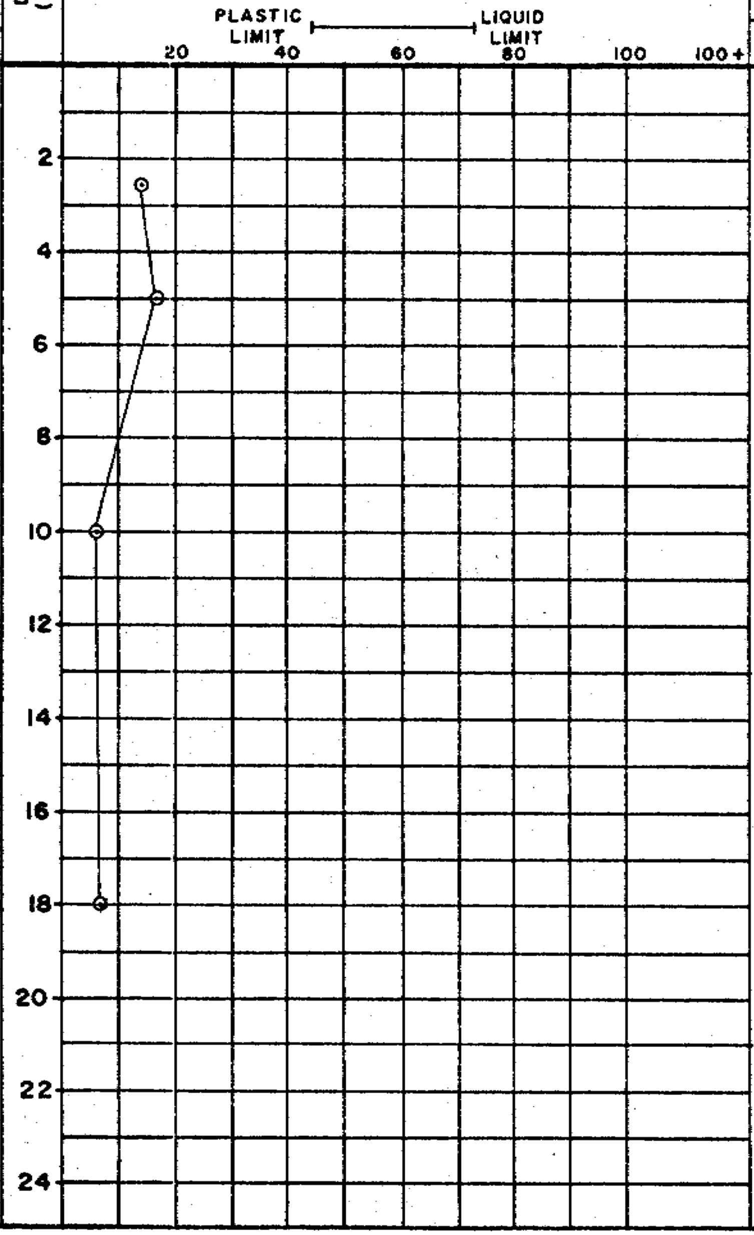
## DEPARTMENT OF PUBLIC WORKS, CANADA
## MACKENZIE HIGHWAY

| | | | | | |
|---|---|---|---|---|---|
| DWN: ALB | FIELD ENG: NRM | DATE DRILLED 24/2/73 | AIRPHOTO NO: A22774 – 61 | CHAINAGE: 3189 + 50 | OFFSET |
| CKD: LAB | TECH: JK | RIG: Mayhew | SURFACE DRAINAGE: Fair to N | VEGETATION: Black Spruce & Birch | ELEV: |

| TEST HOLE | | BA 73A |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 664 | B | 5 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | | | | CL | CLAY (TILL) – Med. Brown – Low Plasticity, Silty | | NF to NB | | | | | | | |
| 4 | 2 | | | | ML-SM | SILT SAND (TILL) – Med. Brown – Silty – Low Plasticity – Some Clay – Limestone Chips | F | | | | | | | | |
| 10 | 3 | | | | | – Shaley, Clayey | | | 10 | 46 | 44 | – | | | Sample may not be representative. |
| 16 | 4 | | | | SW | SAND – Grey – Dense, Gravelly – Some Silt, Coarse | | | | | | | | | |
| 18 | | | | | | END OF HOLE 18' | | | | | | | | | |

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



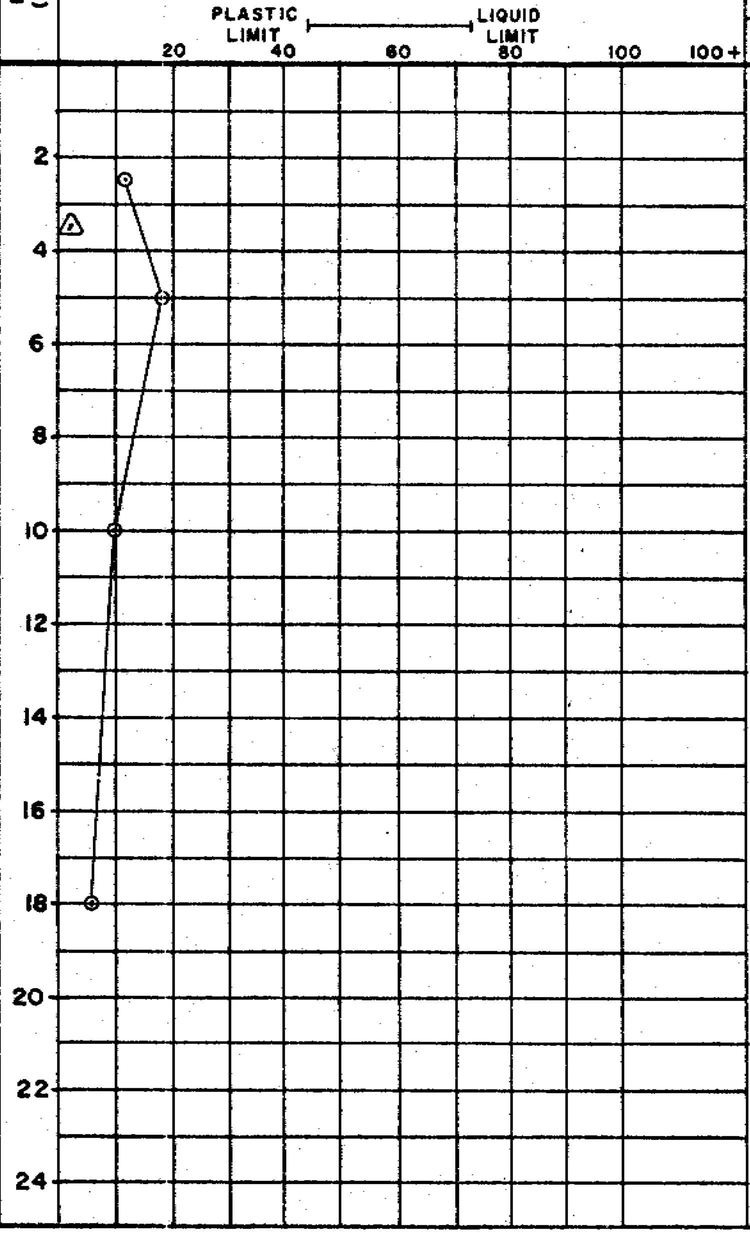
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB | FIELD ENG: NRM | DATE DRILLED: 24/2/73 | AIRPHOTO NO: A22774 - 61 | CHAINAGE: 3189 + 50 | OFFSET
CKD: LAB | TECH: JK | RIG: Mayhew | SURFACE DRAINAGE: Poor | VEGETATION: Black Spruce | ELEV:

| TEST HOLE BA 73B | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 664 | B | 6 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | | | | CL | CLAY (TILL) - Med. Brown<br>- Silty<br>- Low Plasticity<br>- Some Sand | | V 0 - 5% | | | | | | | |
| 4 | 2 | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | |
| 8 | | | | | | SILT (TILL) - Med. Brown<br>- Clayey | F | | | | | | | | |
| 10 | 3 | | | | ML | - Sandy<br>- Trace of Gravel | | | 20 | 56 | 19 | 5 | | | |
| 12 | | | | | | | | NB | | | | | | | |
| 14 | | | | | | - Grey<br>- Shaley | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | |
| 18 | 4 | | | | | END OF HOLE 18' | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

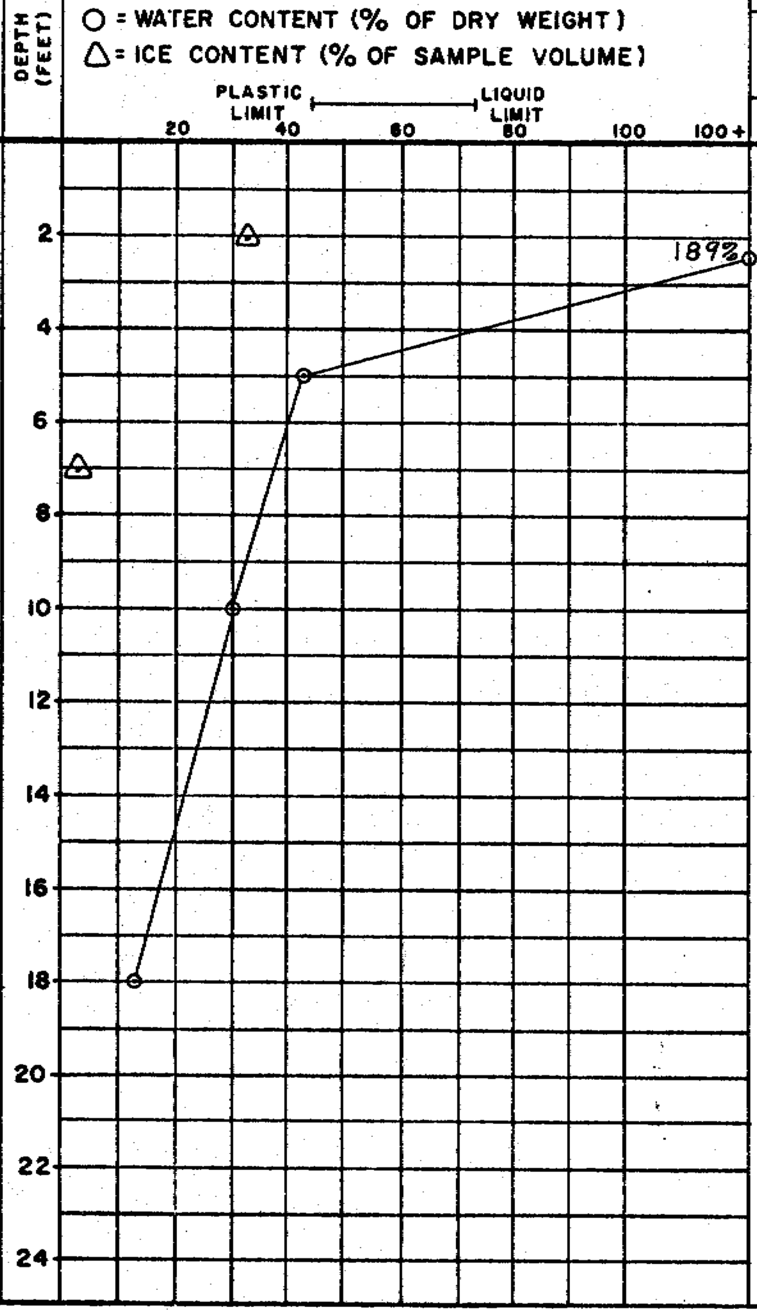


**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

| | | | | | | |
|---|---|---|---|---|---|---|
| DWN: ALB | FIELD ENG: NRM | DATE DRILLED 24/2/73 | AIRPHOTO NO: A22774 - 61 | CHAINAGE: 3189 + 50 | OFFSET | TEST HOLE BA 73B |
| CKD: LAB | TECH: JK | RIG: Mayhew | SURFACE DRAINAGE: Poor | VEGETATION: Black Spruce | ELEV: | |

| MILE | B,C,S | NUMBER |
|---|---|---|
| 664 | B | 7 |

| SAMPLE NUMBER | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | REMARKS |
|---|---|---|---|---|---|
| 1 | PT | PEAT - Black<br>- Fibrous<br>- Silty | | V<br>30 - 35% | |
| 2<br>3 | CL | CLAY (TILL) - Med. Brown<br>- Silty<br>- Low Plasticity<br>- Some Gravel | F | V 0-5% | |
| 4 | ML | SILT (TILL) - Grey<br>- Non-Plastic<br>- Some Shale | | NB | |
| | | END OF HOLE 18' | | | |



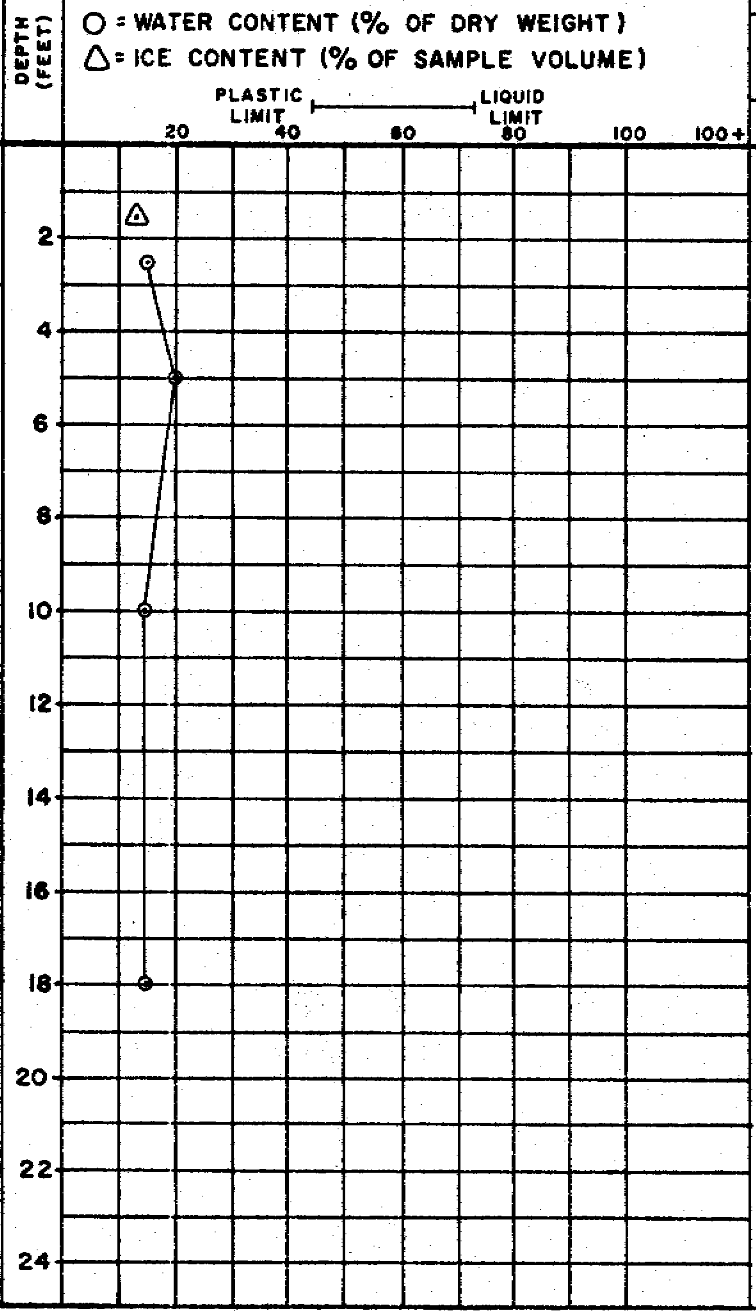
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

| | | | | | |
|---|---|---|---|---|---|
| DWN: ALB | FIELD ENG: NRM | DATE DRILLED 24/2/73 | AIRPHOTO NO: A22774 - 61 | CHAINAGE: 3189 + 50 | OFFSET |
| CKD: LAB | TECH: JK | RIG: Mayhew | SURFACE DRAINAGE: Poor | VEGETATION: Black Spruce | ELEV: |

TEST HOLE BA 73B

| MILE | B,C,S | NUMBER |
|---|---|---|
| 664 | B | 8 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | ▨ | | | PT | ORGANIC SILT<br>- With Peat<br>Black, Fibrous | F | V 10-15% | | | | | | | |
| 4 | 2 | ▨ | | | CL | CLAY (TILL) - Med. Brown<br>- Silty<br>- Some Fine Sand<br>- Low Plasticity | | NB | | | | | | | |
| 10 | 3 | ▨ | | | | - Grey | | | | | | | | | |
| 14 | | | | | ML | SILT - Grey<br>- Some Clay<br>- Low Plasticity<br>- Weathered Shale | | | | | | | | | |
| 18 | 4 | ▨ | | | | | | | | | | | | | |
| | | | | | | END OF HOLE 18' | | | | | | | | | |



**E.W. BROOKER & ASSOCIATES LTD.**

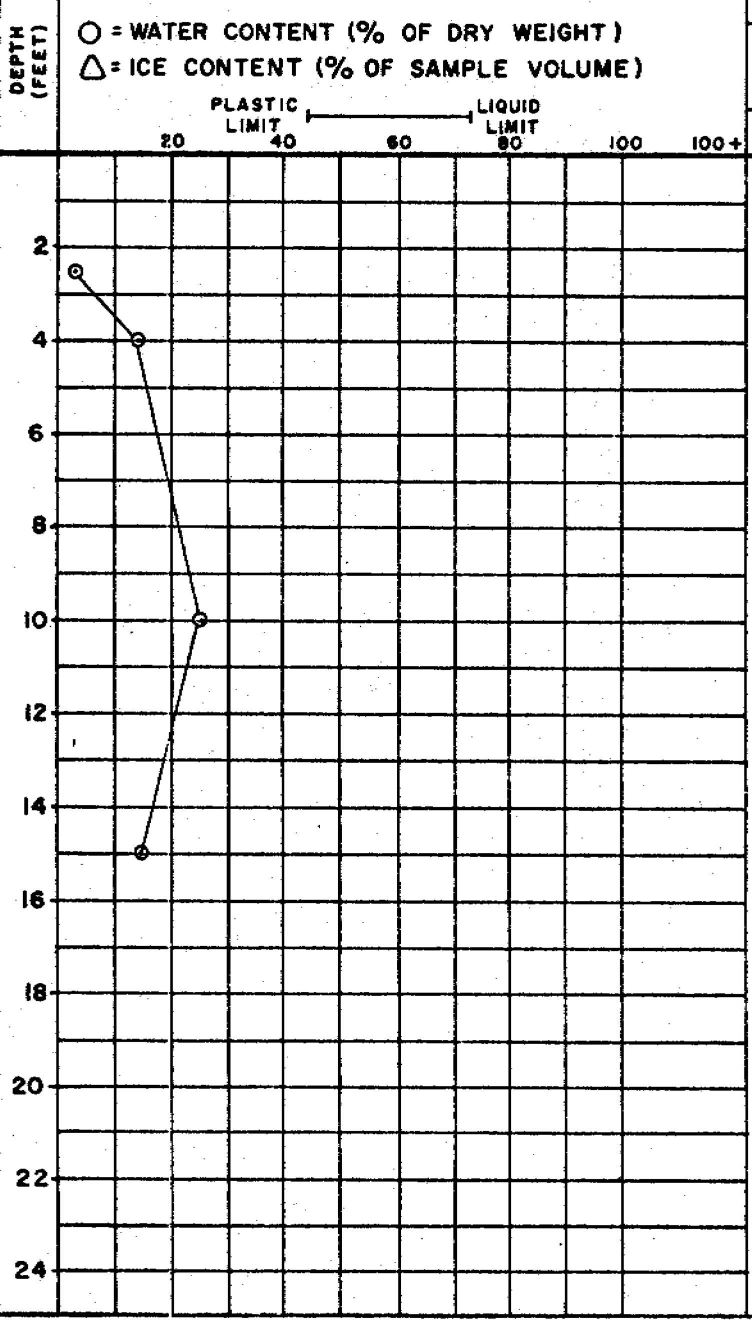
# DRILL HOLE REPORT

**DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 23/2/73
RIG: Texoma
AIRPHOTO NO: A22774-59
SURFACE DRAINAGE: Fair to Good
CHAINAGE:
VEGETATION: Black Spruce & Birch
OFFSET
ELEV:

| TEST HOLE BA 74 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 662 | B | 1 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | ▧ | | | SW | SAND - Light Brown<br>- Med. to Coarse<br>- Some small pebbles | | NF | | | | | | | Location -<br>85' Past 662-C-1 |
| 4 | 2 | ▧ | | | | - Fine to Medium | | | | | | | | | |
| 8 | | | | | | CLAY - Med. Brown<br>SILT - Trace of Coarse Sand | | | | | | | | | |
| 10 | 3 | ▧ | | | CL | - Med. Plasticity<br>- Grey | F | NB | | | | | | | |
| 14 | 4 | ▧ | | | | | | | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | | | | | | | | |



# E.W. BROOKER & ASSOCIATES LTD.

# DRILL HOLE REPORT

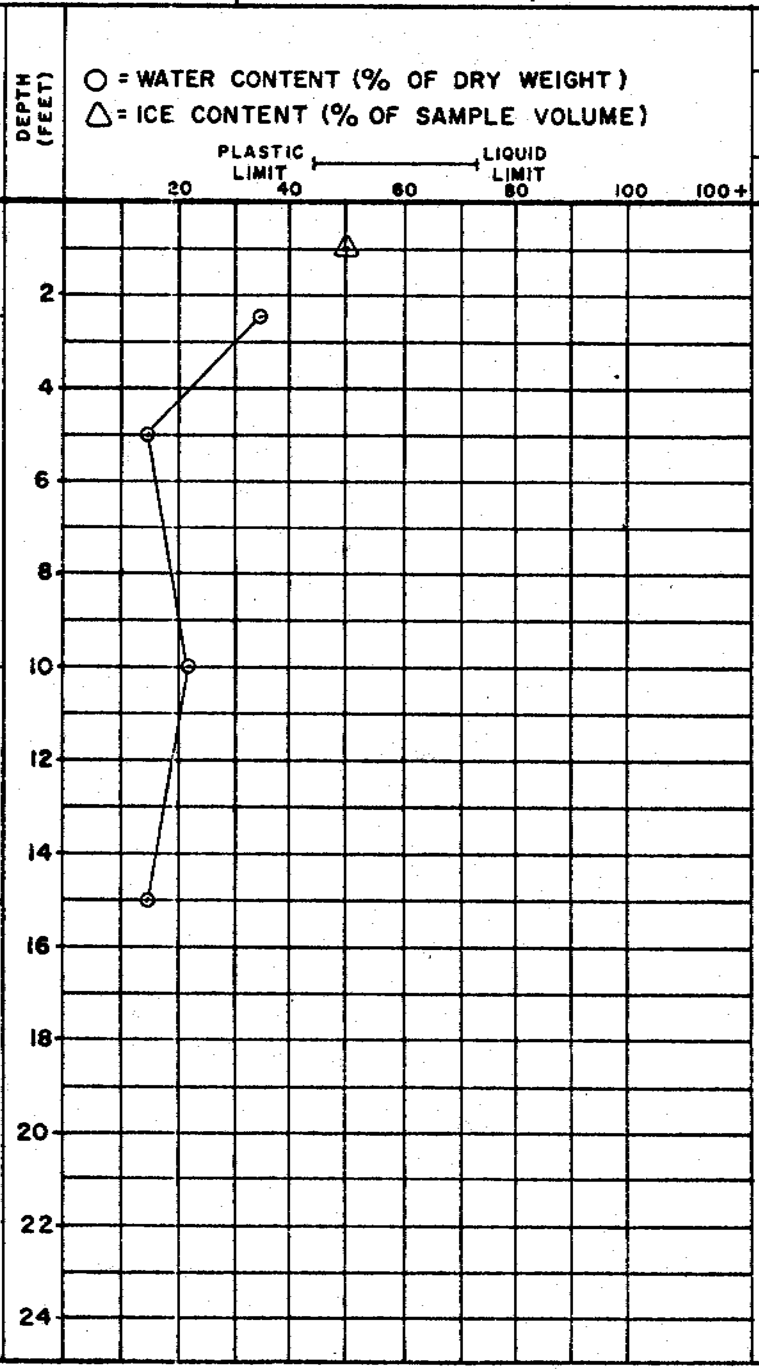
# DEPARTMENT OF PUBLIC WORKS, CANADA
# MACKENZIE HIGHWAY

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 23/2/73
RIG: Texoma
AIRPHOTO NO: A22774 - 59
SURFACE DRAINAGE: Fair - Good
CHAINAGE:
VEGETATION: Black Spruce & Birch
OFFSET
ELEV:

TEST HOLE BA 74

| MILE | B,C,S | NUMBER |
|---|---|---|
| 662 | B | 2 |

| SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|
| 1 | ◸ | | | SM | SILT- - Med. Brown<br>SAND - Fine to Coarse Sand | F | V.- 50% |
| 2 | ◸ | | | SM-GM | SAND - Brown<br>GRAVEL | | NF |
| 3 | ◸ | | | SM | SAND - Fine Sand<br>- Silty | | NB |
| 4 | ◸ | | | CL | CLAY - Low Plasticity<br>SILT - Grey<br>(TILL) | | |
| | | | | | END OF HOLE 15' | | |



| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY % | SILT % | SAND % | GRAVEL % | | | |

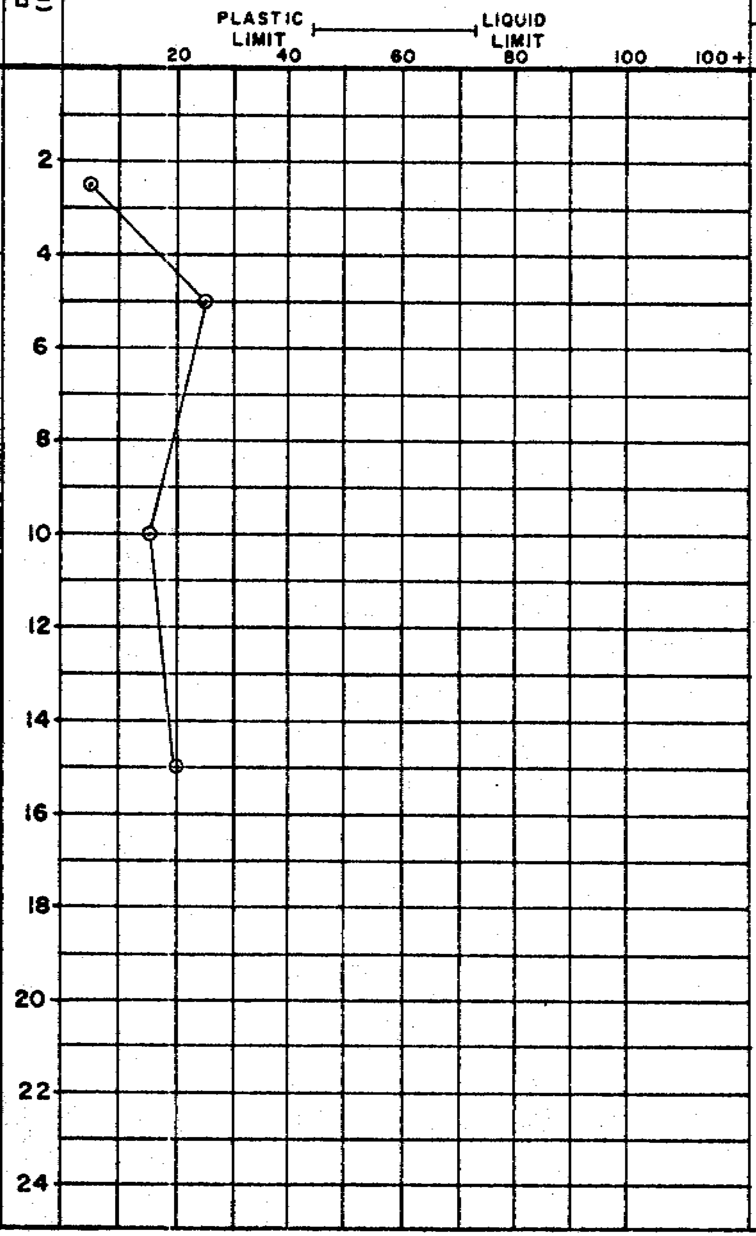
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 23/2/73
RIG: Texoma
AIRPHOTO NO: A22774 - 59
SURFACE DRAINAGE: Fair - Good
CHAINAGE:
VEGETATION: Black Spruce & Birch
OFFSET
ELEV:

| TEST HOLE BA 74 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 662 | B | 3 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 2 | 1 | | | | SW | SAND - Silty, Brown, Coarse, With Some Gravel | F | NF |
| 4 | 2 | | | | | SILT - Medium Brown With Coarse Sand | | |
| 6 | | | | | | | | |
| 8 | | | | | ML | | | |
| 10 | 3 | | | | | - Clayey, Low Plasticity | F | NB |
| 12 | | | | | | | | |
| 14 | 4 | | | | | - Low Plasticity | | |
| 16 | | | | | | END OF HOLE 15' | | |
| 18 | | | | | | | | |
| 20 | | | | | | | | |
| 22 | | | | | | | | |
| 24 | | | | | | | | |

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



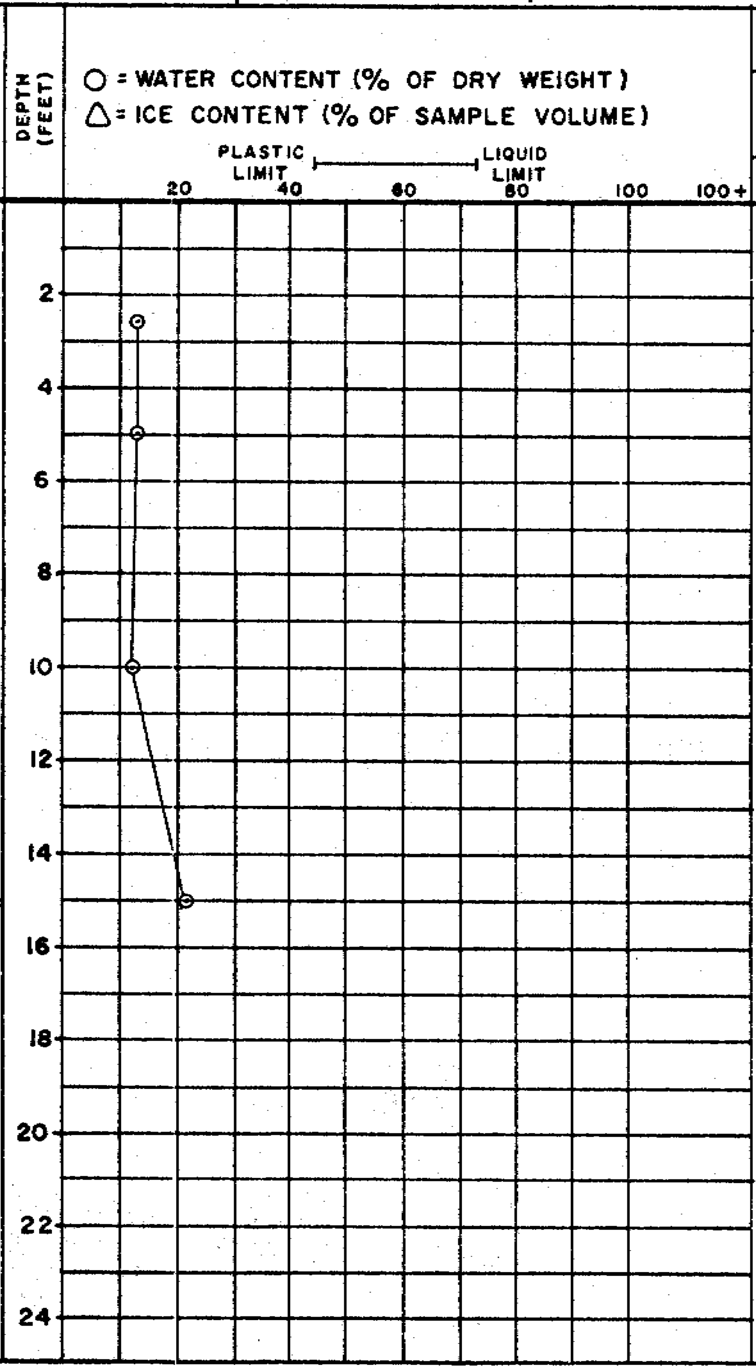
| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY | SILT | SAND | GRAVEL | | | |
| % | % | % | % | | | |

**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB | FIELD ENG: NRM | DATE DRILLED: 23/2/73 | AIRPHOTO NO: A22774 - 59 | CHAINAGE: | OFFSET
CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Fair to Good | VEGETATION: Black Spruce & Birch | ELEV:

| TEST HOLE BA 74 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 662 | B | 4 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SAND & GRAVEL - Coarse, Light Brown, Some Silt | | | | | | | | | |
| 2 | 1 | ◸ | | | | | | | | | | | | | |
| 4 | 2 | ◸ | | | SM-GM | | F | NF | - | 15 | 47 | 38 | | | |
| 10 | 3 | ◸ | | | | | | | | | | | | | |
| 14 | 4 | ◸ | | | ML | SILT - Grey-Brown | | | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | | | | | | | | |

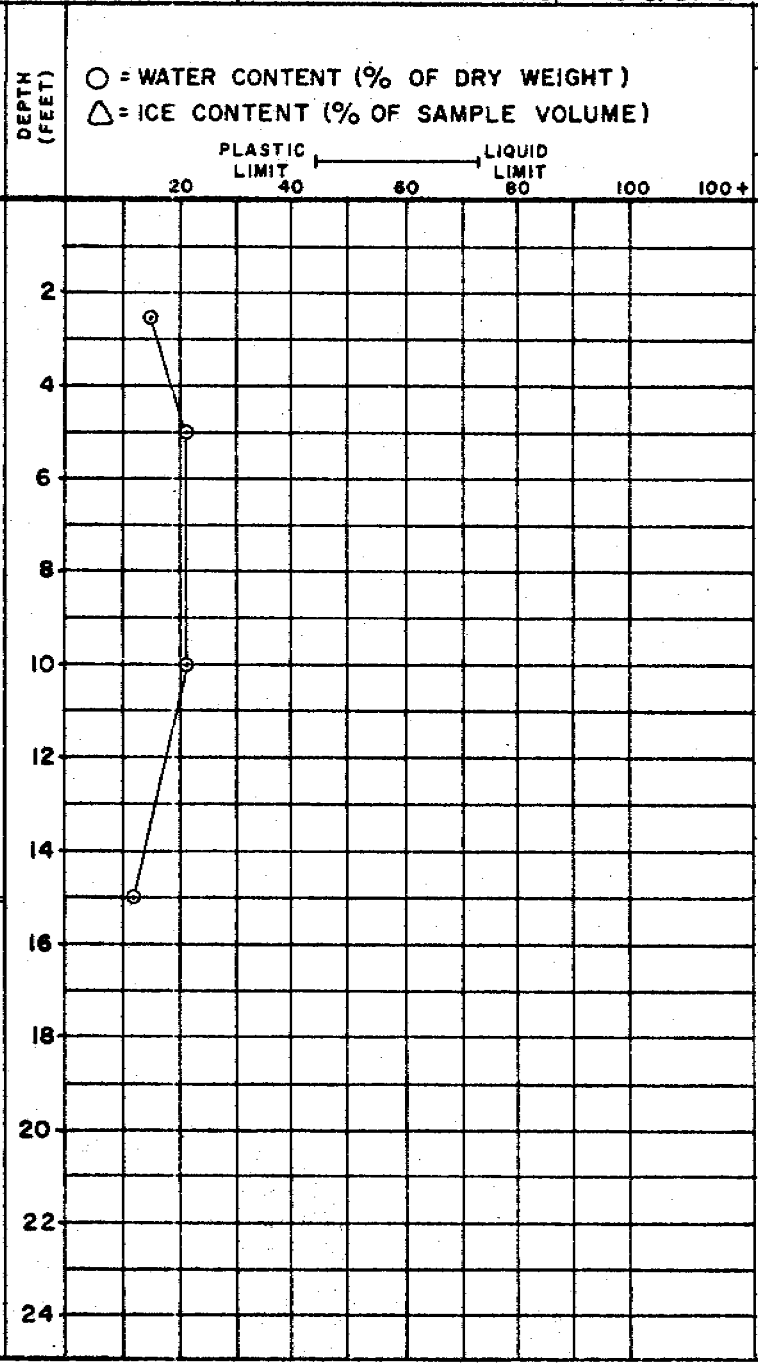


| E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA<br>MACKENZIE HIGHWAY |
|---|---|---|

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 23/2/73
RIG: Texoma
AIRPHOTO NO: A22774 - 59
SURFACE DRAINAGE: Fair
CHAINAGE:
OFFSET
VEGETATION: Black Spruce & Birch
ELEV:

| TEST HOLE BA 75 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 662 | B | 5 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | | | | SM | SAND - Silty, Coarse, Med. Brown, Trace of Clay | | | | | | | | | |
| 4 | 2 | | | | CL | CLAY - Silty With Some Med. Sand, Low Plasticity, Med. Brown | F | NB | | | | | | | |
| 10 | 3 | | | | SM | SAND - Silty, Fine, Trace of Clay, Med. Brown | | | | | | | | | |
| 14 | 4 | | | | ML | SILT - Trace of Clay, Low Plasticity | | | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | | | | | | | | |

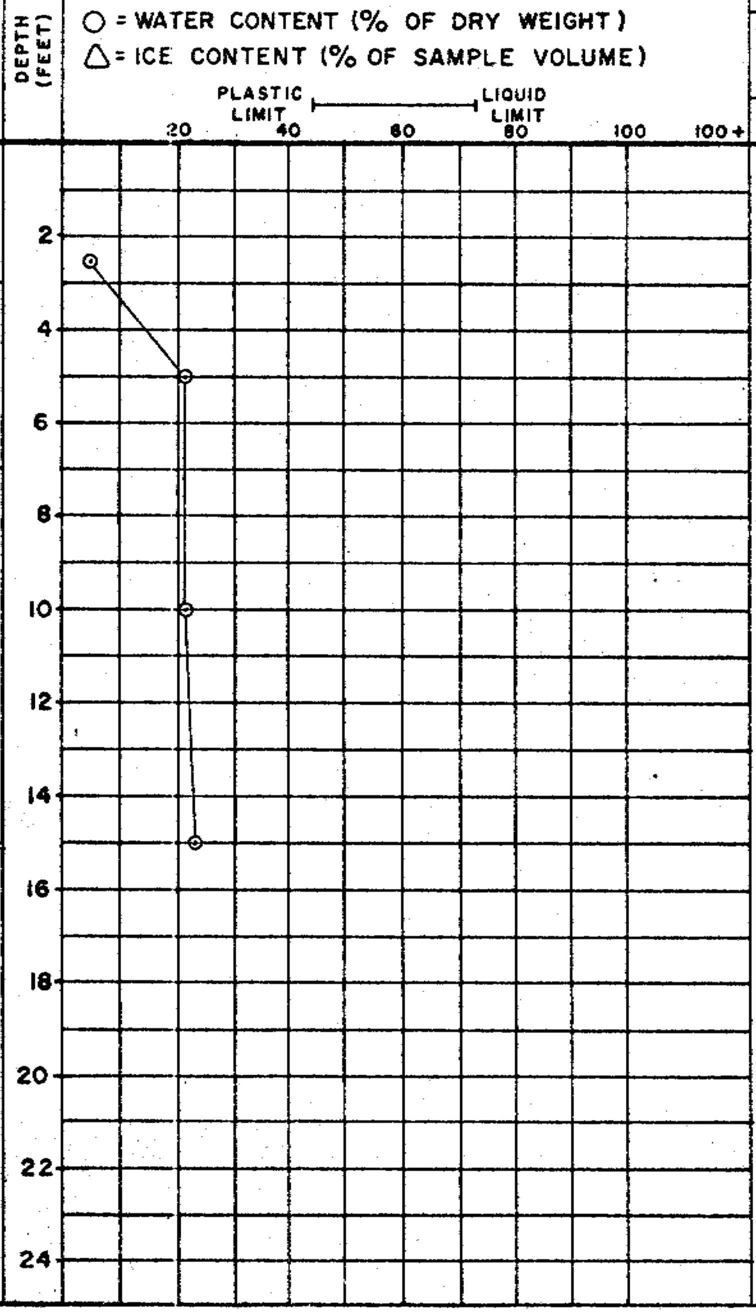


E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY

| | | | | | | |
|---|---|---|---|---|---|---|
| DWN: ALB | FIELD ENG: NRM | DATE DRILLED: 23/2/73 | AIRPHOTO NO: A22774 - 59 | CHAINAGE: | OFFSET | |
| CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Good | VEGETATION: Black Spruce & Birch | ELEV: | |

| TEST HOLE BA 75 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 662 | B | 6 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–3 | 1 | | | | GM | GRAVEL - Silty With Coarse Sand, Brown | F | NF | | | | | | | |
| 3–7 | 2 | | | | CL | CLAY - Silty, With Coarse Sand | | NB | | | | | | | |
| 7–15 | 3<br>4 | | | | SM | SAND - Silty, Medium Brown | F | NB to NF | | | | | | | |
| 15 | | | | | | END OF HOLE 15' | | | | | | | | | |



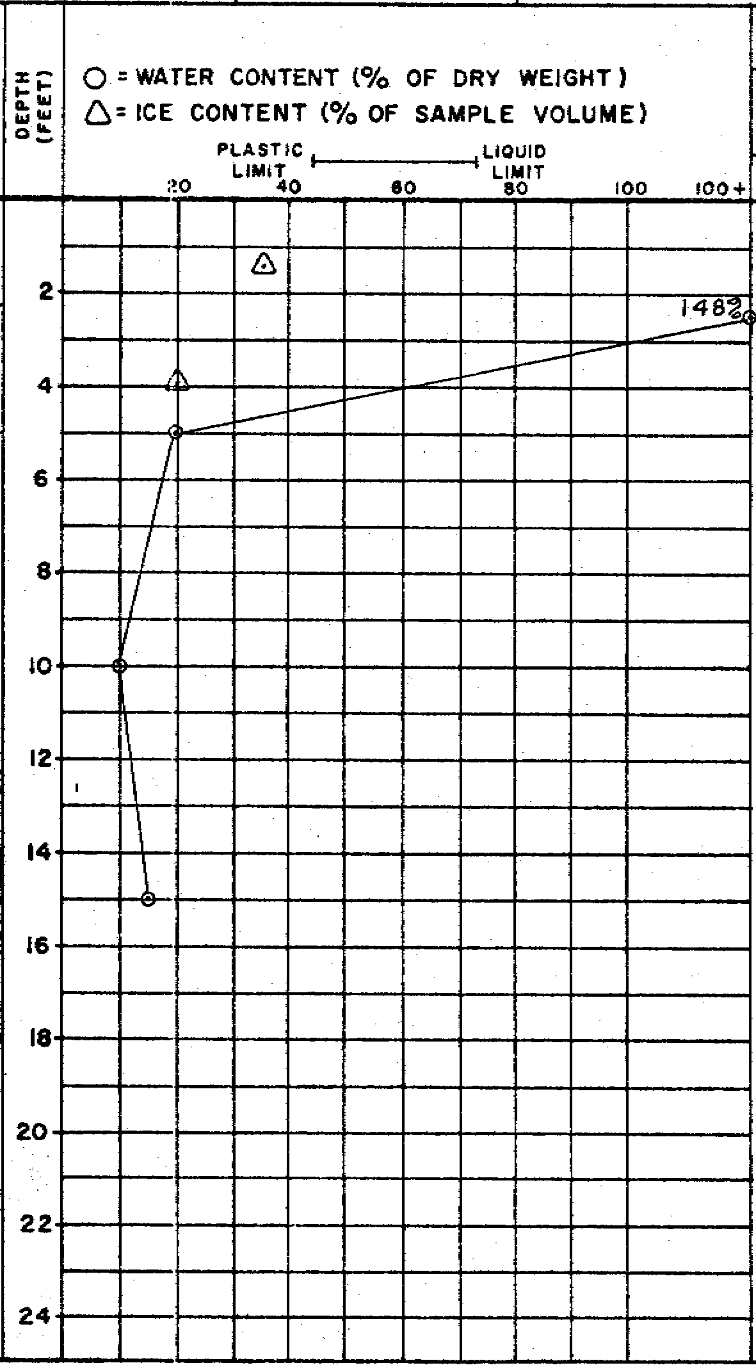
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 23/2/73
RIG: Texoma
AIRPHOTO NO: A22774 – 59
SURFACE DRAINAGE: Fair
CHAINAGE:
OFFSET
VEGETATION Black Spruce & Birch
ELEV:

TEST HOLE BA 75

| MILE | B,C,S | NUMBER |
|---|---|---|
| 662 | B | 7 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 – 5 | 1<br>2 | | | | OL | SILT – Organic, Black, Trace of Medium Sand | F | V - 35%<br>V - 20% | | | | | | | |
| 5 – 15 | 3<br>4 | | | | GW to GM | GRAVEL – Sandy (Coarse), Some Silt, Grey Brown. | U | Unfrozen | – | 13 | 20 | 67 | | | |
| | | | | | | END OF HOLE 15' | | | | | | | | | |



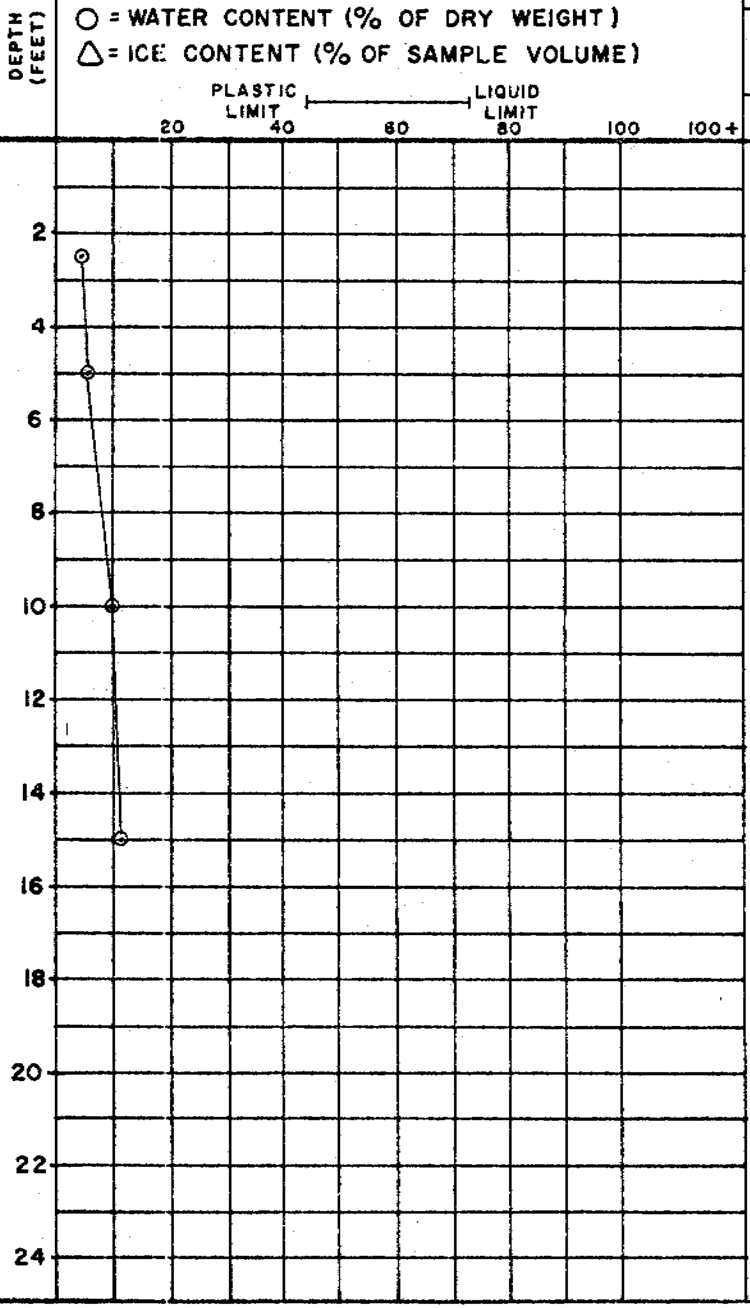
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB | FIELD ENG: NRM | DATE DRILLED: 23/2/73 | AIRPHOTO NO: A22774 - 59 | CHAINAGE: | OFFSET
CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Fair | VEGETATION: Black Spruce & Birch | ELEV:

TEST HOLE BA 75

| MILE | B,C,S | NUMBER |
|---|---|---|
| 662 | B | 8 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | ⧅ | | | GW | GRAVEL - With Coarse Sand, Brown | | | | | | | | | |
| 4–15 | 2<br>3<br>4 | ⧅<br>⧅<br>⧅ | | | CL | SILT CLAY (TILL) - Grey-Brown, With Gravel & Coarse Sand, Low Plastic | F | NB to NF | | | | | | | |
| 15 | | | | | | END OF HOLE 15' | | | | | | | | | |

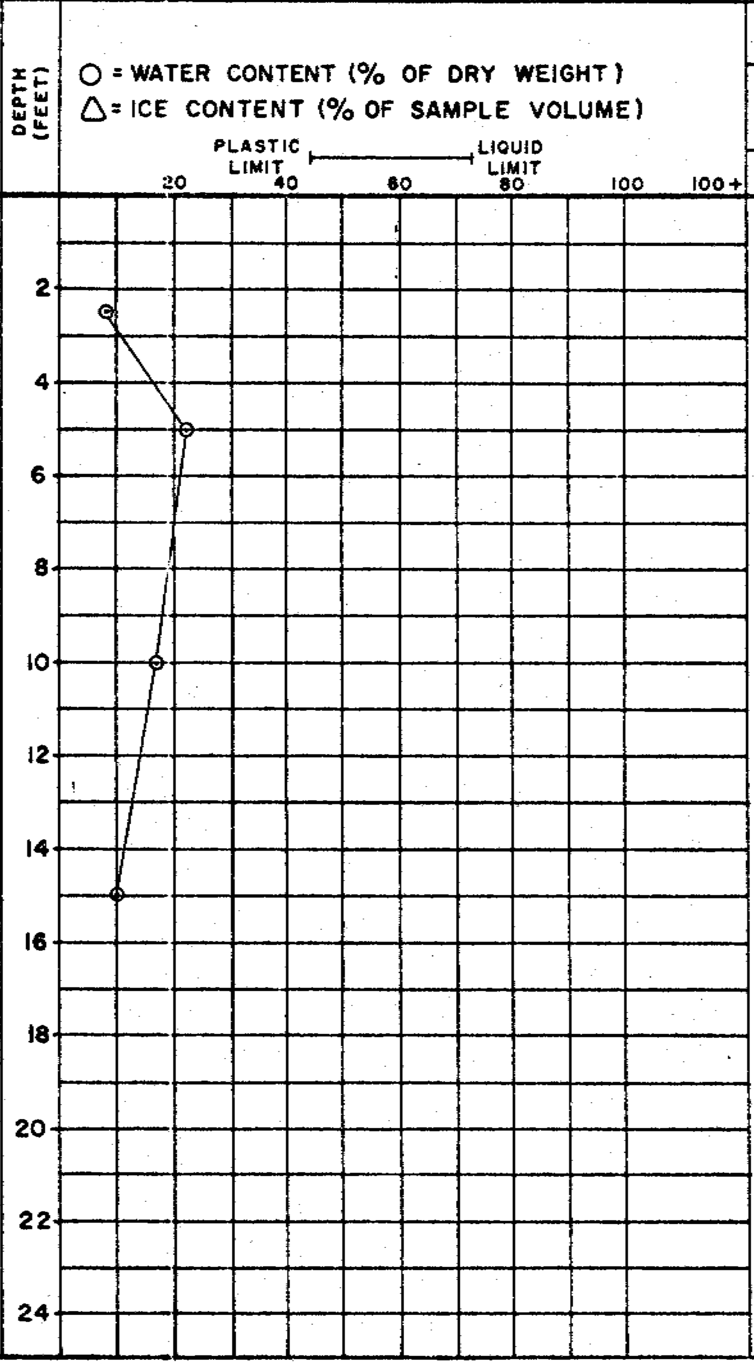


| E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY |
|---|---|---|

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 23/2/73
RIG: Texoma
AIRPHOTO NO: A22774 - 59
SURFACE DRAINAGE: Good
CHAINAGE:
VEGETATION: Black Spruce
OFFSET
ELEV:

| TEST HOLE BA 75 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 662 | B | 9 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 2 | 1 | ◺ | | | SM | SAND - Coarse, Light Brown, Trace of Silt | F | NF |
| 4 | 2 | ◺ | | | CL | CLAY SILT - Grey-Brown, Low Plasticity, With Medium to Coarse Sand | | NB to NF |
| 10 | 3 | ◺ | | | | | | |
| 14 | 4 | ◺ | | | | - Sandy | | |
| 16 | | | | | | END OF HOLE 15' | | |



| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY % | SILT % | SAND % | GRAVEL % | | | |
| | | | | | | |

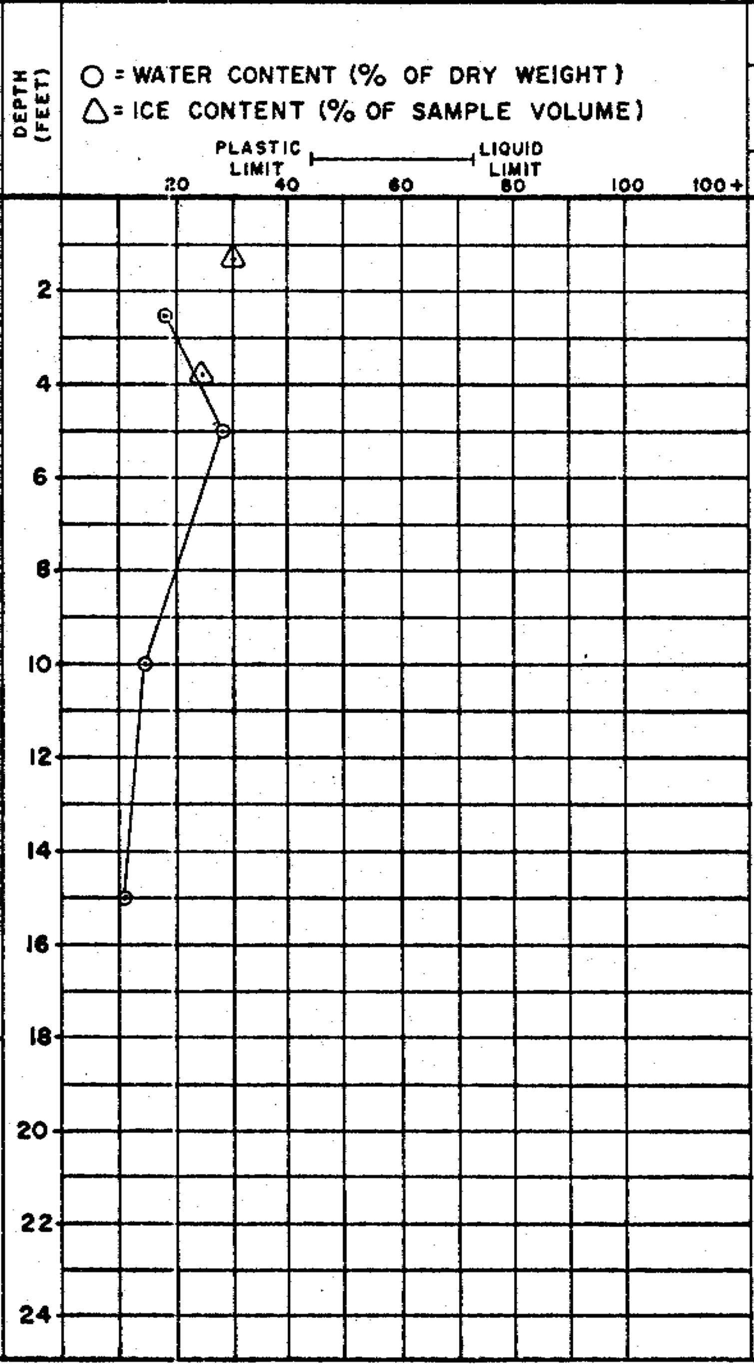
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
FIELD ENG: NRM
DATE DRILLED 23/2/73
AIRPHOTO NO: A22774 - 58
CHAINAGE:
OFFSET
CKD: LAB
TECH: DC
RIG: Texoma
SURFACE DRAINAGE: Fair
VEGETATION: Black Spruce & Birch
ELEV:

TEST HOLE BA 76

| MILE | B,C,S | NUMBER |
|---|---|---|
| 661 | B | 1 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  | CLAY SILT - Brown, Sandy, Low to Intermediate Plasticity | F | V 30% |  |  |  |  |  |  |  |
| 2 | 1 |  |  |  | CL |  |  | V 25% |  |  |  |  |  |  |  |
| 4 | 2 |  |  |  |  | - Low Plasticity, Rock Fragments |  |  |  |  |  |  |  |  |  |
| 10 | 3 |  |  |  |  | - With Coarse Sand |  | NB |  |  |  |  |  |  |  |
| 14 | 4 |  |  |  |  | - Low Plasticity |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | END OF HOLE 15' |  |  |  |  |  |  |  |  |  |

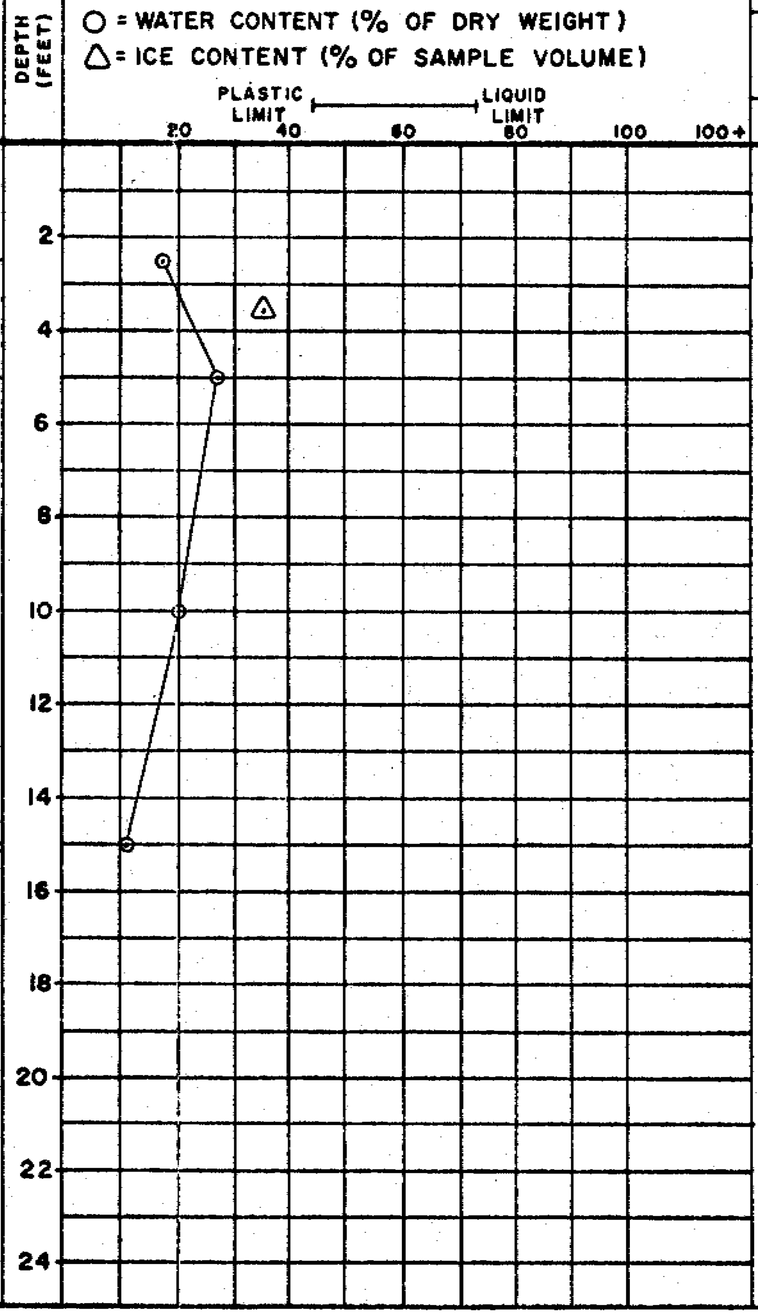


**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 23/2/73
RIG: Texoma
AIRPHOTO NO: A22774 - 58
SURFACE DRAINAGE: Fair
CHAINAGE:
OFFSET
VEGETATION: Black Spruce & Birch
ELEV:

| TEST HOLE BA 76 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 661 | B | 2 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | CLAY - Silty, Brown, With Coarse Sand, Med Plasticity | | NB | | | | | | | |
| 2 | 1 | | | | CI | | | V - 35% | | | | | | | |
| 4 | 2 | | | | | | | | | | | | | | |
| 6 | | | | | | | F | NB | | | | | | | |
| 8 | | | | | | | | | | | | | | | |
| 10 | 3 | | | | | - No Sand | | | | | | | | | |
| 12 | | | | | SM | SAND - Silty, Fine, Trace of Clay | | | | | | | | | |
| 14 | 4 | | | | | END OF HOLE 15' | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |

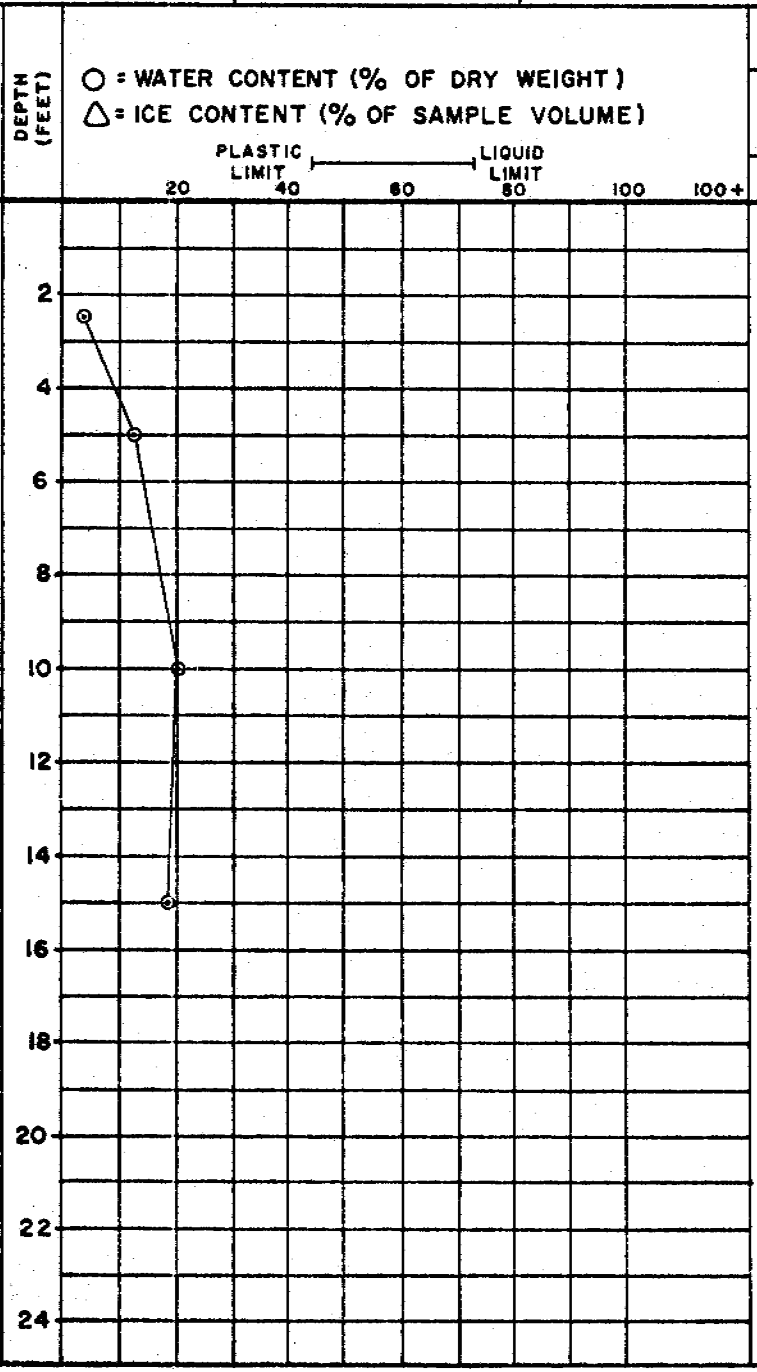


**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

| | | | | | |
|---|---|---|---|---|---|
| DWN: ALB | FIELD ENG: NRM | DATE DRILLED: 24/2/73 | AIRPHOTO NO: A22774 - 55 | CHAINAGE: | OFFSET |
| CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Good | VEGETATION: Black Spruce & Birch | ELEV: |

| TEST HOLE BA 77· | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 661 | B | 3 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 2 | 1 | ⧅ | | | GW | GRAVEL - Light Brown, Some Sand & Silt, Subrounded | F | NF |
| 4 | 2 | ⧅ | | | SM | SAND - Silty, Fine, Light Brown | | |
| 10 | 3 | ⧅ | | | | | U | Unfrozen |
| 14 | 4 | ⧅ | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | |



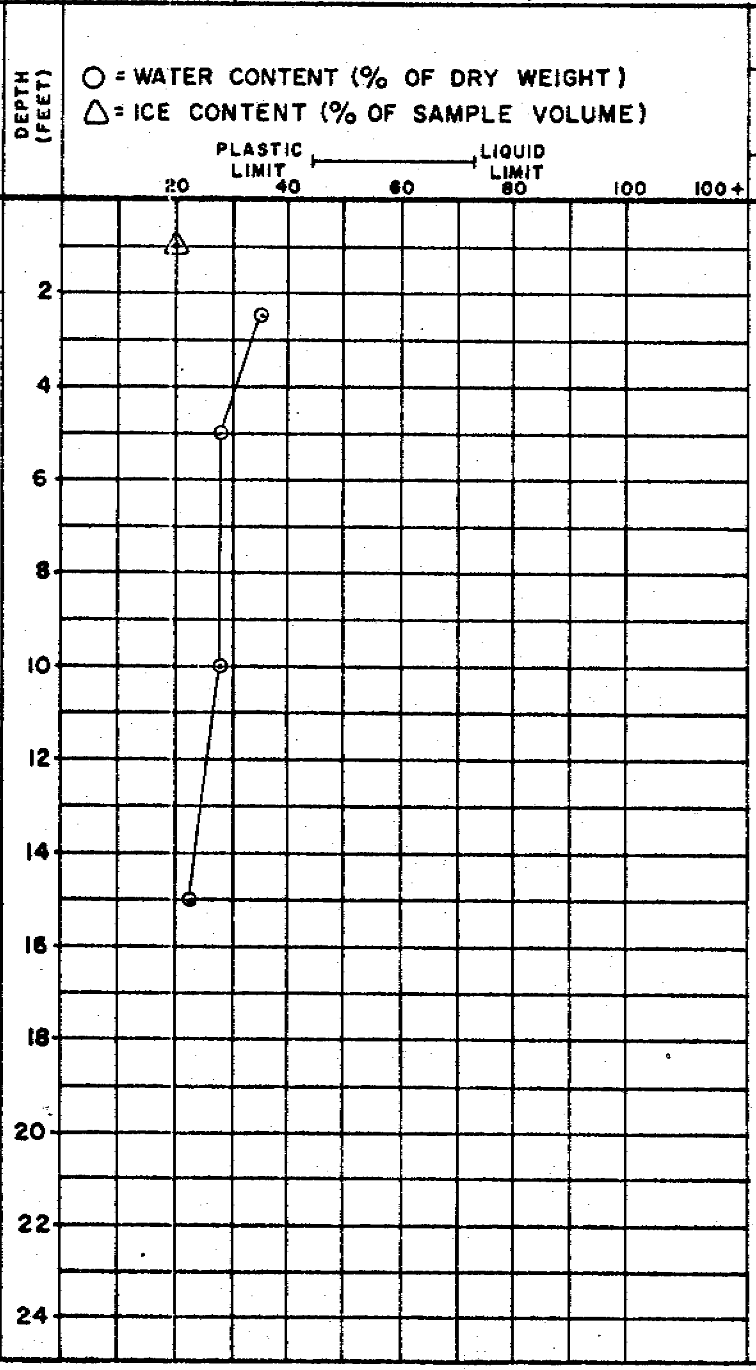
| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY % | SILT % | SAND % | GRAVEL % | | | |

| E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA<br>MACKENZIE HIGHWAY |
|---|---|---|

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED: 24/2/73
RIG: Texoma
AIRPHOTO NO: A22774 - 55
SURFACE DRAINAGE: Good
CHAINAGE:
VEGETATION: Black Spruce & Birch
OFFSET
ELEV:

| TEST HOLE BA 77 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 661 | B | 4 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | CLAY - Silty, Light Brown, Low Plasticity | | V - 20% | | | | | | | |
| 2 | 1 | ⧅ | | | | | F | | | | | | | | |
| 4 | | | | | CL | | | NB | | | | | | | |
| | 2 | ⧅ | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | |
| 10 | 3 | ⧅ | | | | - Grey Brown, Med. Plasticity | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | |
| 14 | | ⧅ | | | | - Low Plasticity | | | | | | | | | |
| | 4 | | | | | END OF HOLE 15' | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |



**E.W. BROOKER & ASSOCIATES LTD.**

# DRILL HOLE REPORT

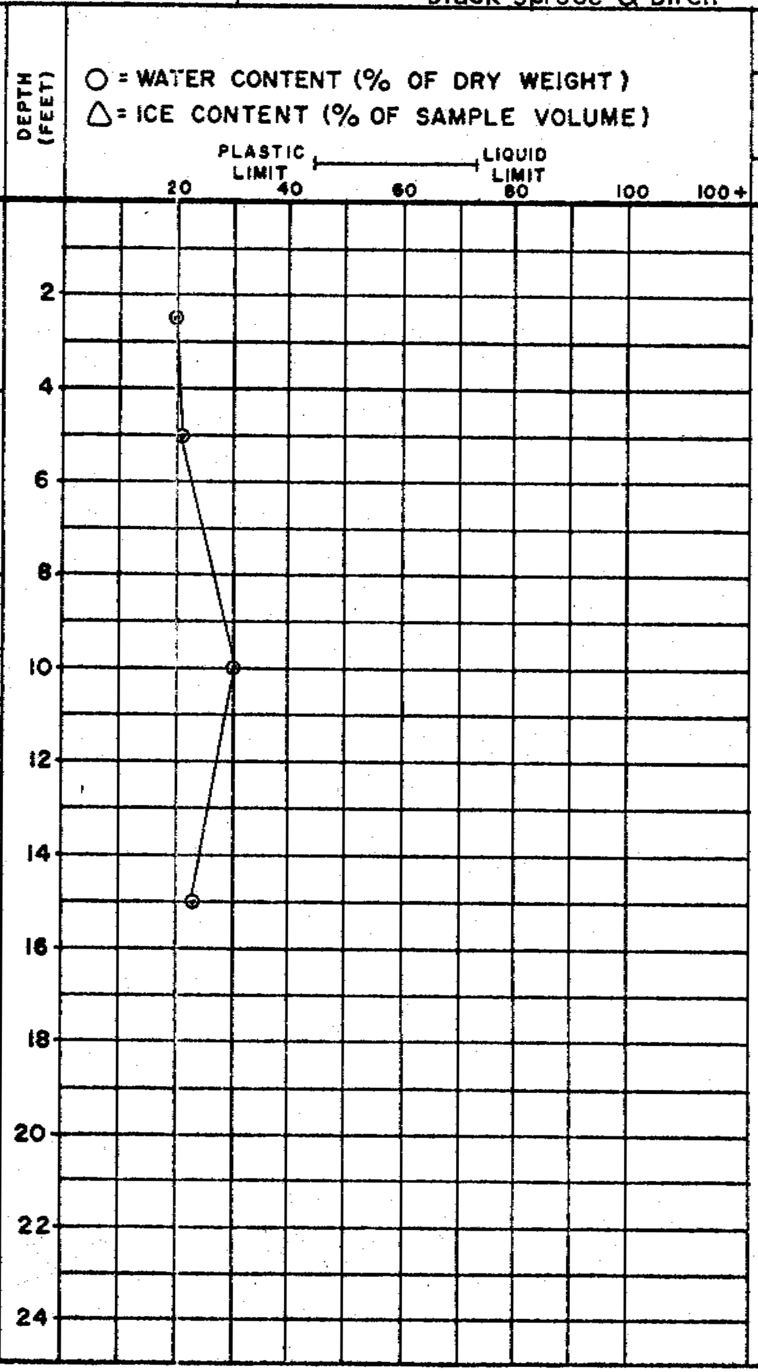
**DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB
FIELD ENG: NRM
DATE DRILLED 24/2/73
AIRPHOTO NO: A22774 - 55
CHAINAGE:
OFFSET
CKD: LAB
TECH: DC
RIG: Texoma
SURFACE DRAINAGE: Good
VEGETATION: Black Spruce & Birch
ELEV:

TEST HOLE BA 77

| MILE | B,C,S | NUMBER |
|---|---|---|
| 661 | B | 5 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 2 | 1 | ⧅ | | | CL | CLAY - Silty, Some Coarse Sand, Med. Brown, Low Plasticity | | NB |
| 4 | 2 | ⧅ | | | SM | SAND - Silty, Medium to Coarse, Med. Brown | F | NF |
| 6 | | | | | | | | |
| 8 | | | | | | | | |
| 10 | 3 | ⧅ | | | CL | CLAY - Silty, Low Plasticity, Dark Grey | | NB |
| 12 | | | | | | | | |
| 14 | 4 | ⧅ | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | |
| 18 | | | | | | | | |
| 20 | | | | | | | | |
| 22 | | | | | | | | |
| 24 | | | | | | | | |



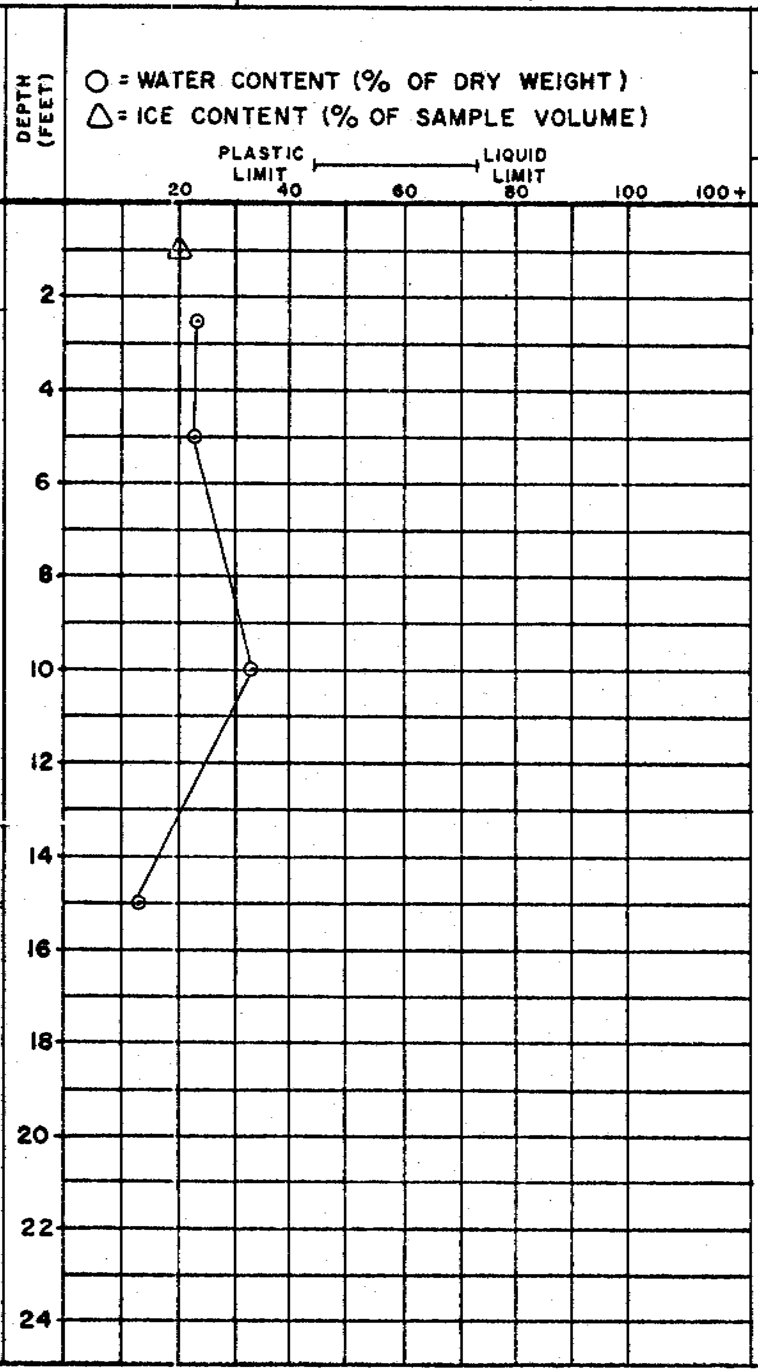
| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY | SILT | SAND | GRAVEL | | | |
| % | % | % | % | | | |

| E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA<br>MACKENZIE HIGHWAY |
|---|---|---|

DWN: ALB
FIELD ENG: NRM
DATE DRILLED 24/2/73
AIRPHOTO NO: A22774 - 55
CHAINAGE:
OFFSET
CKD: LAB
TECH: DC
RIG: Texoma
SURFACE DRAINAGE: Good
VEGETATION: Black Spruce & Birch
ELEV:

| TEST HOLE BA 77 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 661 | B | 6 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 0 – 13 | | | | | CL | CLAY - Silty, Some Coarse Sand, Low Plasticity | | V- 20% |
| 2 – 3 | 1 | ⧅ | | | | | | |
| 4 – 5 | 2 | ⧅ | | | | | | |
| 10 | 3 | ⧅ | | | | | F | NB |
| 13 – 15 | | | | | GW | GRAVEL` - Sandy, Trace of Silt, Fine, Med. Brown | | NF |
| 14 – 15 | 4 | ⧅ | | | | | | |
| 15 | | | | | | END OF HOLE 15' | | |



| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY % | SILT % | SAND % | GRAVEL % | | | |

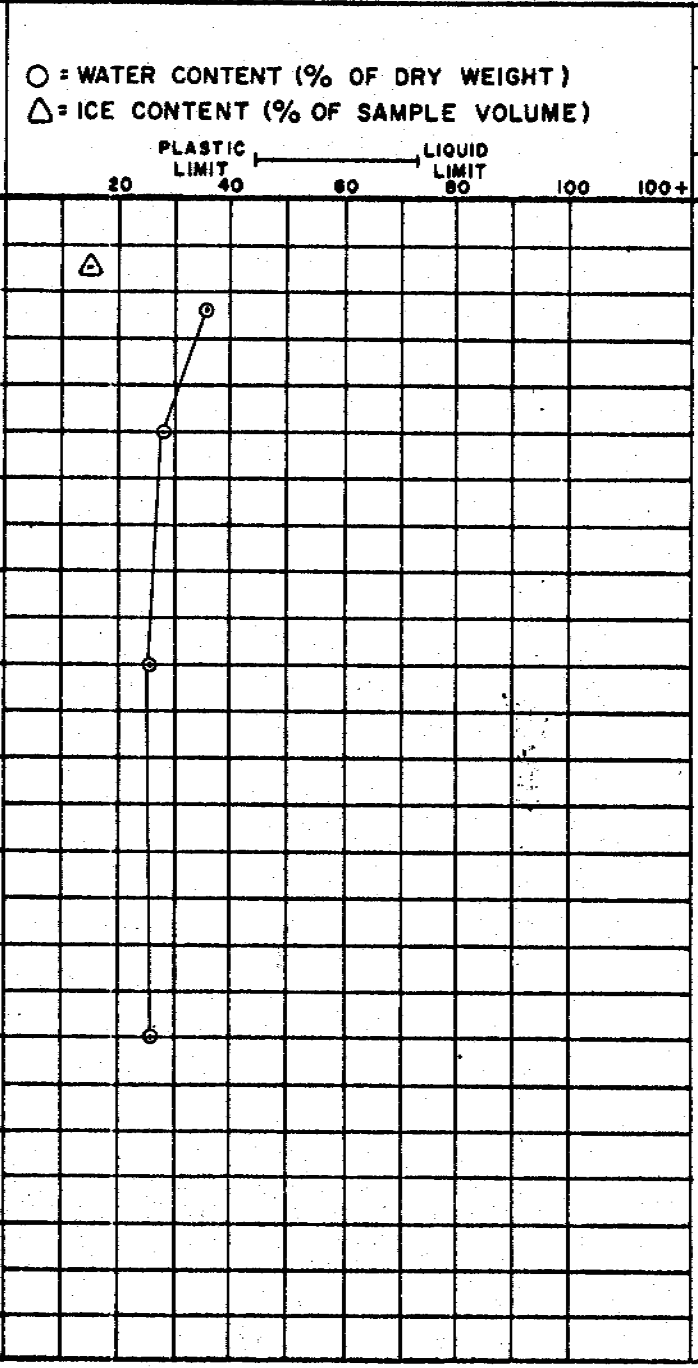
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: JK
DATE DRILLED 24/2/73
RIG: Mayhew
AIRPHOTO NO: A22774 - 56
SURFACE DRAINAGE: Good to North
CHAINAGE: 3465 + 26
VEGETATION: Black Spruce & Birch
OFFSET
ELEV:

TEST HOLE BA 78

| MILE | B,C,S | NUMBER |
|---|---|---|
| 659 | B | 1 |

| DEPTH (FEET) | SAMPLE NUMBER | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|
| 0 - 2.9 | 1 | OL to ML | ORGANIC SILT - Med. Brown, Clayey, Med. Plasticity | F | V<br>10 - 15% |
| 2.9 - 5 | 2 | CL | CLAY - Med. Brown - Silty - Low Plasticity - Large Boulder @ 4½' - 5' | F | NB |
| 5 - 14 | 3 | CL | | U | Unfrozen |
| 14 - 18 | 4 | ML | SILT - Grey - Some Clay - Low Plasticity | U | |
| 18 | | | END OF HOLE 18' | | |



GRAIN-SIZE ANALYSIS: CLAY % | SILT % | SAND % | GRAVEL %
WET DENSITY (P.C.F.)
DRY DENSITY (P.C.F.)
REMARKS
% RECOVERY
PENETRATION RESISTANCE
SAMPLE TYPE

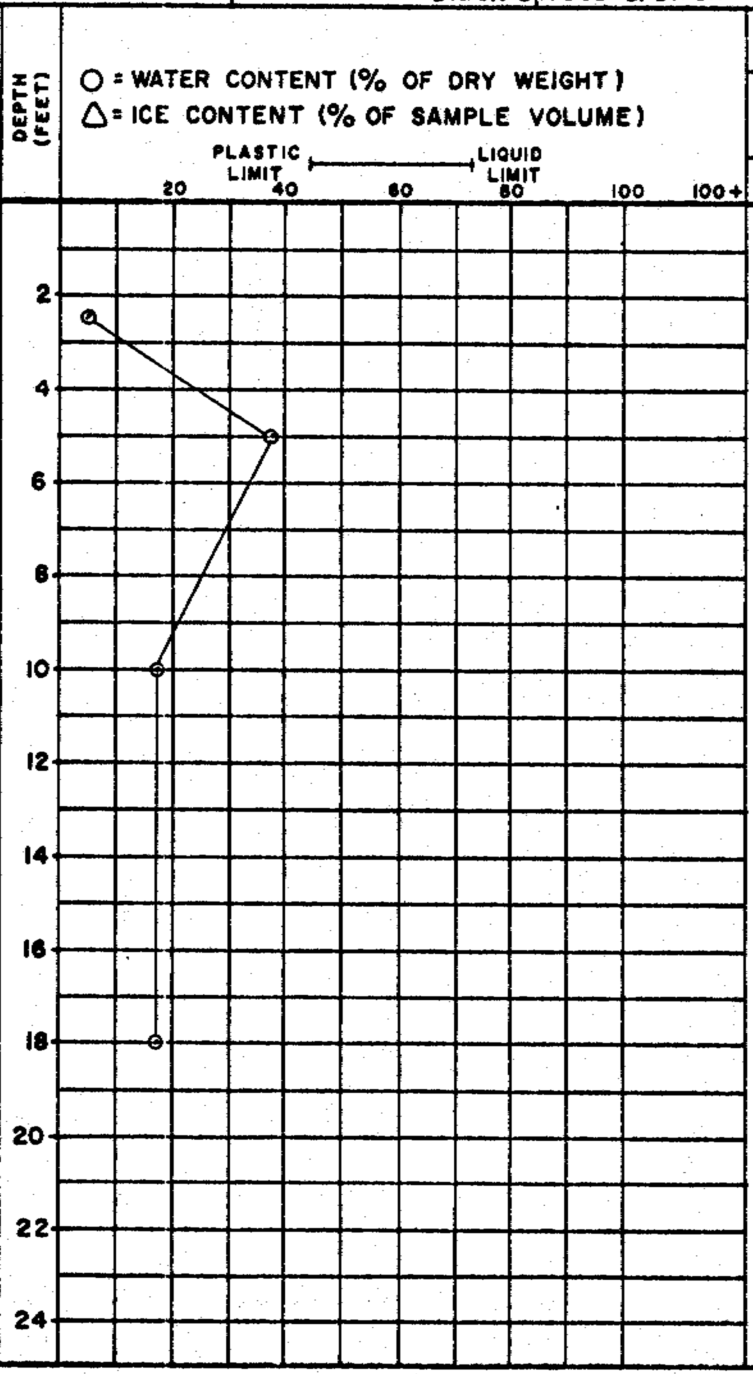
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB | FIELD ENG: NRM | DATE DRILLED 24/2/73 | AIRPHOTO NO: A22774 - 55 | CHAINAGE: 3465 + 20 | OFFSET

CKD: LAB | TECH: JK | RIG: Mayhew | SURFACE DRAINAGE: Good to North | VEGETATION: Black Spruce & Birch | ELEV:

| TEST HOLE BA 78 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 659 | B | 2 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 - 4 | 1 | ⧄ | | | GW | GRAVEL - Med. Brown, Loose, Clean, Well Graded, Sandy, Medium Gravel | F | NF | | | | | | | |
| 4 - 18 | 2<br>3<br>4 | ⧄<br>⧄<br>⧄ | | | CL | CLAY - Med. Brown<br>- Silty<br>- Low Plasticity<br><br>- Grey<br>- Silty<br>- Low Plasticity | U | NB<br>Unfrozen | | | | | | | |
| 18 | | | | | | END OF HOLE 18' | | | | | | | | | |



# E.W. BROOKER & ASSOCIATES LTD.

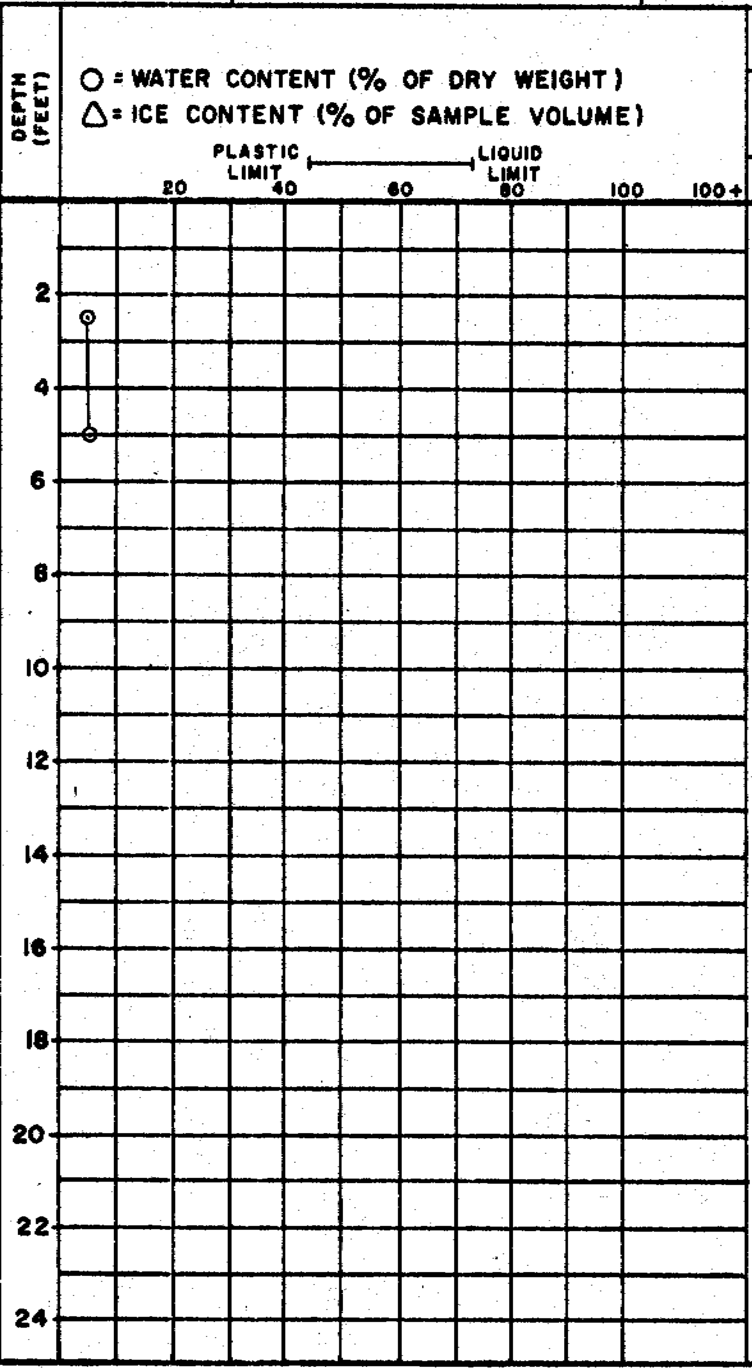
# DRILL HOLE REPORT

## DEPARTMENT OF PUBLIC WORKS, CANADA
## MACKENZIE HIGHWAY

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: JK
DATE DRILLED: 25/2/73
RIG: Mayhew
AIRPHOTO NO: A22774 - 53
SURFACE DRAINAGE: Good to West
CHAINAGE:
VEGETATION: Birch & Black Spruce
OFFSET
ELEV:

| TEST HOLE BA 79 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 658 | B | 1 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| | | | | | SP | SAND - Reddish Brown<br>- Gravelly, Coarse<br>- Loose<br>- Poorly Graded<br>- Organics Present to 3' | F | NF |
| 2 | 1 | | | | | | | |
| 4 | 2 | | | | | | | |
| 6 | | | | | | END OF HOLE 5' | | |
| 8 | | | | | | | | |
| 10 | | | | | | | | |
| 12 | | | | | | | | |
| 14 | | | | | | | | |
| 16 | | | | | | | | |
| 18 | | | | | | | | |
| 20 | | | | | | | | |
| 22 | | | | | | | | |
| 24 | | | | | | | | |



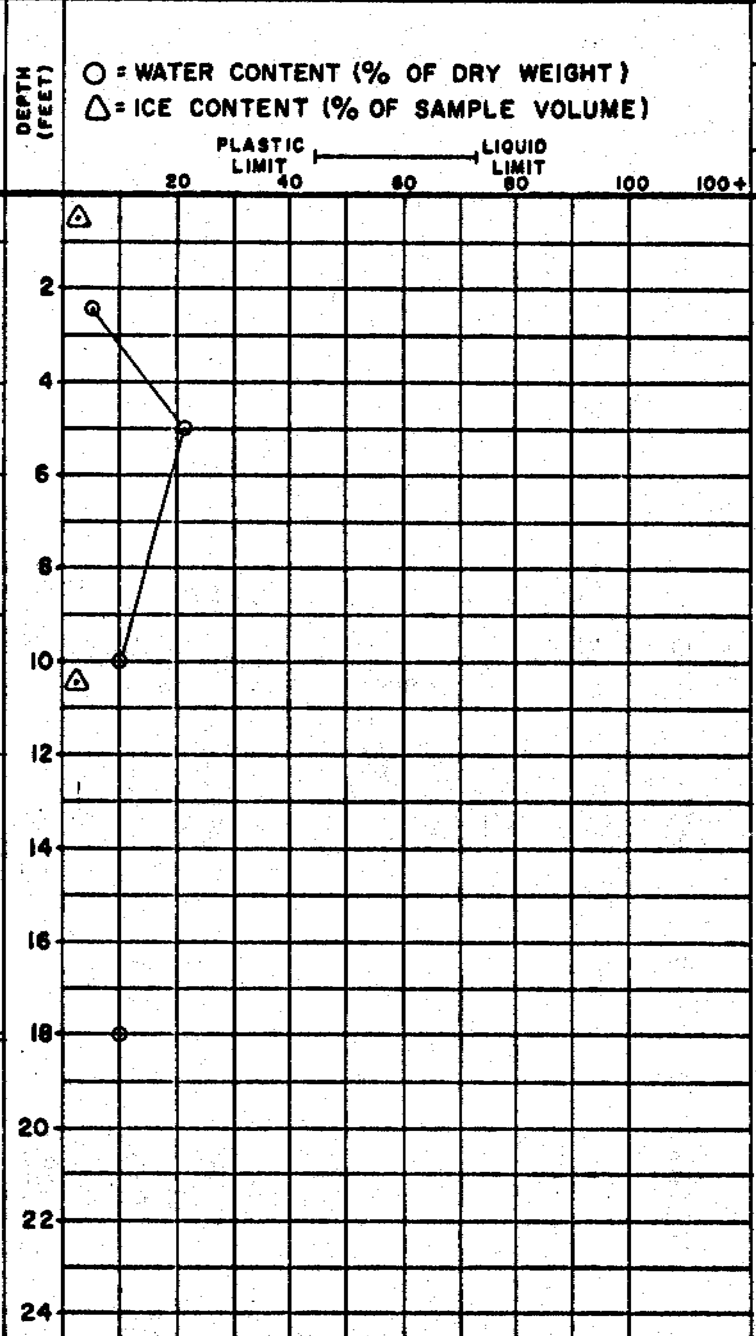
| GRAIN-SIZE ANALYSIS | | | | | | |
|---|---|---|---|---|---|---|
| CLAY | SILT | SAND | GRAVEL | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
| % | % | % | % | | | |

| E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA<br>MACKENZIE HIGHWAY |
|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| DWN: ALB | FIELD ENG: NRM | DATE DRILLED 25/2/73 | AIRPHOTO NO: A22774 - 53 | CHAINAGE: | OFFSET | TEST HOLE BA 79 |
| CKD: LAB | TECH: JK | RIG: Mayhew | SURFACE DRAINAGE: Good to West | VEGETATION: Birch & Black Spruce | ELEV: | |

| MILE | B,C,S | NUMBER |
|---|---|---|
| 658 | B | 2 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PT | PEAT - Reddish Brown, Fibrous | | V- 0-5% | | | | | | | |
| 2 | 1 | | | | GW | GRAVEL - Reddish Brown, Loose, Poorly Graded, Some Silt | | NF | | | | | | | |
| 4 | 2 | | | | CL | CLAY - Grey, Low Plastic, (TILL) Silty, Gravelly | | NB | | | | | | | |
| 6 | | | | | | GRAVEL | | | | | | | | | |
| 8 | | | | | | - Med. Brown<br>- Sandy<br>- Trace of Silt | | NF | | | | | | | |
| 10 | 3 | | | | GW- | - Well Graded | F | V -0 - 5% | 0 | 2 | 36 | 62 | | | |
| 12 | | | | | | | | | | | | | | | |
| 14 | | | | | | - Cleaner from 15' Down | | NF | | | | | | | |
| 16 | | | | | | | | | | | | | | | |
| 18 | 4 | | | | | END OF HOLE 18' | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |



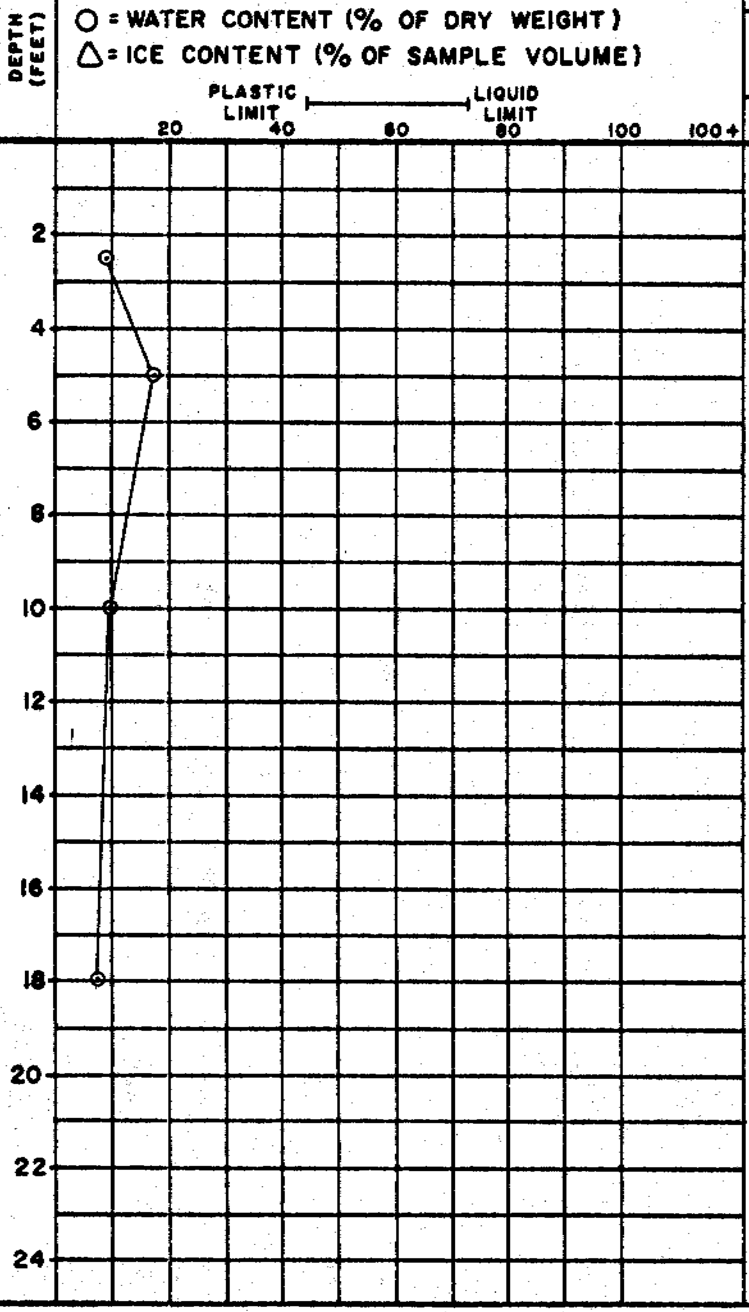
Page 1 of 2

**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: JK
DATE DRILLED 25/2/73
RIG: Mayhew
AIRPHOTO NO: A22774 - 53
SURFACE DRAINAGE: Good to West
CHAINAGE:
VEGETATION: Black Spruce & Birch
OFFSET
ELEV:

| TEST HOLE BA 79 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 658 | B | 3 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–4 | 1 | ⧅ | | | GW | GRAVEL- Reddish Brown<br>- Loose<br>- Well Graded<br>- Sandy<br>- Fine | | NF | | | | | | | |
| 4–6 | 2 | ⧅ | | | CL | CLAY (TILL) - Med. Brown<br>- Silty<br>- Low Plasticity | | NB | | | | | | | |
| 10 | 3 | ⧅ | | | GW - SW | SAND GRAVEL Med. Brown<br>Poorly Gradad,<br>- Dense, Coarse<br>- Silty<br>- Well Graded | F | V - 0 2% | | | | | | | |
| 16 | | | | | | - Sandy Gravel @ 15' | | NF | | | | | | | |
| 18 | 4 | ⧅ | | | | | | | - | 7 | 22 | 71 | | | |
| 24 | | | | | | | | | | | | | | | |



Page 2 of 2

| E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA<br>MACKENZIE HIGHWAY |
|---|---|---|

DWN: ALB | FIELD ENG: NRM | DATE DRILLED: 25/2/73 | AIRPHOTO NO: A22774 - 53 | CHAINAGE: | OFFSET

CKD: NRM | TECH: JK | RIG: Mayhew | SURFACE DRAINAGE: Good to West | VEGETATION: Black Spruce & Birch | ELEV:

| TEST HOLE BA 79 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 658 | B | 3 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | DEPTH (FEET) | ○ = WATER CONTENT (% OF DRY WEIGHT) △ = ICE CONTENT (% OF SAMPLE VOLUME) PLASTIC LIMIT — LIQUID LIMIT 20 40 60 80 100 100+ | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SAND-<br>GRAVEL | | | | | | | | | | | |
| 26 | | | | | | - some | | | 26 | | | | | | | | |
| 28 | | | | | GW<br>SW | | | | 28 | | | | | | | | |
| 30 | | | | | | | F | NF | 30 | | | | | | | | |
| 32 | | | | | | - Some Clay From 30' Down | | | 32 | | | | | | | | |
| 34 | | | | | | | | | 34 | | | | | | | | |
| 36 | | | | | | END OF HOLE 35' | | | 36 | | | | | | | | |
| 38 | | | | | | | | | 38 | | | | | | | | |
| 40 | | | | | | | | | 40 | | | | | | | | |
| 42 | | | | | | | | | 42 | | | | | | | | |
| 44 | | | | | | | | | 44 | | | | | | | | |
| 46 | | | | | | | | | 46 | | | | | | | | |
| 48 | | | | | | | | | 48 | | | | | | | | |

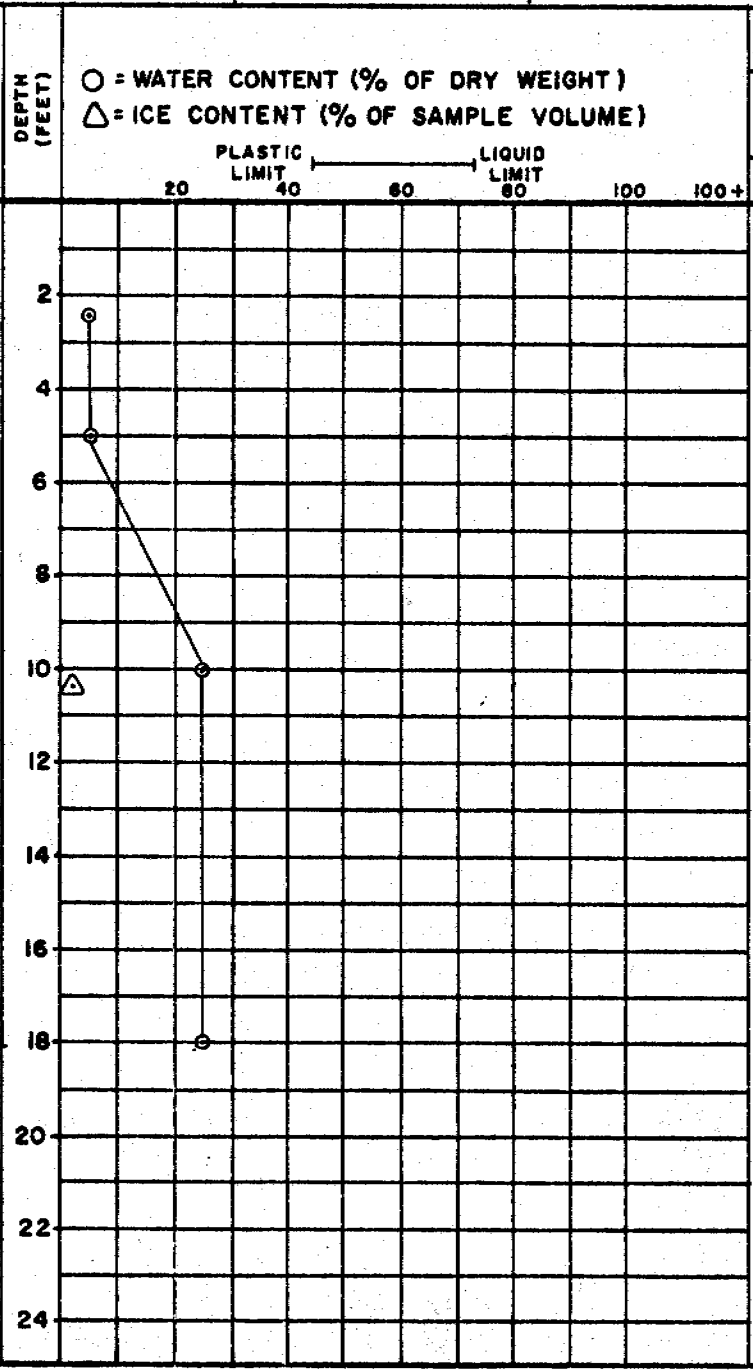
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
FIELD ENG: NRM
DATE DRILLED 25/2/73
AIRPHOTO NO: A22774 - 56
CHAINAGE:
OFFSET
CKD: LAB
TECH JK
RIG: Mayhew
SURFACE DRAINAGE: Good to West
VEGETATION: Black Spruce
ELEV:

TEST HOLE BA 80

| MILE | B,C,S | NUMBER |
|---|---|---|
| 658 | B | 4 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 0–8 | 1<br>2 | ⧅<br>⧅ | | | SW-SM | SAND - Med. Brown<br>- Coarse<br>- Gravelly<br>- Loose<br>- Some Silt | | NF |
| 8–13 | 3 | ⧅ | | | CL-CI | CLAY - Grey<br>- Silty<br>- Med. to Low. Plasticity | F | V - 0-5% |
| 13–18 | 4 | ⧅ | | | CL | - More Silty<br>- Low Plasticity | | NB |
| 18 | | | | | | END OF HOLE 18' | | |



| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY % | SILT % | SAND % | GRAVEL % | | | |

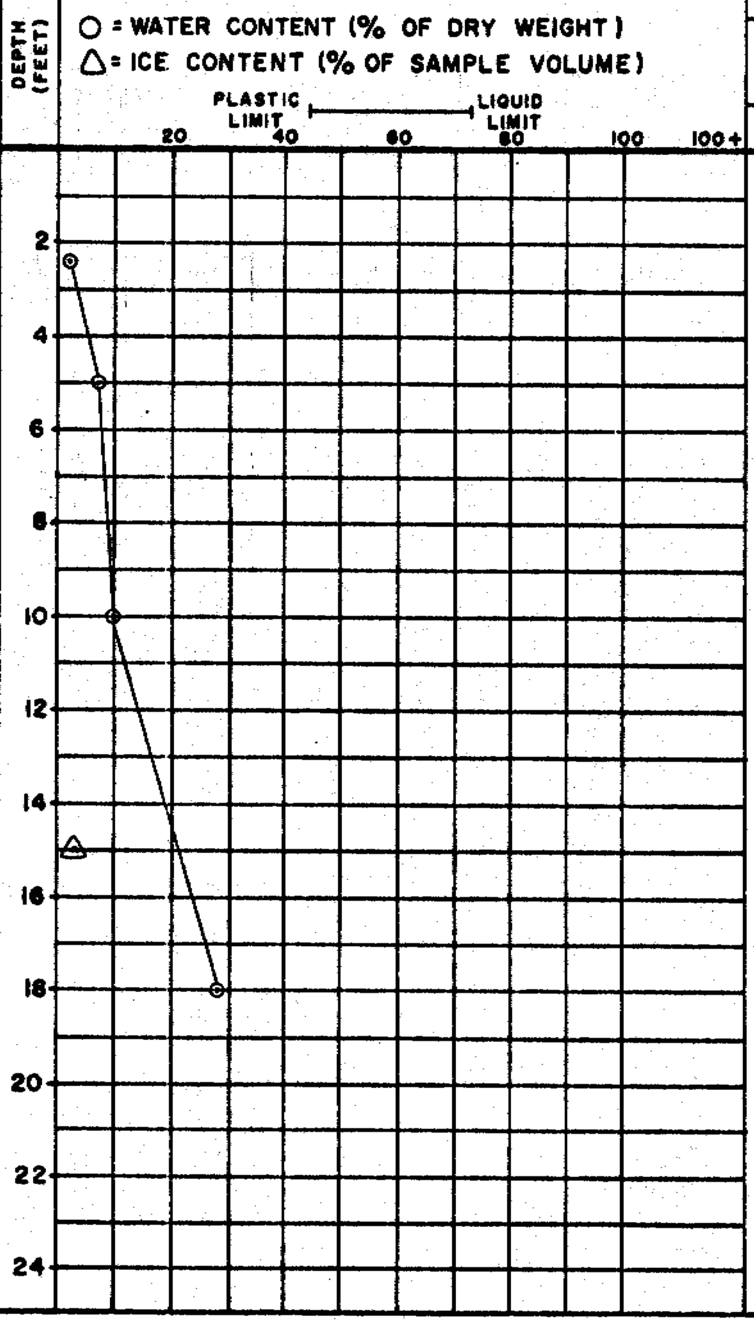
| E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA<br>MACKENZIE HIGHWAY |
|---|---|---|

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: JK
DATE DRILLED: 25/2/73
RIG: Mayhew
AIRPHOTO NO: A22774 - 53
SURFACE DRAINAGE: Good to NW
CHAINAGE:
VEGETATION: Black Spruce & Birch
OFFSET
ELEV:

TEST HOLE BA 80

| MILE | B,C,S | NUMBER |
|---|---|---|
| 658 | B | 5 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | | | | GW- | GRAVEL<br>- Med. Brown<br>- Well Graded<br>- Loose, Sandy | | | | | | | | | |
| 4<br>6 | 2 | | | | | - Coarse Sand to Fine Gravel, trace of Silt. | | NF | - | 10 | 34 | 66 | | | |
| 8 | | | | | | - Boulder @ 9' | | | | | | | | | |
| 10 | 3 | | | | | - Silty | F | | | | | | | | |
| 12<br>14<br>16 | | | | | CL | CLAY - Grey<br>- Silty<br>- Low Plasticity | | V- 0-5% | | | | | | | |
| 18 | 4 | | | | | | | | | | | | | | |
| | | | | | | END OF HOLE 18' | | | | | | | | | |
| 20<br>22<br>24 | | | | | | | | | | | | | | | |



# E.W. BROOKER & ASSOCIATES LTD.

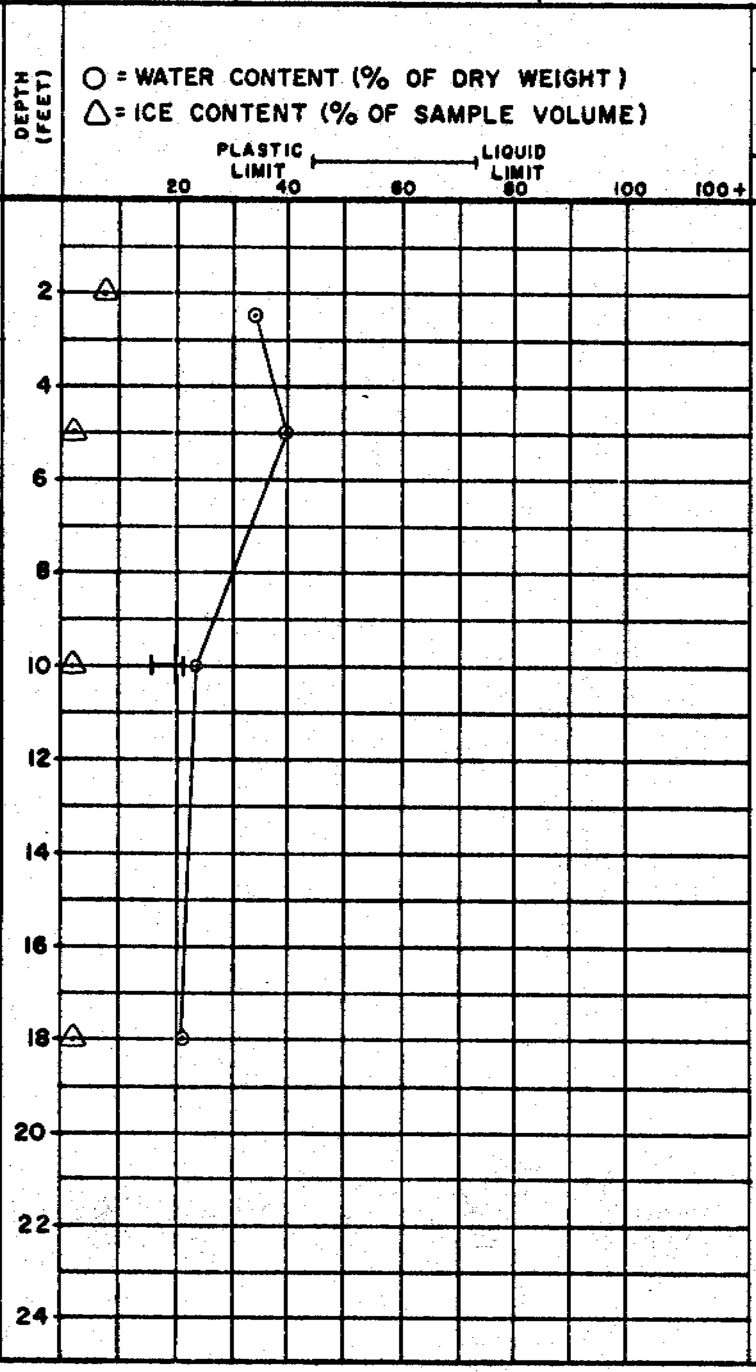
# DRILL HOLE REPORT

# DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: JK
DATE DRILLED 25/2/73
RIG: Mayhew
AIRPHOTO NO: A22774 - 53
SURFACE DRAINAGE: Fair to E.
CHAINAGE:
VEGETATION: Black Spruce & Birch
OFFSET
ELEV:

| TEST HOLE BA 81 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 657 | B | 1 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–4 | 1 | | | | ML | SILT - Med. Brown<br>- Clayey<br>- Low Plasticity | | V - 5-10% | | | | | | | |
| 4–18 | 2 | | | | CL | SAND - Gravelly, Silty,<br>(TILL) Some Clay, Grey,<br>Low Plasticity. | | | | | | | | | |
| 10 | 3 | | | | | - Grey | F | V - 0-5% | 11 | 25 | 34 | 30 | | | |
| 18 | 4 | | | | | | | | | | | | | | |
| 18 | | | | | | END OF HOLE 18' | | | | | | | | | |



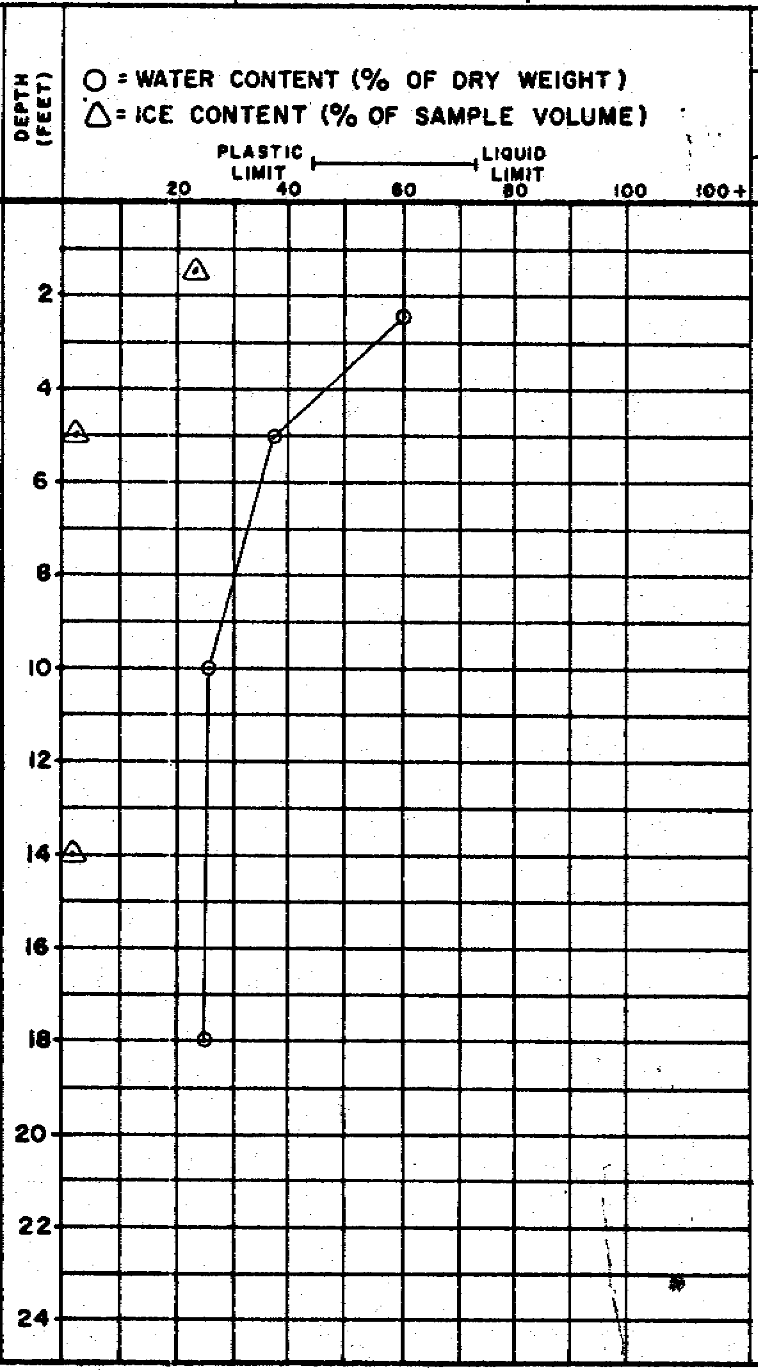
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB
FIELD ENG: NRM
DATE DRILLED 25/2/73
AIRPHOTO NO: A22774 - 53
CHAINAGE:
OFFSET
CKD: LAB
TECH: JK
RIG: Mayhew
SURFACE DRAINAGE: Good to S
VEGETATION: Black Spruce & Birch
ELEV:

TEST HOLE BA 81

| MILE | B,C,S | NUMBER |
|---|---|---|
| 657 | B | 2 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 2 | 1 | | | | OL | ORGANIC SILT<br>- Med. Brown<br>- Clayey | | V 20-25% |
| 4 | 2 | | | | ML | SILT - Med. Brown<br>- Clayey<br>- Low Plasticity | | |
| 10 | 3 | | | | | - Grey | F | V 0-5% |
| 18 | 4 | | | | | | | |
| | | | | | | END OF HOLE 18' | | |



| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY % | SILT % | SAND % | GRAVEL % | | | |

| E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA<br>MACKENZIE HIGHWAY |
|---|---|---|

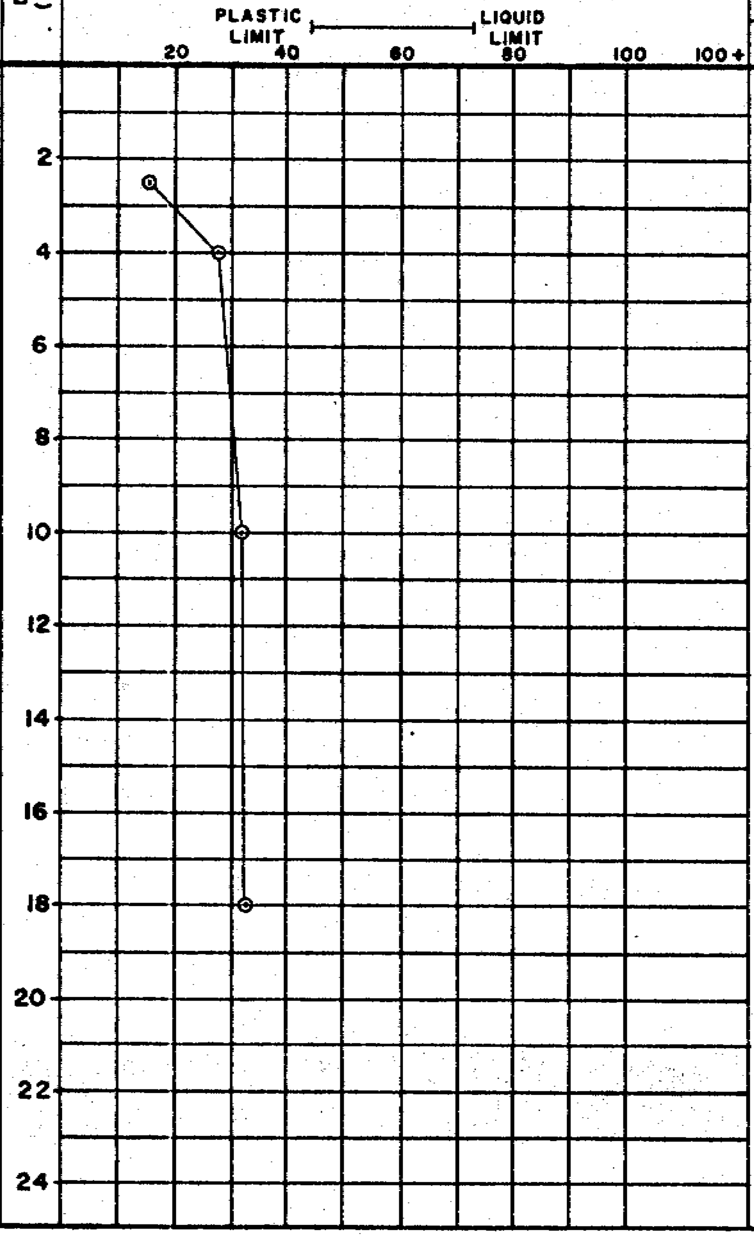
DWN: ALB FIELD ENG: NRM DATE DRILLED 25/2/73 AIRPHOTO NO: A22763 – 81 CHAINAGE: OFFSET

CKD: LAB TECH: JK RIG: Mayhew SURFACE DRAINAGE: Good to E VEGETATION: Black Spruce & Birch ELEV:

| TEST HOLE BA 82 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 656 | B | 1 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | | | SM | SAND - Med. Brown<br>- Fine<br>- Dense<br>- Silty | | NF<br>to<br>NB | | | | | | | |
| | 2 | | | | ML | SILT - Med. Brown<br>- Some Fine Sand<br>- Some Clay<br>- Low Plasticity | | NB | | | | | | | |
| | 3<br>4 | | | | SP | SAND - Med. Brown<br>- Fine<br>- Dense<br>- Uniform | F | NF<br>to<br>NB | | | | | | | |
| | | | | | | END OF HOLE 18' | | | | | | | | | |

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



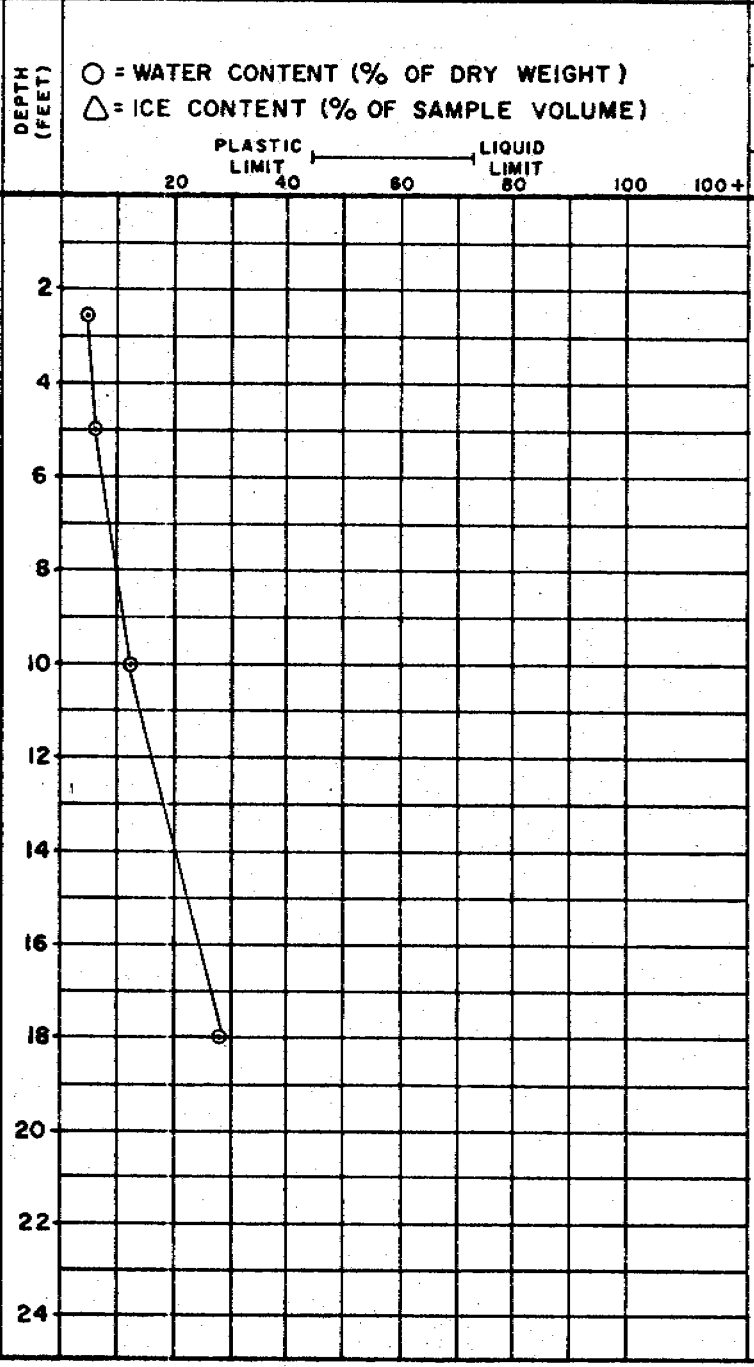
| E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA<br>MACKENZIE HIGHWAY |
|---|---|---|

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: JK
DATE DRILLED 25/2/73
RIG: Mayhew
AIRPHOTO NO: A22763 - 81
SURFACE DRAINAGE: Good to E
CHAINAGE:
VEGETATION: Black Spruce & Birch
OFFSET
ELEV:

**TEST HOLE BA 82**

| MILE | B,C,S | NUMBER |
|---|---|---|
| 656 | B | 2 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  | SAND - Med. Brown<br>- Fine |  |  |  |  |  |  |  |  |  |
| 2 | 1 |  |  |  |  | - Dense<br>- Uniform<br>- Greyish | F |  |  |  |  |  |  |  |  |
| 4 | 2 |  |  |  |  |  |  | NF to NB |  |  |  |  |  |  |  |
| 6 |  |  |  |  | SP |  |  |  |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  | - Some Silt |  |  |  |  |  |  |  |  |  |
| 10 | 3 |  |  |  |  |  |  |  | 0 | 15 | 85 | 0 |  |  |  |
| 12 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 14 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 16 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 18 | 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 20 |  |  |  |  |  | END OF HOLE 18' |  |  |  |  |  |  |  |  |  |
| 22 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 24 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

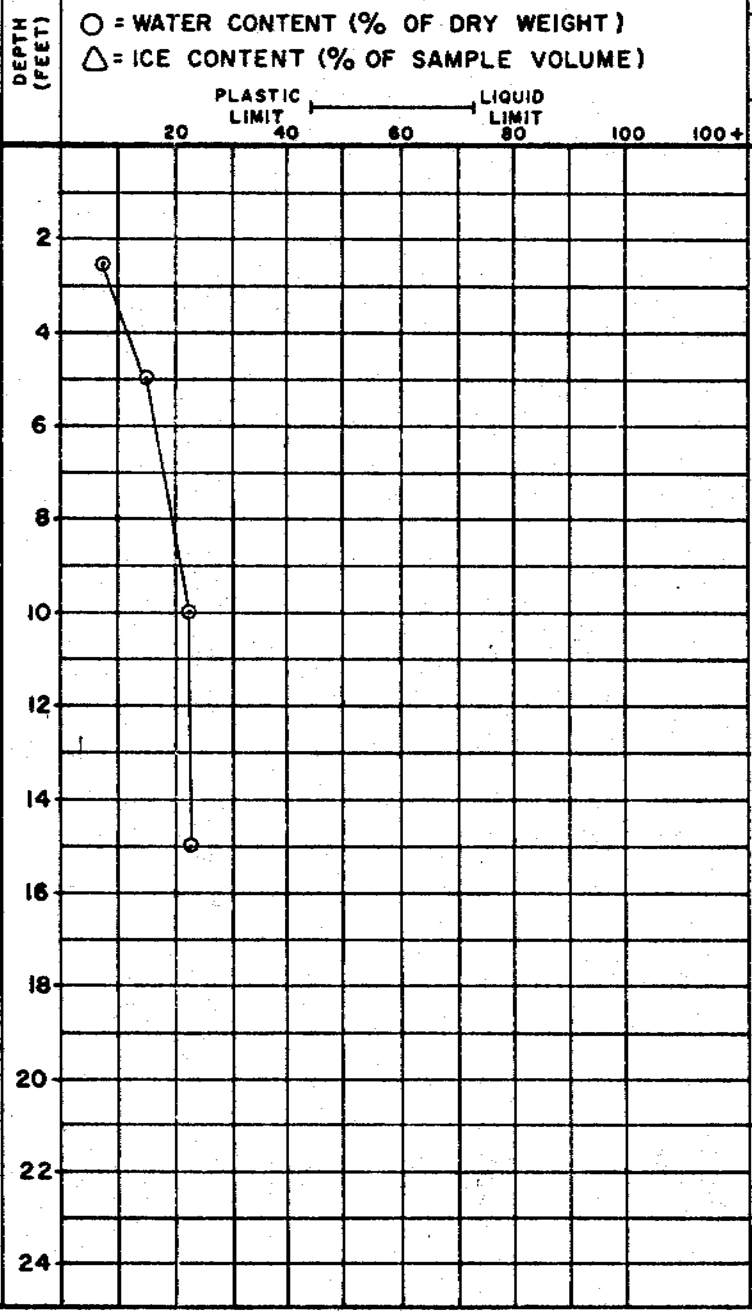


| E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA<br>MACKENZIE HIGHWAY |
|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| DWN: ALB | FIELD ENG: NRM | DATE DRILLED 24/2/73 | AIRPHOTO NO: A22763 - 78 | CHAINAGE: | OFFSET |
| CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Good | VEGETATION: Black Spruce & Birch | ELEV: |

| TEST HOLE BA 84 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 655 | B | 1 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | SAND - Silty, Light Brown | F | NF |
| 2 | 1 | ⧅ | | | SP - SM | | | |
| 4 | 2 | ⧅ | | | | | | |
| 6 | | | | | | | | |
| 8 | | | | | | | | |
| 10 | 3 | ⧅ | | | | - Grey Brown | | |
| 12 | | | | | | | | |
| 14 | 4 | ⧅ | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | |
| 18 | | | | | | | | |
| 20 | | | | | | | | |
| 22 | | | | | | | | |
| 24 | | | | | | | | |



| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY | SILT | SAND | GRAVEL | | | |
| % | % | % | % | | | |

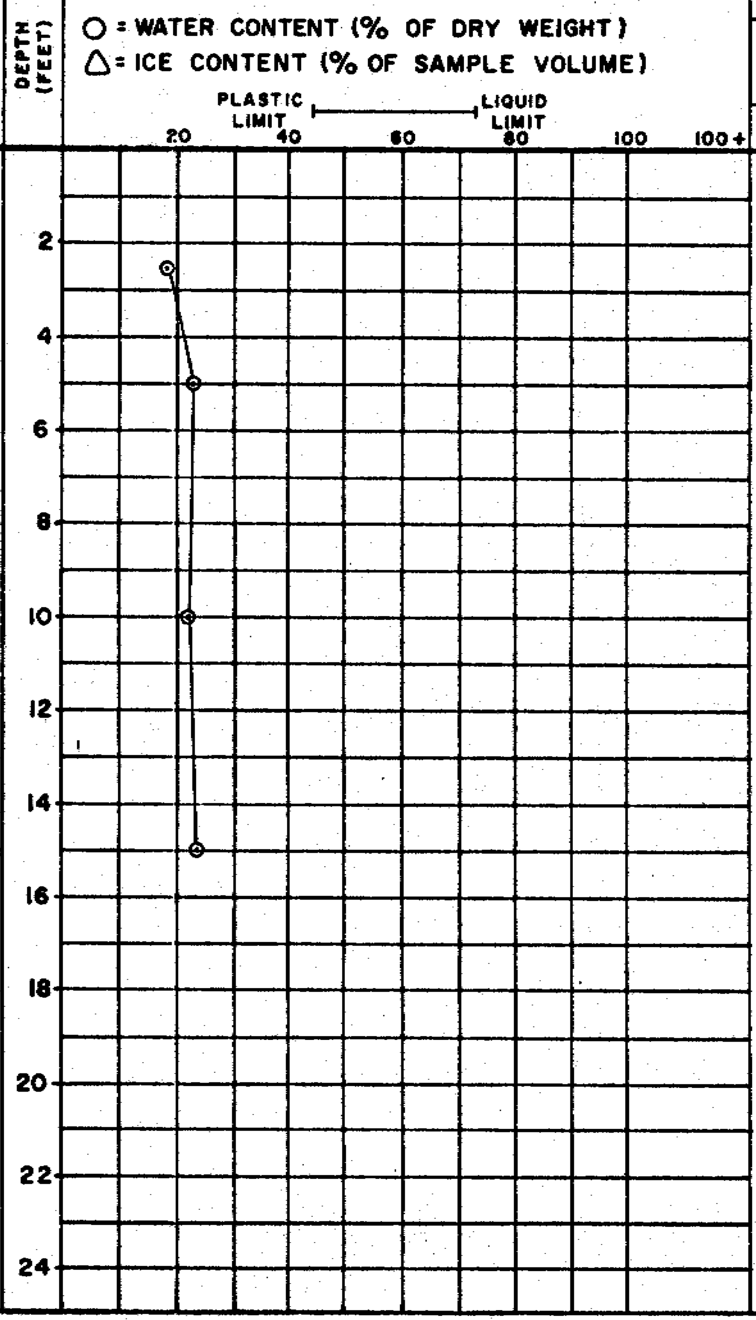
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB | FIELD ENG: NRM | DATE DRILLED 25/2/73 | AIRPHOTO NO: A22763 - 80 | CHAINAGE: | OFFSET
CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Good | VEGETATION: Black Spruce | ELEV:

TEST HOLE BA 83

| MILE | B,C,S | NUMBER |
|---|---|---|
| 655 | B | 2 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ML | SILT - Grey-Brown<br>- Fine Sandy<br>- Non-Plastic | | | | | | | | | |
| 2 | 1 | ◸ | | | | | F | NB | | | | | | | |
| 4 | 2 | ◸ | | | | | | | | | | | | | |
| 10 | 3 | ◸ | | | | | | | | | | | | | |
| 14 | 4 | ◸ | | | | - Grey | | | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |



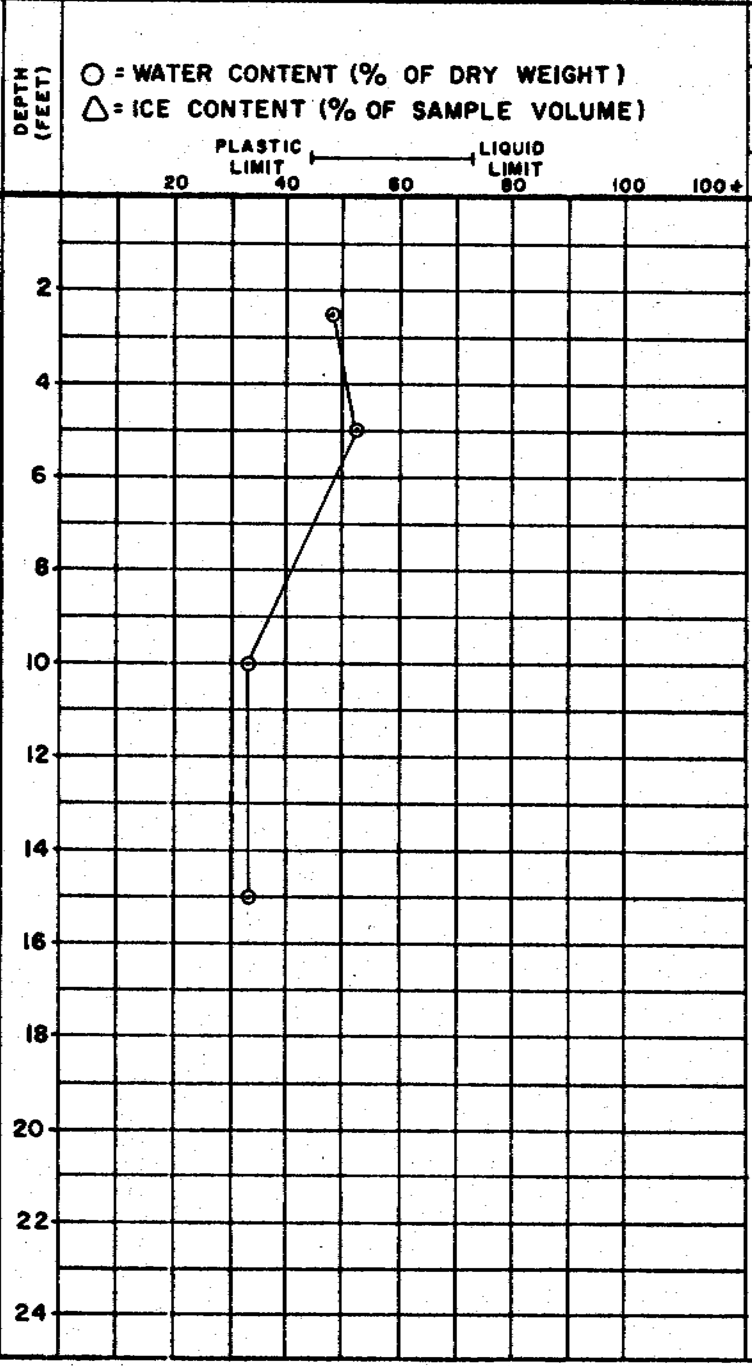
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
FIELD ENG: NRM
DATE DRILLED 25/2/73
AIRPHOTO NO: A22763 - 80
CHAINAGE:
OFFSET
CKD:
TECH: DC
RIG: Texoma
SURFACE DRAINAGE: Good
VEGETATION: Black Spruce
ELEV:

TEST HOLE BA 83

| MILE | B,C,S | NUMBER |
|---|---|---|
| 655 | B | 3 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| | | | | | OL | CLAY - Grey Black, Silty, Organic | | |
| 2 | 1 | ⧅ | | | | | | |
| 4 | 2 | ⧅ | | | | - Grey-Black, Silty, Organic. | | |
| 6 | | | | | | | | |
| 8 | | | | | | | F | NB |
| 10 | 3 | ⧅ | | | CI | - Grey, Silty, Med. Plasticity | | |
| 12 | | | | | | | | |
| 14 | 4 | ⧅ | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | |
| 18 | | | | | | | | |
| 20 | | | | | | | | |
| 22 | | | | | | | | |
| 24 | | | | | | | | |



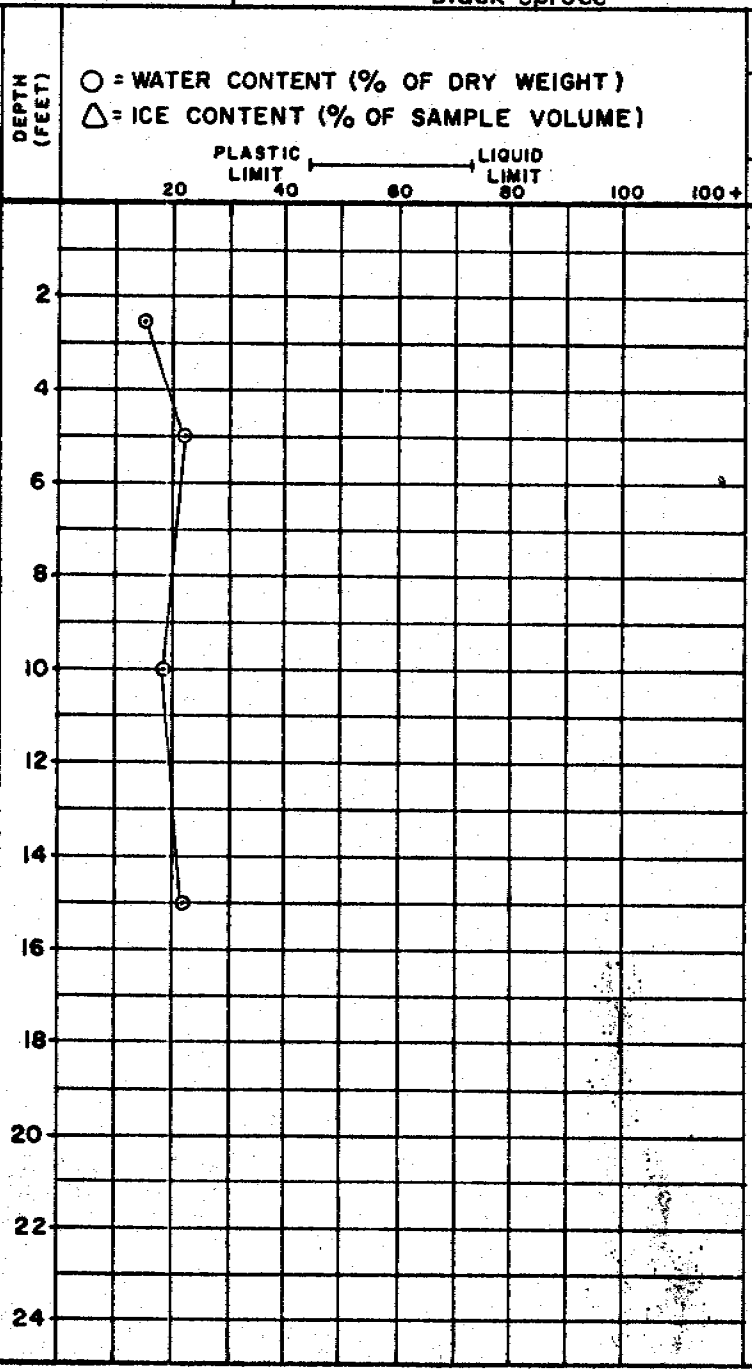
| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY % | SILT % | SAND % | GRAVEL % | | | |

**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 25/2/73
RIG: Texoma
AIRPHOTO NO: A22763 - 80
SURFACE DRAINAGE: Good
CHAINAGE:
VEGETATION: Black Spruce
OFFSET
ELEV:

| TEST HOLE BA 83 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 655 | B | 4 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SILT - Light Brown, Fine, Sandy, Non-Plastic | | | | | | | | | |
| 2 | 1 | | | | ML | | | | | | | | | | |
| 4 | 2 | | | | | | F | NB | | | | | | | |
| 10 | 3 | | | | | | | | | | | | | | |
| 14 | 4 | | | | | - Same | | | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | | | | | | | | |



# E.W. BROOKER & ASSOCIATES LTD.

# DRILL HOLE REPORT

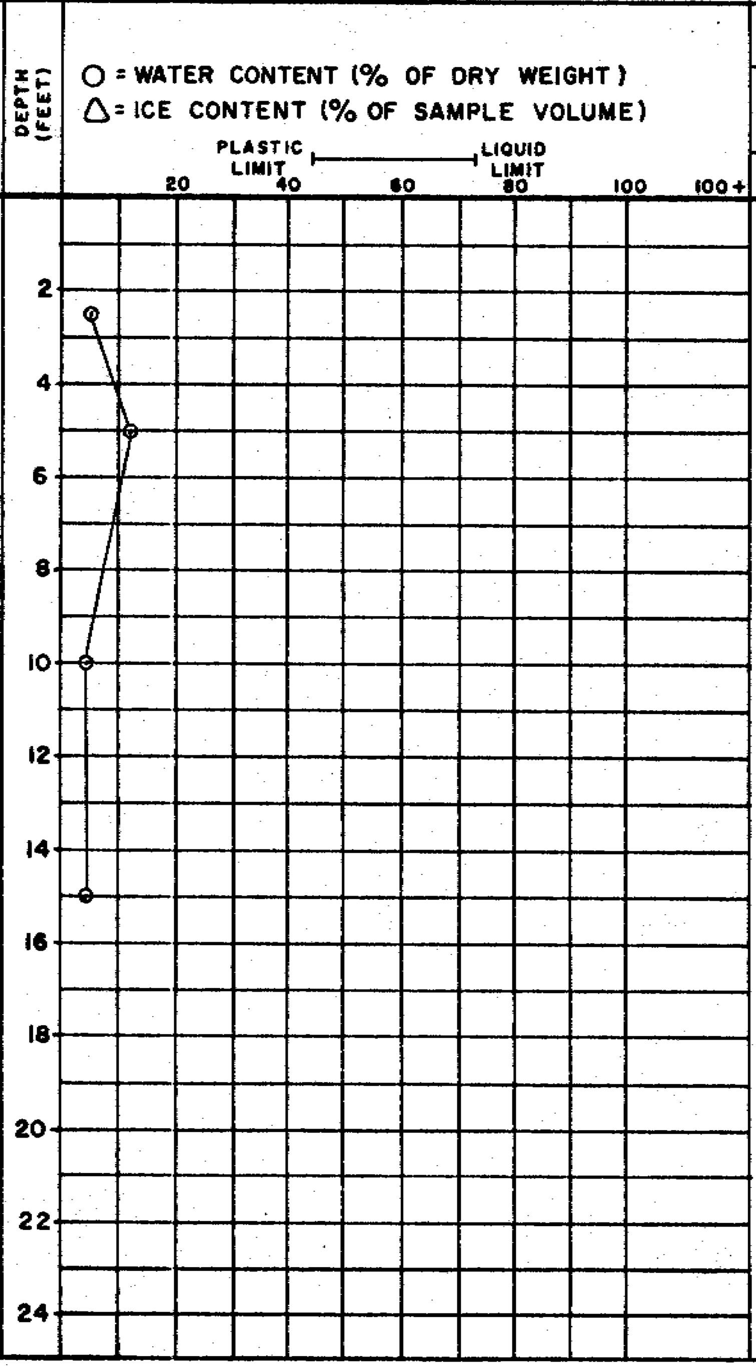
# DEPARTMENT OF PUBLIC WORKS, CANADA
# MACKENZIE HIGHWAY

DWN: ALB
FIELD ENG: NRM
DATE DRILLED 24/2/73
AIRPHOTO NO: A22763 - 78
CHAINAGE:
OFFSET
CKD: LAB
TECH: DC
RIG: Texoma
SURFACE DRAINAGE: Good
VEGETATION: Black Spruce & Birch
ELEV:

TEST HOLE BA 84

| MILE | B,C,S | NUMBER |
|---|---|---|
| 654 | B | 1 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  | SAND - Light Brown,<br>Trace of Silt and gravel. |  |  |  |  |  |  |  |  |  |
| 2 | 1 |  |  |  | SP - SM |  | F | NF |  |  |  |  |  |  |  |
| 4 | 2 |  |  |  |  |  |  |  | - | 9 | 90 | 1 |  |  |  |
| 6 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 8 |  |  |  |  |  | - Brown |  |  |  |  |  |  |  |  |  |
| 10 | 3 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 12 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 14 | 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 16 |  |  |  |  |  | END OF HOLE 15' |  |  |  |  |  |  |  |  |  |
| 18 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 20 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 22 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 24 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |



# E.W. BROOKER & ASSOCIATES LTD.

## DRILL HOLE REPORT

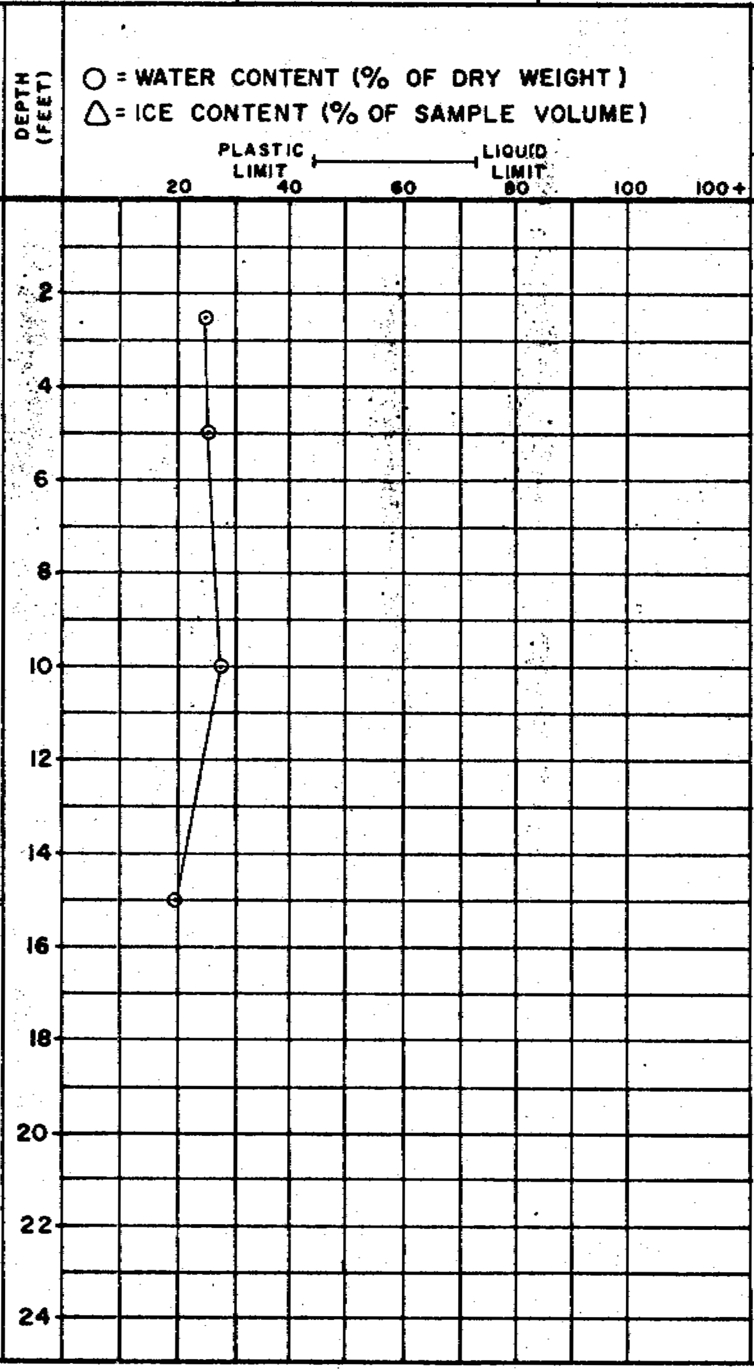
## DEPARTMENT OF PUBLIC WORKS, CANADA
## MACKENZIE HIGHWAY

| | | | | | |
|---|---|---|---|---|---|
| DWN: ALB | FIELD ENG: NRM | DATE DRILLED: 25/2/73 | AIRPHOTO NO: A22763 - 77 | CHAINAGE: | OFFSET |
| CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Good | VEGETATION: Black Spruce & Birch | ELEV: |

TEST HOLE BA 85

| MILE | B,C,S | NUMBER |
|---|---|---|
| 654 | B | 2 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | | | | SM | SAND - Silty, Fine, Grey-Brown | | | | | | | | | |
| 4 | 2 | | | | CL | CLAY - Silty, Med. Brown, Low Plastic | F | | | | | | | | |
| 6 | | | | | | | | NB | | | | | | | |
| 8 | | | | | ---<br>CI | | | | | | | | | | |
| 10 | 3 | | | | | - Medium Plastic, silty, trace of sand | | | 44 | 54 | 2 | - | | | |
| 12 | | | | | | | | | | | | | | | |
| 14 | 4 | | | | | - Medium Plastic, Grey | | | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |



## E.W. BROOKER & ASSOCIATES LTD.

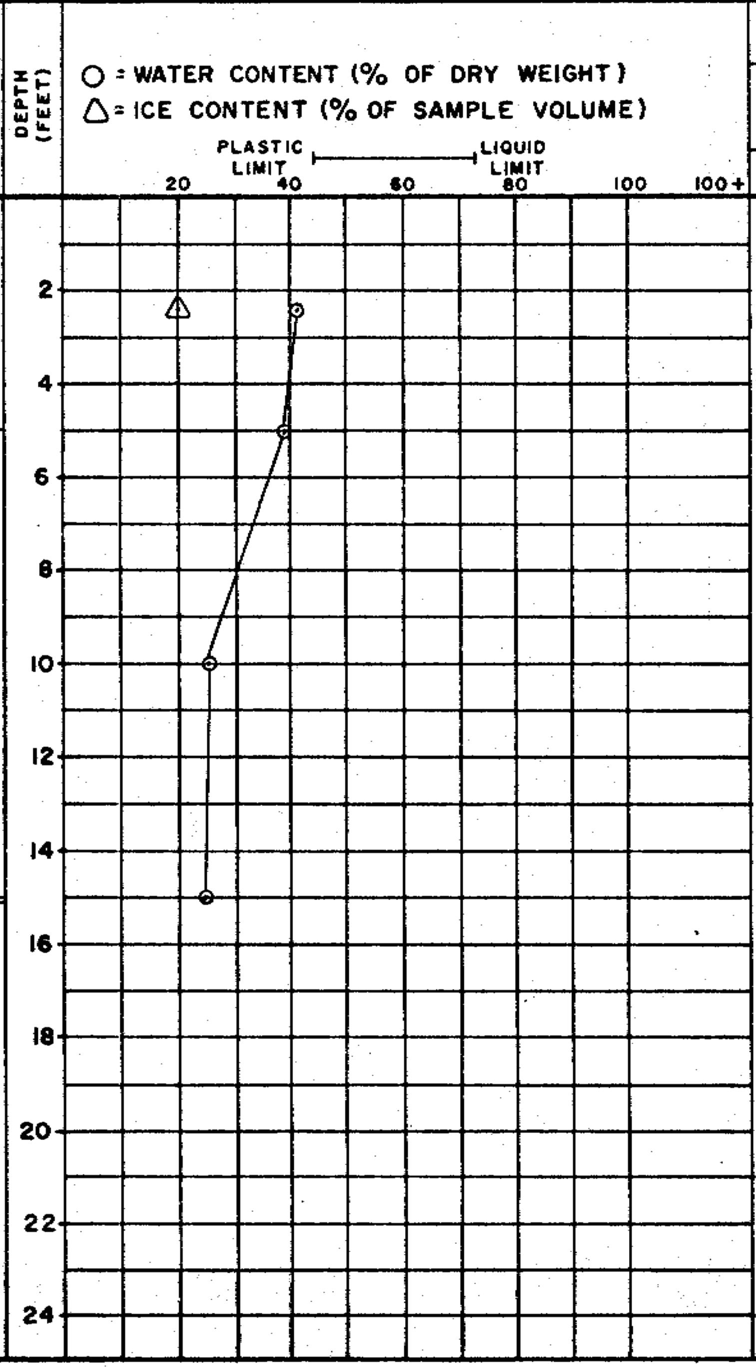
## DRILL HOLE REPORT

## DEPARTMENT OF PUBLIC WORKS, CANADA
## MACKENZIE HIGHWAY

DWN: ALB
FIELD ENG: NRM
DATE DRILLED 25/2/73
AIRPHOTO NO: A22763 - 77
CHAINAGE:
OFFSET
CKD: LAB
TECH DC
RIG: Texoma
SURFACE DRAINAGE: Good
VEGETATION: Black Spruce & Birch
ELEV:

| TEST HOLE BA 85 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 654 | B | 3 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | | | | | | CLAY - Silty, Grey-Brown, Low to Med. Plasticity | F | V - 20% | | | | | | | |
| | 1 | ⧄ | | | CL-<br>CI | | | | | | | | | | |
| 4 | 2 | ⧄ | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | |
| 10 | 3 | ⧄ | | | | - Trace of Fine Sand | | NB | | | | | | | |
| 12 | | | | | | | | | | | | | | | |
| 14 | 4 | ⧄ | | | | - Grey, Med. Plastic | | | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |

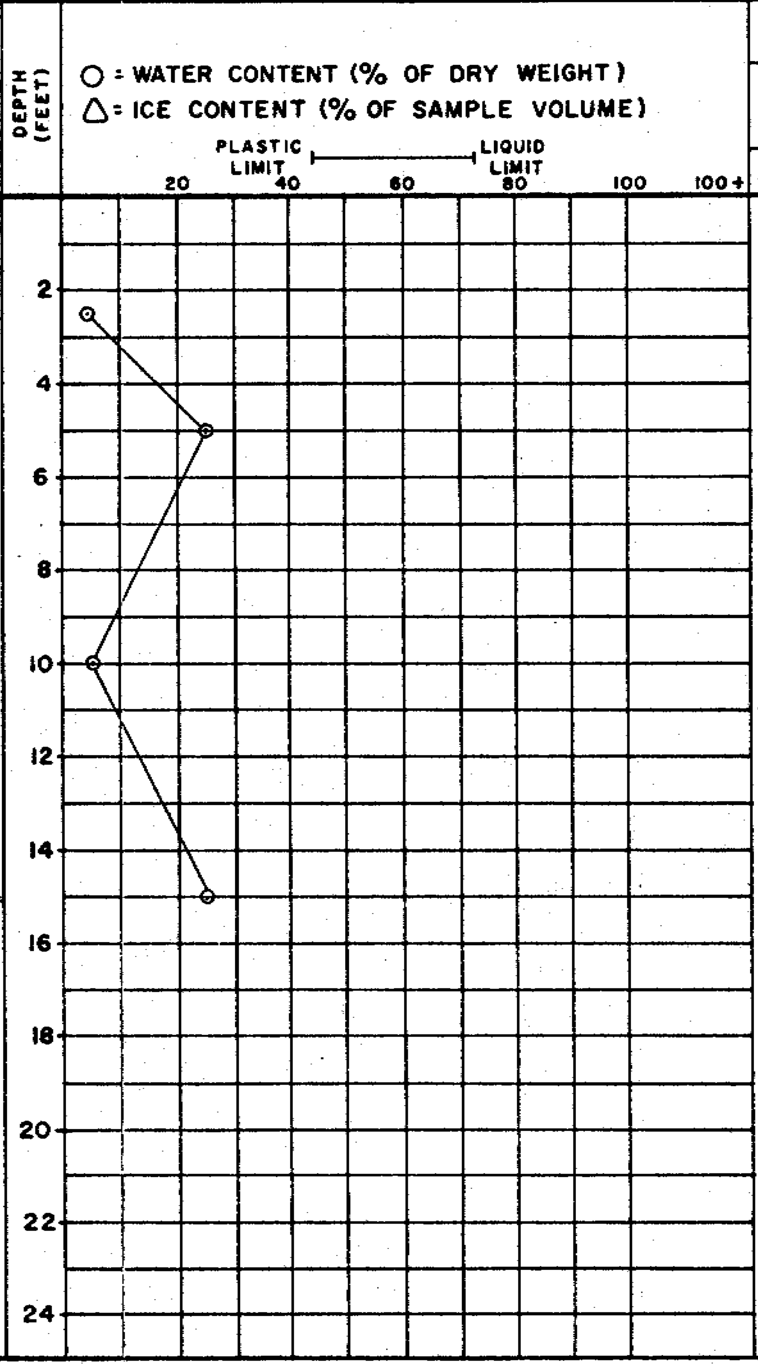


**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
FIELD ENG: NRM
DATE DRILLED 25/2/73
AIRPHOTO NO: A22763 - 77
CHAINAGE:
OFFSET
CKD: LAB
TECH: DC
RIG: Texoma
SURFACE DRAINAGE: Good
VEGETATION: Black Spruce & Birch
ELEV:

| TEST HOLE BA 86A | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 654 | B | 4 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | ⧄ | | | SM | SAND - Silty, Fine, Light Brown | F | NF to NB | | | | | | | |
| | 2 | ⧄ | | | | - Grey-Brown | | | | | | | | | |
| | 3 | ⧄ | | | | | | | | | | | | | |
| | | | | | ML | SILT - Sandy, Grey, Non-Plastic | | | | | | | | | |
| | 4 | ⧄ | | | | | | | | | | | | | |
| | | | | | | END OF HOLE 15' | | | | | | | | | |



E.W. BROOKER & ASSOCIATES LTD.

DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

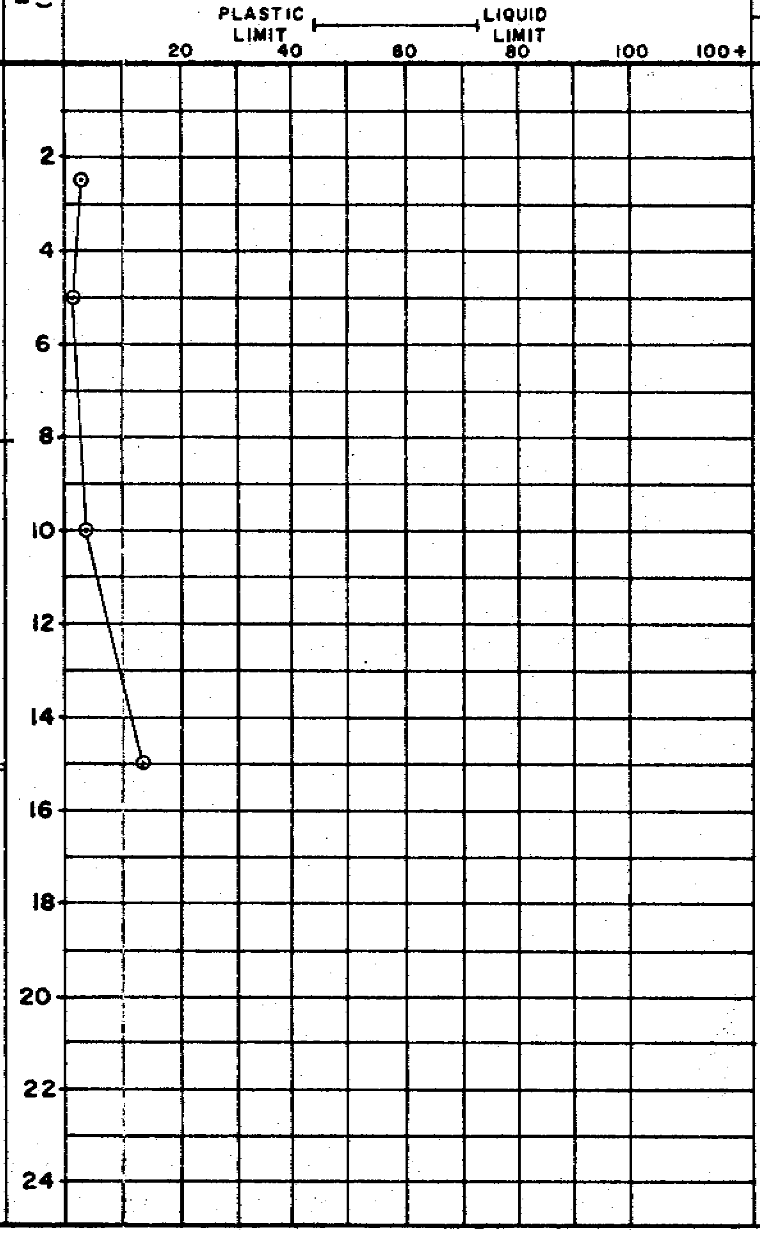
DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 25/2/73
RIG: Texoma
AIRPHOTO NO: A22763 - 77
SURFACE DRAINAGE: Good
CHAINAGE:
VEGETATION: Black Spruce & Birch
OFFSET
ELEV:

TEST HOLE BA 86A

| MILE | B,C,S | NUMBER |
|---|---|---|
| 653 | B | 1 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 |  |  |  | SP | SAND - Rusty to Yellow Brown, Fine to Med. | F | NF |  |  |  |  |  |  |  |
| 4 | 2 |  |  |  |  | - Fine |  |  |  |  |  |  |  |  |  |
| 10 | 3 |  |  |  | SM | - Silty, Fine, Wet | U | Unfrozen |  |  |  |  |  |  |  |
| 14 | 4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 16 |  |  |  |  |  | END OF HOLE 15' |  |  |  |  |  |  |  |  |  |

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)

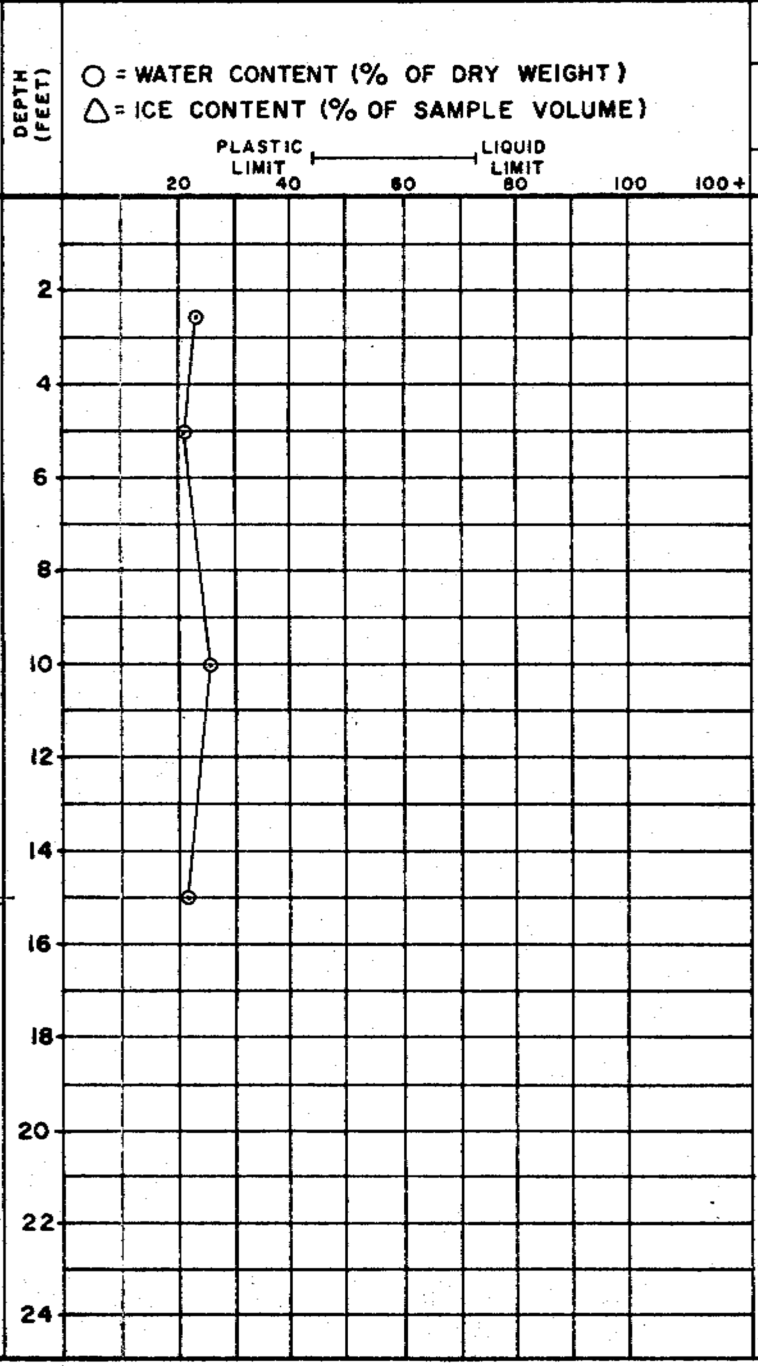


| E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA<br>MACKENZIE HIGHWAY |
|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| DWN: ALB | FIELD ENG: NRM | DATE DRILLED 25/2/73 | AIRPHOTO NO: A22763 - 77 | CHAINAGE: | OFFSET: | TEST HOLE BA 86A |
| CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Fair to Good | VEGETATION: Black Spruce & Birch | ELEV: | |

| MILE | B,C,S | NUMBER |
|---|---|---|
| 653 | B | 2 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SAND - Grey-Brown, Fine | | | | | | | | | |
| 2 | 1 | ⧅ | | | SP | | | | | | | | | | |
| 4 | 2 | ⧅ | | | | | F | NB | | | | | | | |
| 6 | | | | | | | | | | | | | | | |
| 8 | | | | | --- | | | | | | | | | | |
| | | | | | | - Silty, Fine | | | | | | | | | |
| 10 | 3 | ⧅ | | | SM | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | |
| | | | | | | - Grey | | | | | | | | | |
| 14 | 4 | ⧅ | | | | | | | | | | | | | |
| | | | | | | END OF HOLE 15' | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |

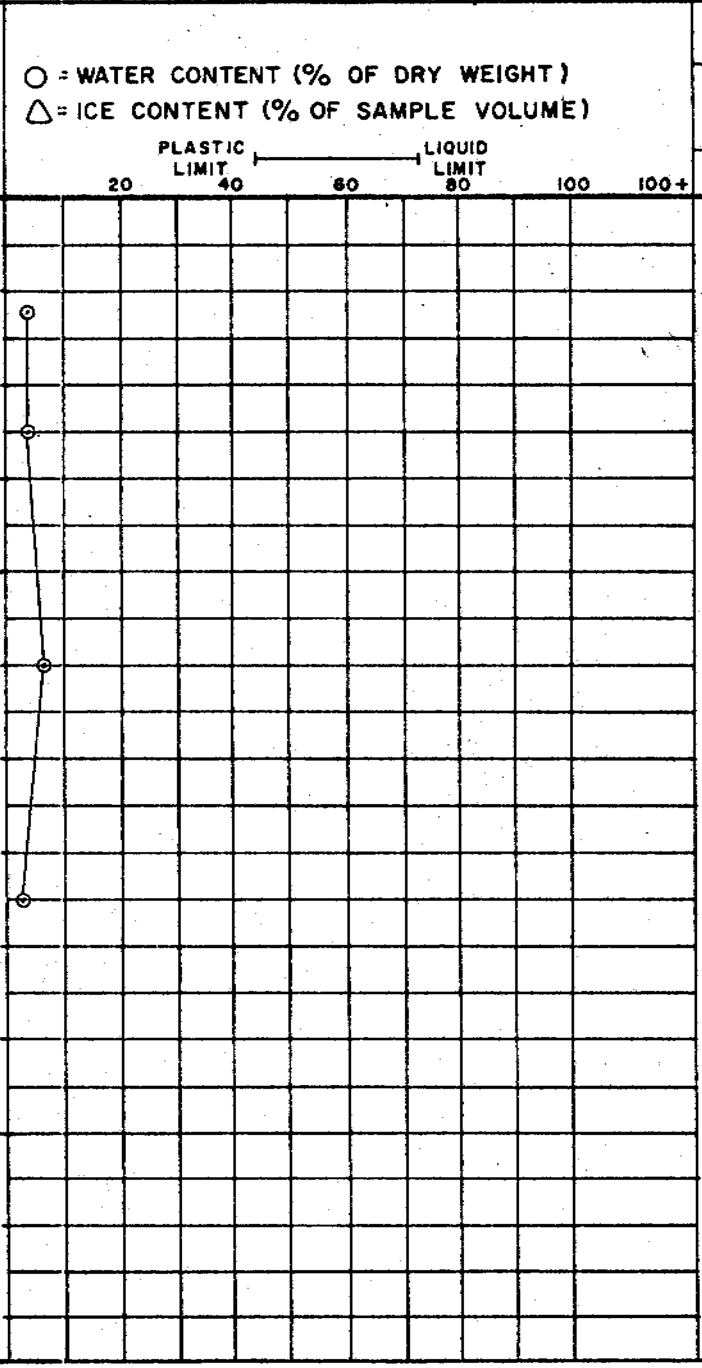


**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

| | | | | | |
|---|---|---|---|---|---|
| DWN: ALB | FIELD ENG: NRM | DATE DRILLED: 25/2/73 | AIRPHOTO NO: A22763 - 77 | CHAINAGE: | OFFSET |
| CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Good | VEGETATION: Black Spruce & Birch | ELEV: |

| TEST HOLE BA 86A | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 653 | B | 3 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SAND - Brown, Fine to Med. | | | | | | | | | |
| 2 | 1 | ⧅ | | | SP | | | | | | | | | | |
| 4 | 2 | ⧅ | | | | | | | | | | | | | |
| 6 | | | | | | | F | NF | | | | | | | |
| 8 | | | | | | | | | | | | | | | |
| 10 | 3 | ⧅ | | | | | | | 0 | 2 | 98 | 0 | | | |
| 12 | | | | | | | | | | | | | | | |
| 14 | 4 | ⧅ | | | | - fine, trace of silt, uniform | | | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |

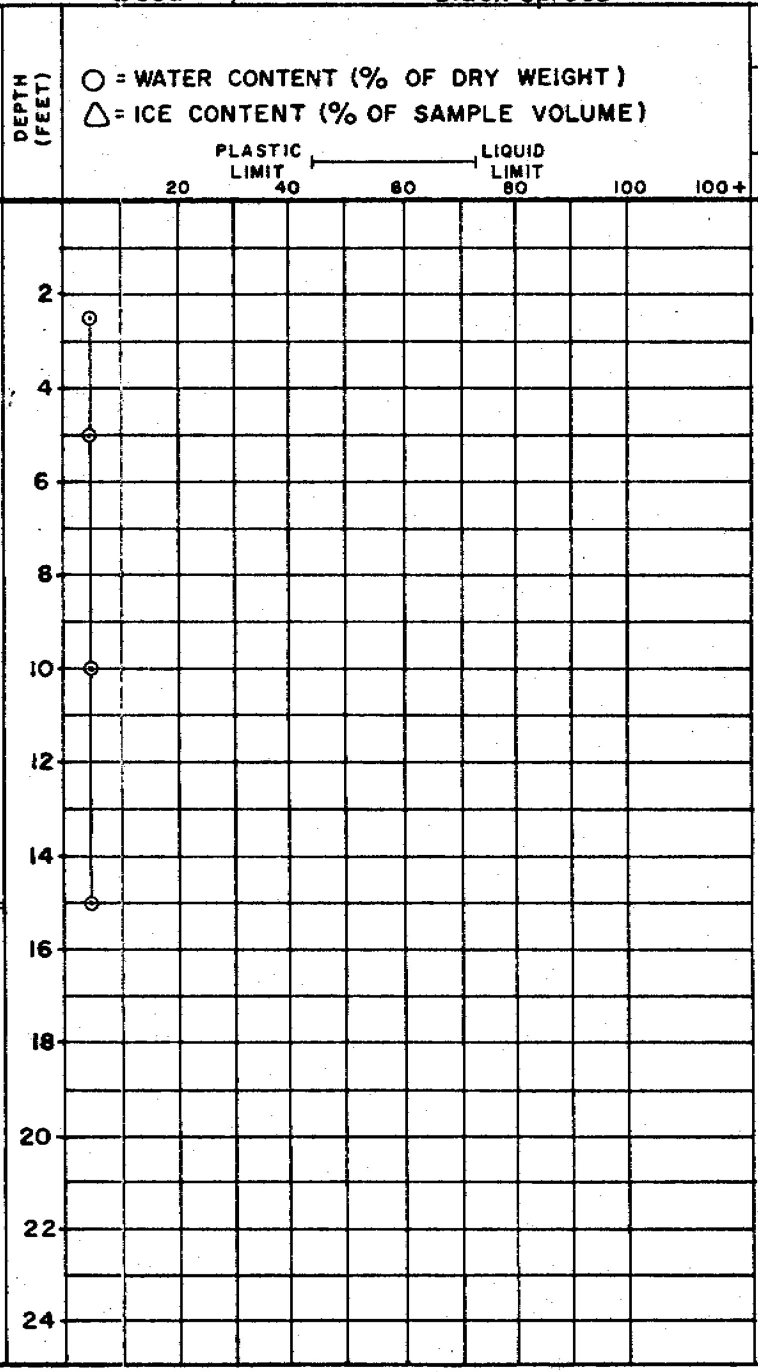


**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 25/2/73
RIG: Texoma
AIRPHOTO NO: A22763 - 77
SURFACE DRAINAGE: Good
CHAINAGE:
VEGETATION: Black Spruce
OFFSET
ELEV:

| TEST HOLE BA 86B | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 653 | B | 4 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SAND - Yellow Brown, Fine to Med. Sand | | | | | | | | | |
| 2 | 1 | | | | | | | | | | | | | | |
| 4 | 2 | | | | SP | - Fine, Trace of Organics | | | | | | | | | |
| 6 | | | | | | | F | NF | | | | | | | |
| 8 | | | | | | | | | | | | | | | |
| 10 | 3 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | |
| 14 | 4 | | | | | - White, Fine | | | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |



**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

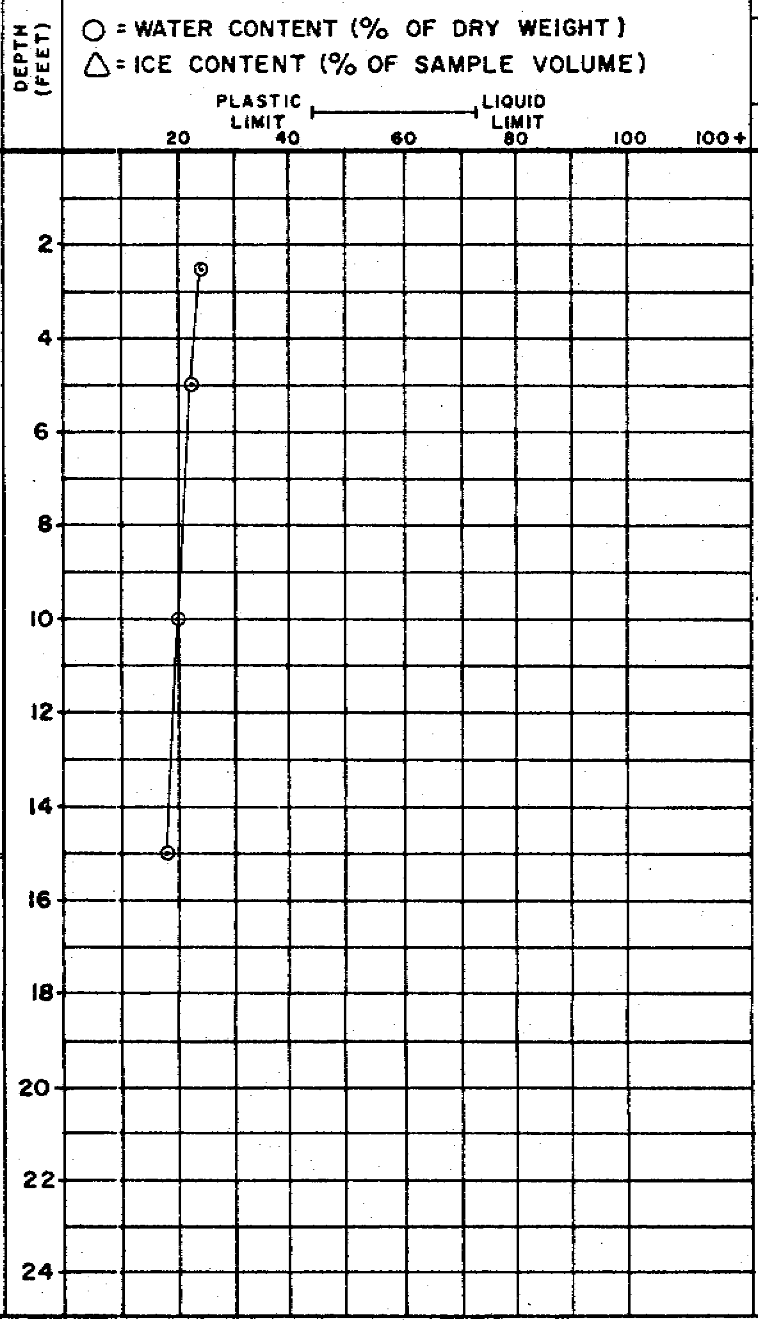
DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 25/2/73
RIG: Texoma
AIRPHOTO NO: A22763 - 75
SURFACE DRAINAGE: Fair
CHAINAGE:
VEGETATION: Black Spruce
OFFSET
ELEV:

TEST HOLE BA 88

| MILE | B,C,S | NUMBER |
|---|---|---|
| 652 | B | 1 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 – 6 | 1<br>2 | | | | SP - SM | SAND - Light Brown, Fine | | | | | | | | | |
| 6 – 15 | | | | | ML | SILT - Med. Brown, Non-Plastic | F | NB | | | | | | | |
| 10 | 3 | | | | | - Sandy, some Clay | | | 15 | 56 | 29 | 0 | | | |
| 14 – 15 | 4 | | | | | | | | | | | | | | |
| 15 | | | | | | END OF HOLE 15' | | | | | | | | | |

GRAIN- SIZE ANALYSIS

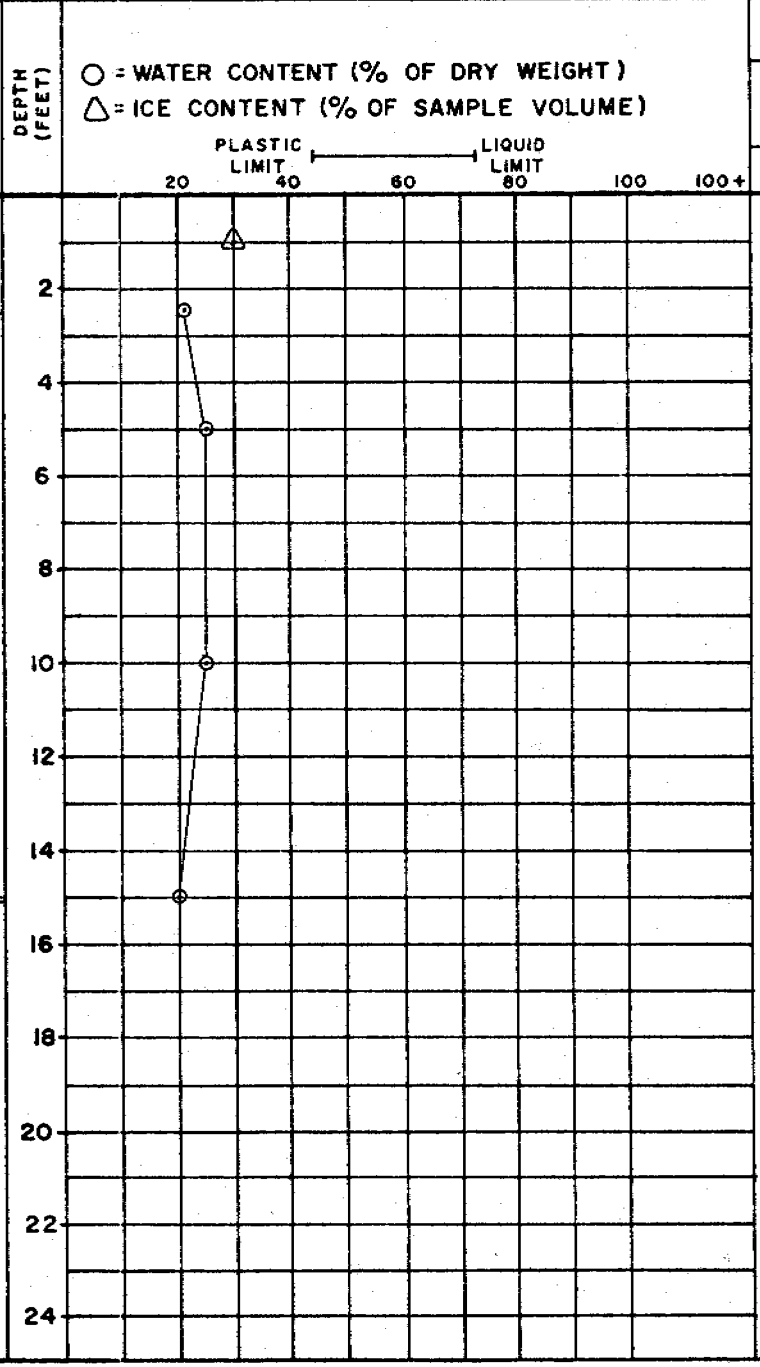


**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB | FIELD ENG: NRM | DATE DRILLED 25/2/73 | AIRPHOTO NO: A22763 - 75 | CHAINAGE: | OFFSET
CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Fair to Good | VEGETATION: Black Spruce | ELEV:

| TEST HOLE BA 87 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 652 | B | 2 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 1 | ⧅ | | | SP | SAND - Fine to Med., Brown some Silt, poorly graded. | F | V - 25% | | | | | | | |
| 4 | 2 | ⧅ | | | | | | | - | 11 | 89 | 0 | | | |
| 6 | | | | | | | | NB | | | | | | | |
| 8 | | | | | | | | | | | | | | | |
| 10 | 3 | ⧅ | | | ML to SM | SILT - Fine Sandy, Non Plastic, Grey | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | |
| 14 | 4 | ⧅ | | | | | | | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |



E.W. BROOKER & ASSOCIATES LTD.

# DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 25/2/73
RIG: Texoma
AIRPHOTO NO: A22763 - 75
SURFACE DRAINAGE: Good
CHAINAGE:
VEGETATION: Black Spruce
OFFSET
ELEV:

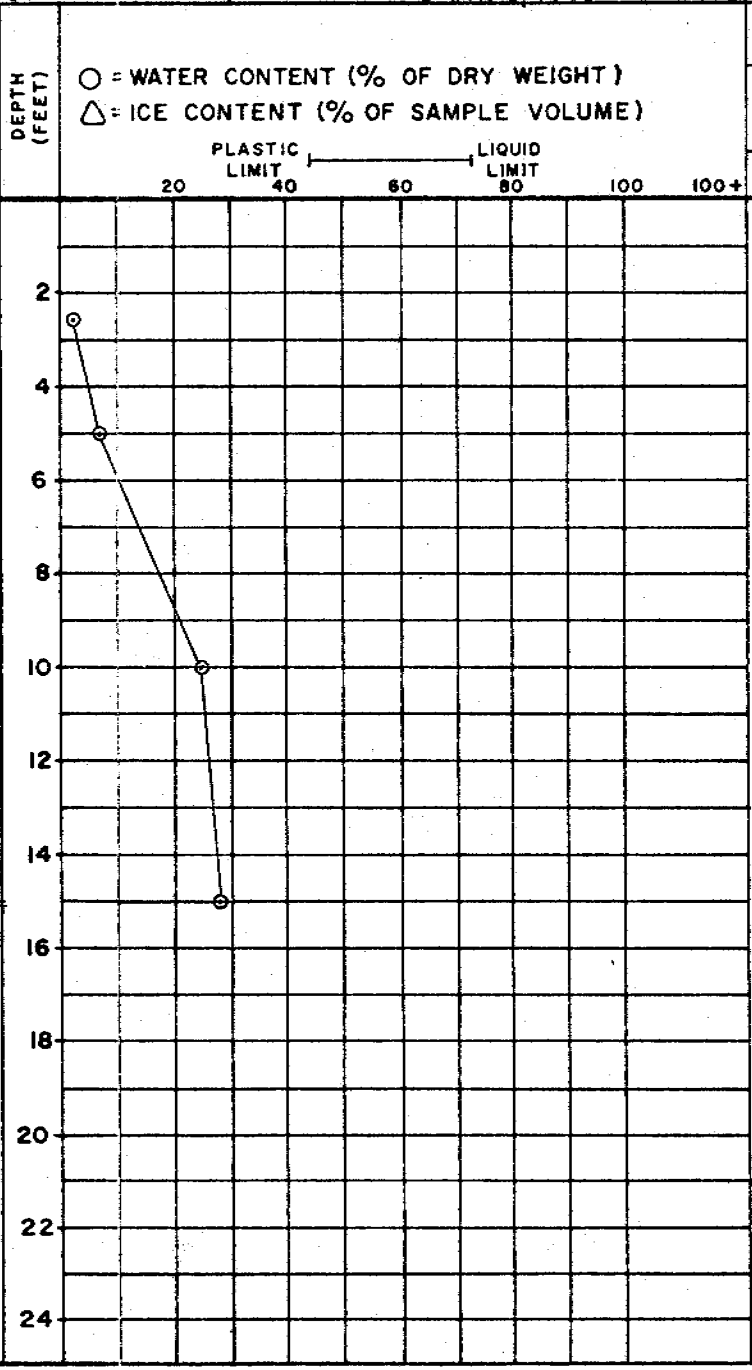
TEST HOLE BA 87

| MILE | B,C,S | NUMBER |
|---|---|---|
| 652 | B | 3 |

REMARKS

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 2 | 1 | | | | SP | SAND - Light Brown, Trace of Silt | | |
| 4 | 2 | | | | | - Clean | F | NF |
| 6 | | | | | | | | |
| 8 | | | | | ML | SILT - Med. Brown, Non-Plastic | | |
| 10 | 3 | | | | | | | |
| 12 | | | | | | | F | NB |
| 14 | 4 | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | |
| 18 | | | | | | | | |
| 20 | | | | | | | | |
| 22 | | | | | | | | |
| 24 | | | | | | | | |

GRAIN-SIZE ANALYSIS: CLAY %, SILT %, SAND %, GRAVEL %; WET DENSITY (P.C.F.); DRY DENSITY (P.C.F.)



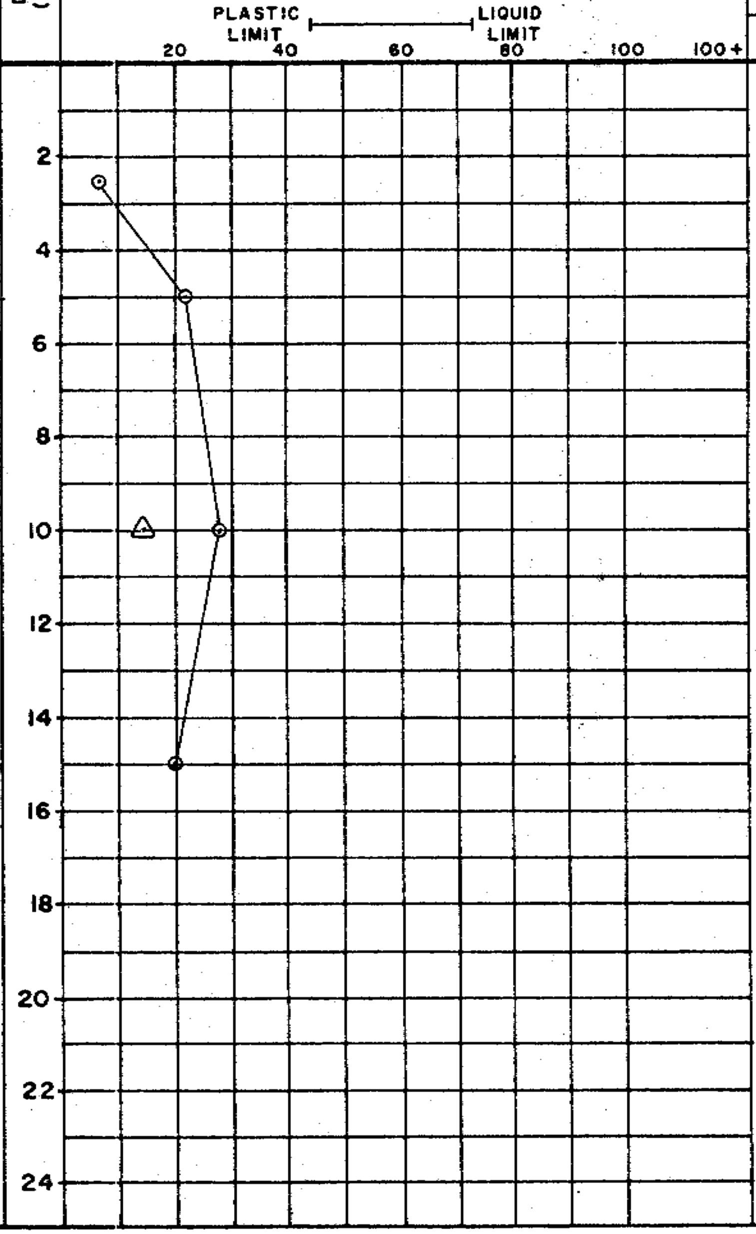
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 25/2/73
RIG: Texoma
AIRPHOTO NO: A22763 - 75
SURFACE DRAINAGE: Good
CHAINAGE:
VEGETATION: Black Spruce
OFFSET
ELEV:

| TEST HOLE BA 87 | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 652 | B | 4 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | | | SM-ML | SAND - Light Brown, Fine SILT | | NB | | | | | | | |
| | 2 | | | | SP | SAND - Clean, Fine, Light Brown | | | | | | | | | |
| | 3<br>4 | | | | CL | CLAY - Grey, Silty, Low Plasticity | F | V - 15% | | | | | | | |
| | | | | | | END OF HOLE 15' | | | | | | | | | |

○ = WATER CONTENT (% OF DRY WEIGHT)
△ = ICE CONTENT (% OF SAMPLE VOLUME)



**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

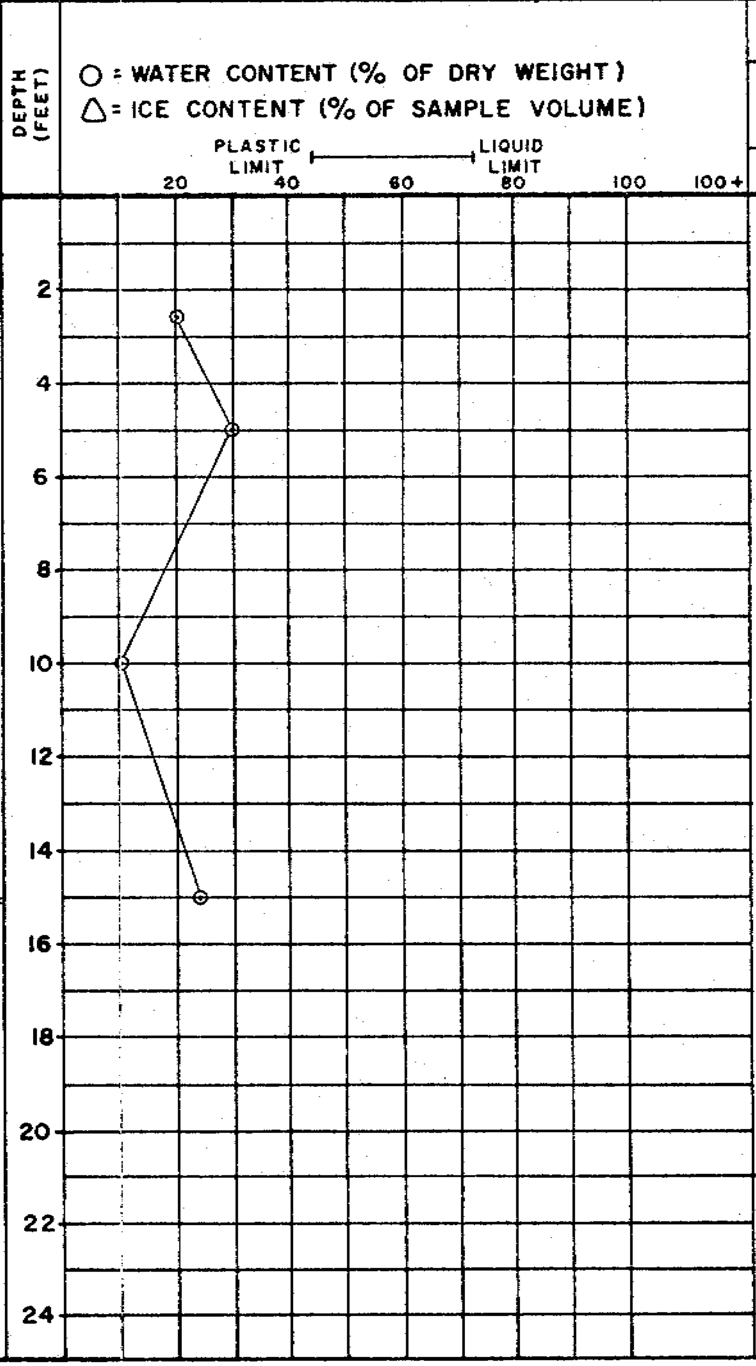
DWN: ALB | FIELD ENG: NRM | DATE DRILLED 26/2/73 | AIRPHOTO NO: A22774 - 44 | CHAINAGE: | OFFSET

CKD: LAD | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Good | VEGETATION: Black Spruce | ELEV:

TEST HOLE BA 89

| MILE | B,C,S | NUMBER |
|---|---|---|
| 651 | B | 1 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SILT - Light Brown, Non-Plastic | | | | | | | | | |
| 2 | 1 | | | | ML | | | | | | | | | | |
| 4 | 2 | | | | | - Clayey, Low Plasticity | F | NB | | | | | | | |
| 6 | | | | | CL | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | |
| 10 | 3 | | | | | - Gravelly, Some Sand | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | |
| 14 | 4 | | | | | - Clayey, Low Plasticity | | | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |



# E.W. BROOKER & ASSOCIATES LTD.

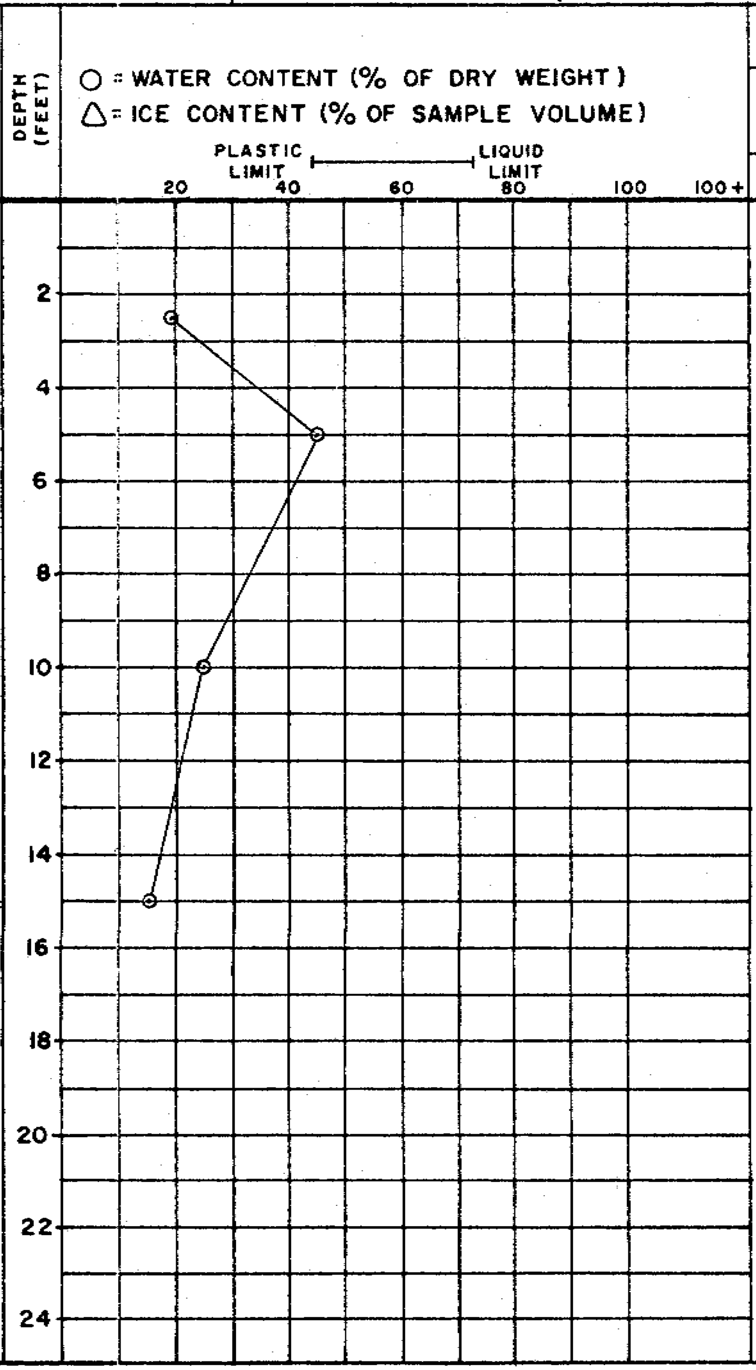
# DRILL HOLE REPORT

DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: ALB
CKD: LAP
FIELD ENG: NRM
TECH: DC
DATE DRILLED: 26/2/73
RIG: Texoma
AIRPHOTO NO: A22774 - 44
SURFACE DRAINAGE: Good
CHAINAGE:
VEGETATION: Black Spruce
OFFSET
ELEV:

| TEST HOLE | BA 89 | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 651 | B | 2 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | | | | ML | SILT - Light Brown, Very Low Plasticity | F | NB | | | | | | | |
| | 2 | | | | | | | | | | | | | | |
| | 3 | | | | | | | | | | | | | | |
| | | | | | SM | SAND - Coarse, Traces of Silt | | | | | | | | | |
| | 4 | | | | | | | | | | | | | | |
| | | | | | | END OF HOLE 15' | | | | | | | | | |



E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY

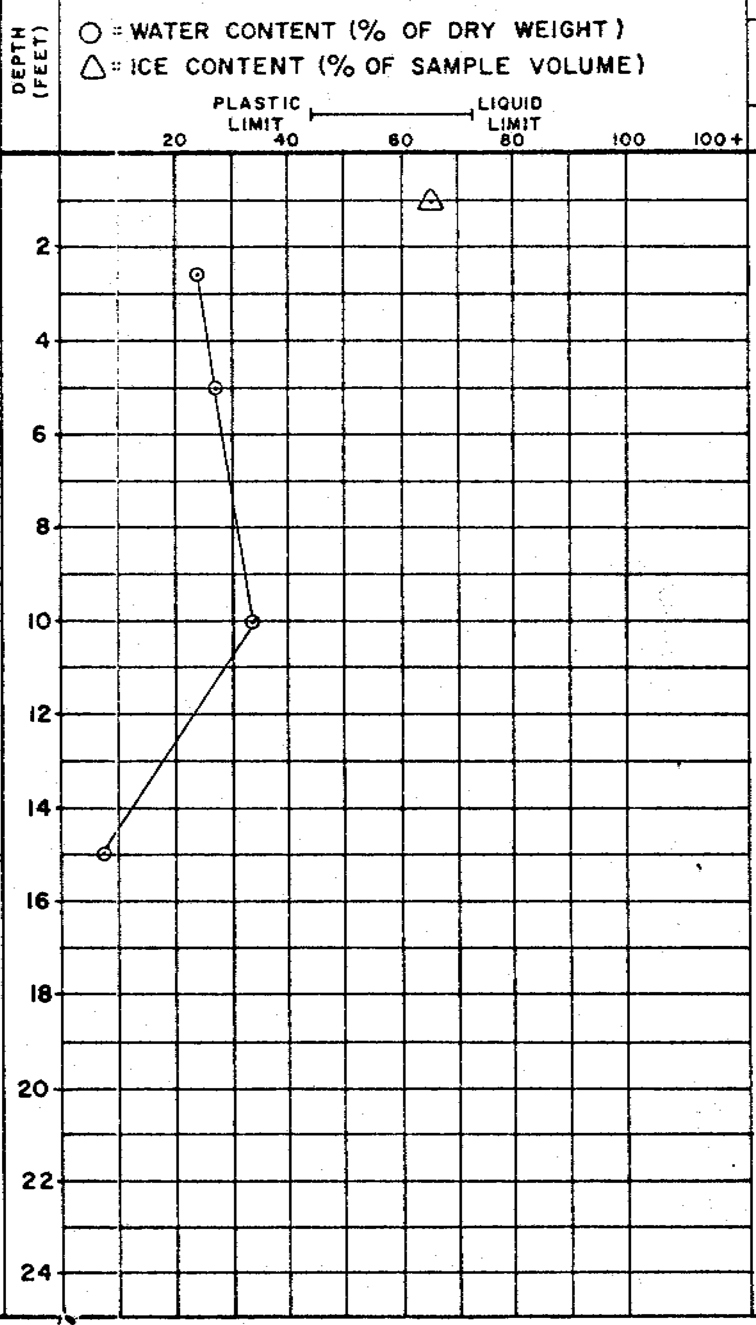
DWN: ALB | FIELD ENG: NRM | DATE DRILLED 26/2/73 | AIRPHOTO NO: A22774 - 44 | CHAINAGE: | OFFSET

CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Good | VEGETATION: Black Spruce | ELEV:

TEST HOLE BA 89

| MILE | B,C,S | NUMBER |
|---|---|---|
| 651 | B | 3 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | CLAY - Silty, Light Brown, Low Plasticity | F | V - 65% | | | | | | | |
| 2 | 1 | ⧄ | | | CL | | | | | | | | | | |
| 4 | 2 | ⧄ | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | |
| 10 | 3 | ⧄ | | | | | | NB | | | | | | | |
| 12 | | | | | GM | GRAVEL - Silty, Subangular | | | | | | | | | |
| 14 | 4 | ⧄ | | | | | | | | | | | | | |
| 16 | | | | | | END OF HOLE 15' | | | | | | | | | |
| 18 | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |



**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

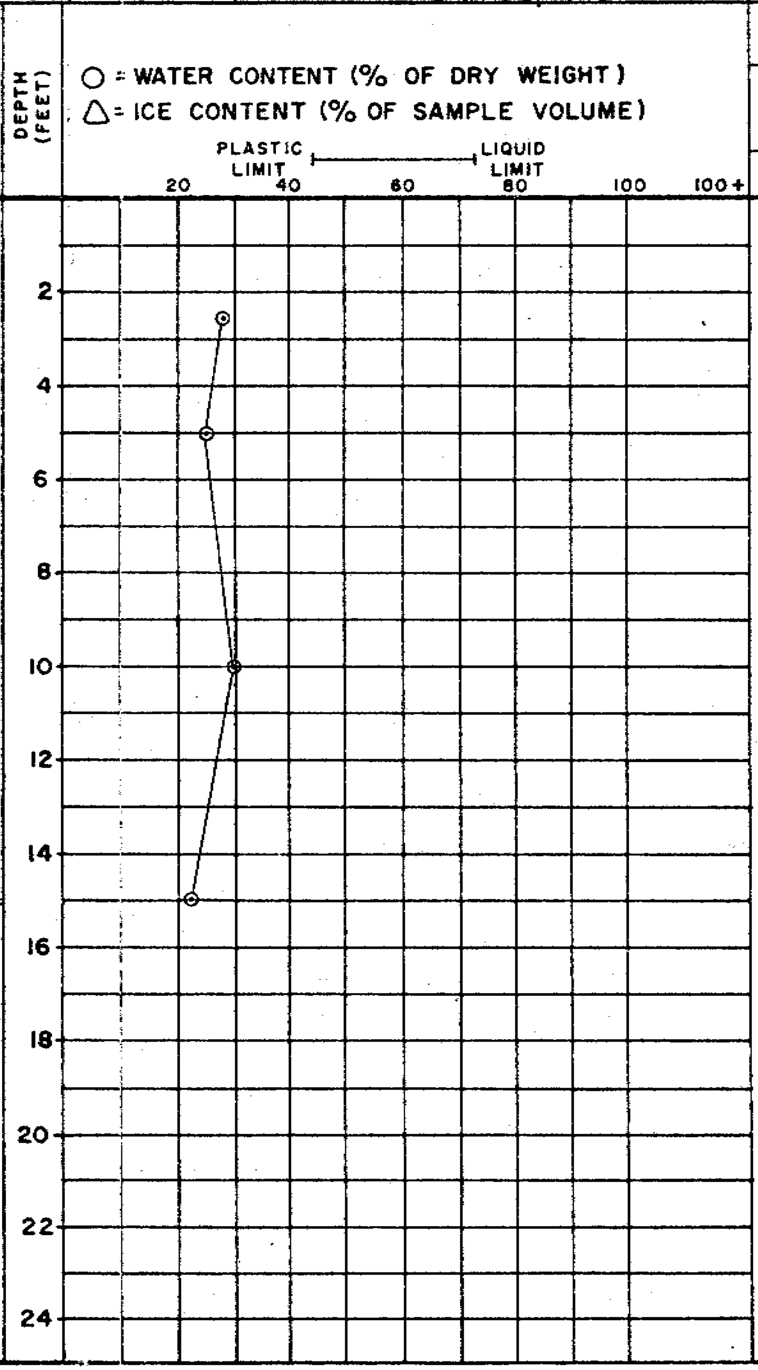
DWN: ALB | FIELD ENG: NRM | DATE DRILLED 26/2/73 | AIRPHOTO NO: A22774 - 44 | CHAINAGE: | OFFSET

CKD: LAR | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Good | VEGETATION: Black Spruce - | ELEV:

TEST HOLE BA 90

| MILE | B,C,S | NUMBER |
|---|---|---|
| 651 | B | 4 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 0 - 4 | 1 | | | | ML | SILT - Light Brown, Non Plastic | F | NB |
| 4 - 15 | 2<br>3<br>4 | | | | CL | CLAY - Med. Brown, Silty, Low Plasticity, Grey, | | |
| 15 | | | | | | END OF HOLE 15' | | |



| GRAIN-SIZE ANALYSIS | | | | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| CLAY % | SILT % | SAND % | GRAVEL % | | | |

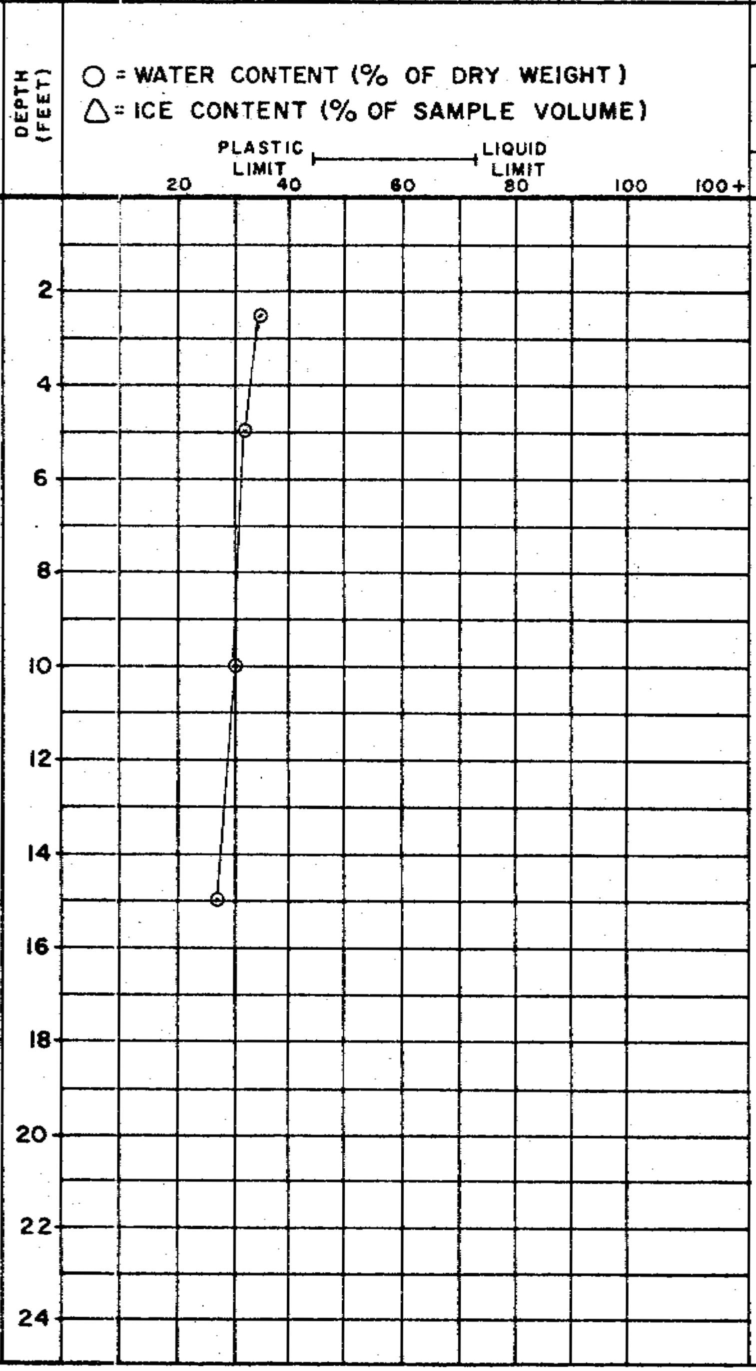
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: DC
DATE DRILLED 26/2/73
RIG: Texoma
AIRPHOTO NO: A22774 - 44
SURFACE DRAINAGE: Good
CHAINAGE:
VEGETATION: Black Spruce
OFFSET
ELEV:

TEST HOLE BA 90

| MILE | B,C,S | NUMBER |
|---|---|---|
| 651 | B | 5 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 – 12 | | | | | CL | CLAY - Med. Brown<br>- Silty<br>- Low Plasticity | F | NB | | | | | | | |
| 2 | 1 | ⧅ | | | | | | | | | | | | | |
| 4 | 2 | ⧅ | | | | | | | | | | | | | |
| 10 | 3 | ⧅ | | | | - Mottled | | | | | | | | | |
| 12 – 15 | | | | | ML | SILT - Grey, Trace of Clay, Low Plasticity | | | | | | | | | |
| 14 | 4 | ⧅ | | | | | | | | | | | | | |
| 15 | | | | | | END OF HOLE 15' | | | | | | | | | |



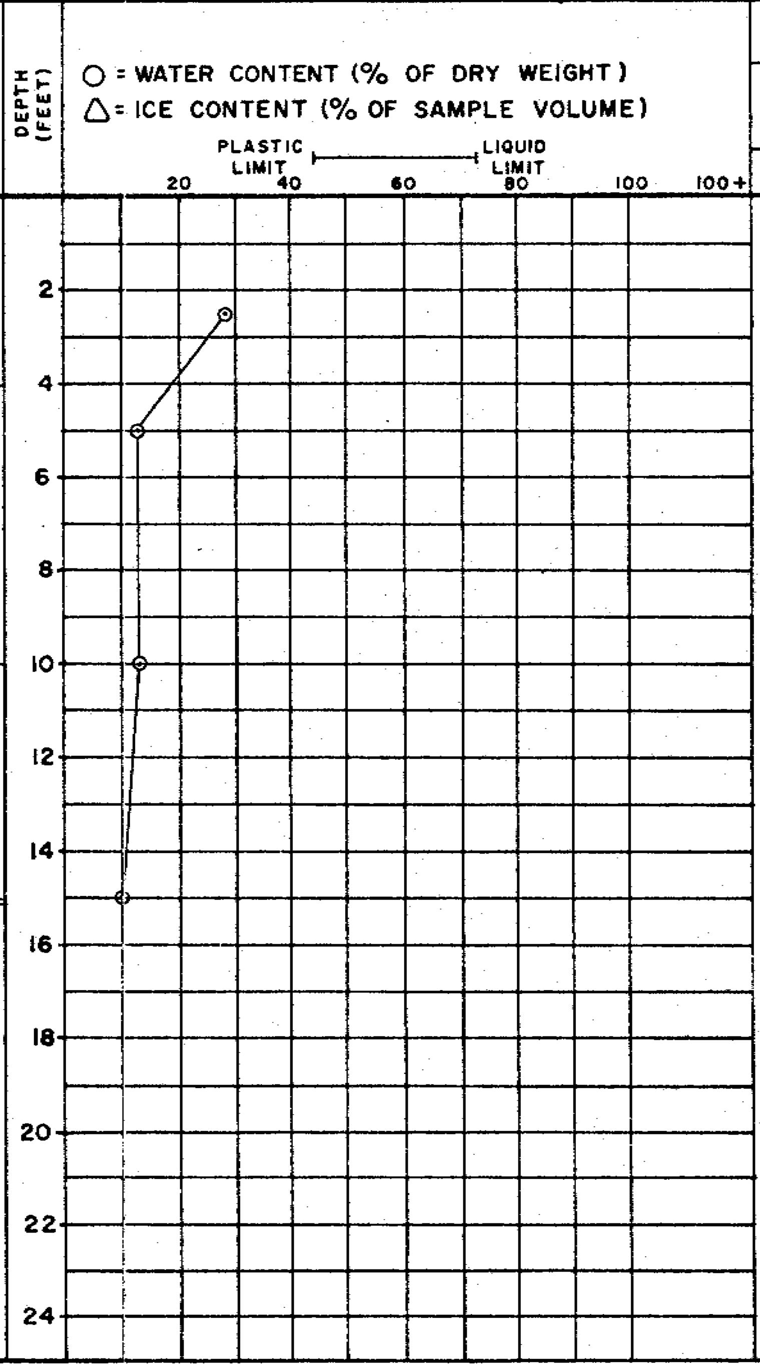
E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY

DWN: ALB | FIELD ENG: NRM | DATE DRILLED: 26/2/73 | AIRPHOTO NO: A22774 - 44 | CHAINAGE: | OFFSET

CKD: LAB | TECH: DC | RIG: Texoma | SURFACE DRAINAGE: Good | VEGETATION: Black Spruce | ELEV:

| TEST HOLE BA 91A | | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 650 | B | 1 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 2 | 1 | ⧅ | | | CL | CLAY - Light Brown, Silty, Low Plasticity, Some Sand | | NB |
| 4 | 2 | ⧅ | | | GM | GRAVEL - Silty, Fine to Medium, Subrounded | F | NF |
| 10 | 3 | ⧅ | | | | - Traces of Silt | U | Unfrozen |
| 14 | 4 | ⧅ | | | | | | |
| 15 | | | | | | END OF HOLE 15' | | |



GRAIN-SIZE ANALYSIS: CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.)

REMARKS

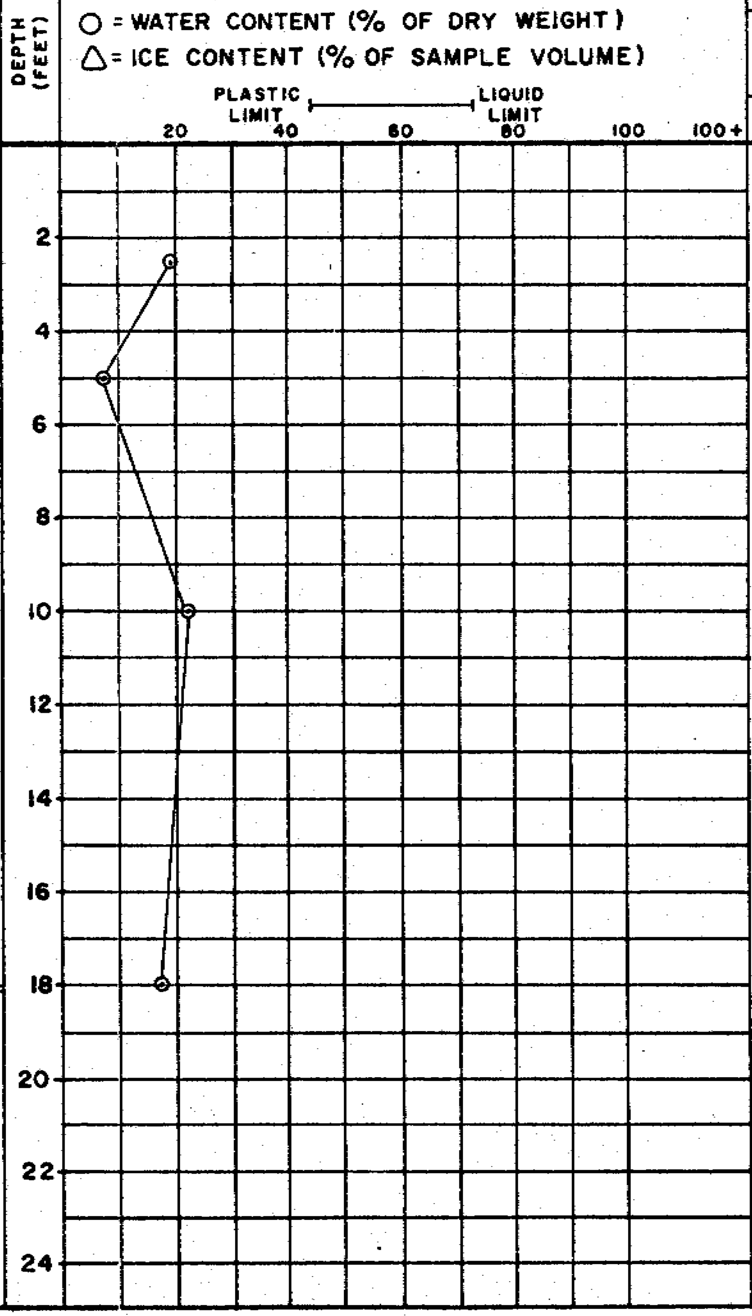
**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA**
**MACKENZIE HIGHWAY**

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: TJ
DATE DRILLED 8/3/73
RIG: Mayhew
AIRPHOTO NO: A23003 - 32
SURFACE DRAINAGE: Excellent to N
CHAINAGE:
VEGETATION: Thick Spruce 40-50'
OFFSET
ELEV:

TEST HOLE BA 91B

| MILE | B,C,S | NUMBER |
|---|---|---|
| 649 | B | 2 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ML | SILT<br>- Lt Brown<br>- Non-Plastic | F | NB | | | | | | | |
| 2 | 1 | | | | GW - SW | GRAVEL, SAND<br>- Varying from Gravel<br>- Med.<br>- Sandy to<br>- Sand<br>- Coarse - Med.<br>- Some Gravel<br>- Moist<br>- Clean | U | Unfrozen | | | | | | | |
| | 2 | | | | | | | | - | 6 | 27 | 67 | | | |
| 10 | 3 | | | | | | | | | | | | | | |
| 18 | 4 | | | | | | | | | | | | | | |
| | | | | | | END OF HOLE 18' | | | | | | | | | |



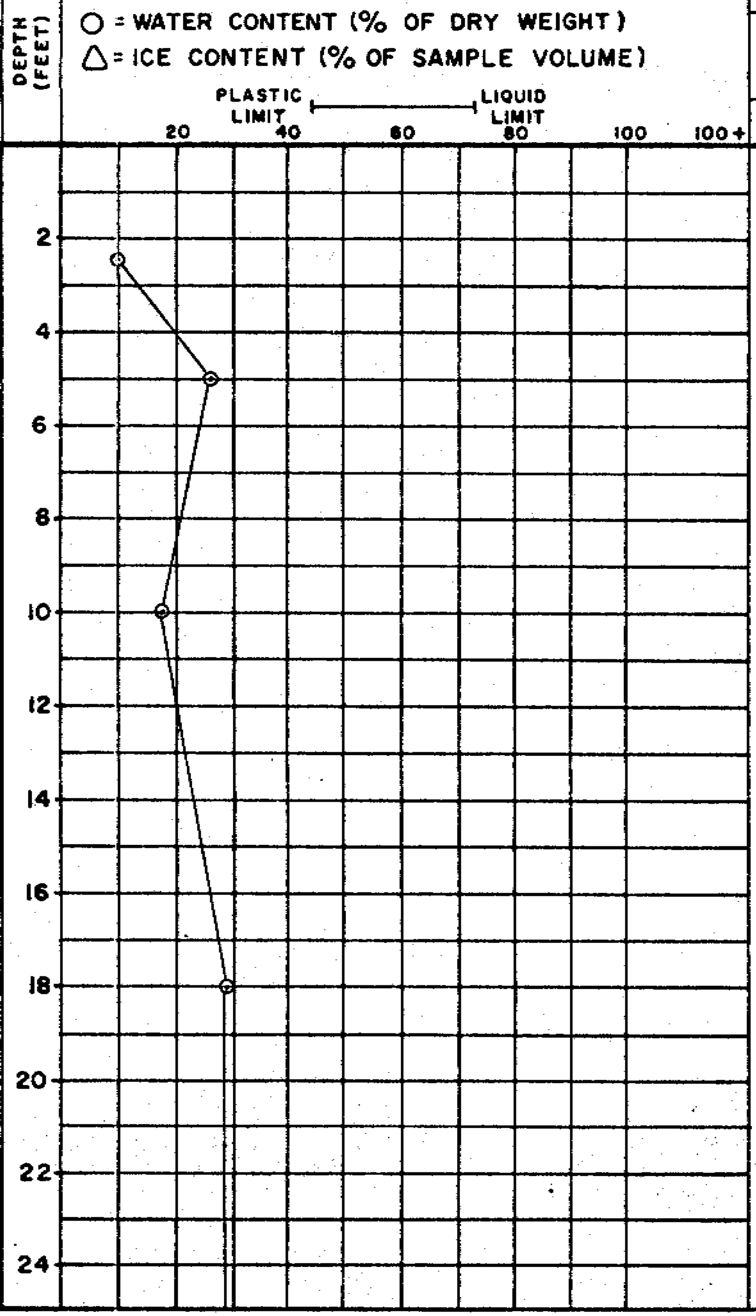
# E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY

DWN: ALB
CKD: LAP
FIELD ENG: NRM
TECH: TJ
DATE DRILLED 8/3/73
RIG: Mayhew
AIRPHOTO NO: A23003 - 32
SURFACE DRAINAGE: Excellent to W
CHAINAGE:
VEGETATION: Thick Spruce Birch 35-40'
OFFSET
ELEV:

TEST HOLE BA 91B

| MILE | B,C,S | NUMBER |
|---|---|---|
| 649 | B | 3 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0–2 | | | | | ML | SILT - Lt. Brown<br>- Non-Plastic | F | NB. | | | | | | | |
| 2 | 1 | | | | ML-<br>SM | SILT to SAND - Lt. Brown<br>- Gravelly<br>- 1' Thick Layers of Clean Gravelly Coarse Sand at Intervals of 4 to 5', Sand Layers are Moist - Unfrozen | F to U | NB to Unfrozen | | | | | | | |
| 5 | 2 | | | | | | | | | | | | | | |
| 10 | 3 | | | | | | | | | | | | | | |
| 18 | 4 | | | | | | | | | | | | | | |



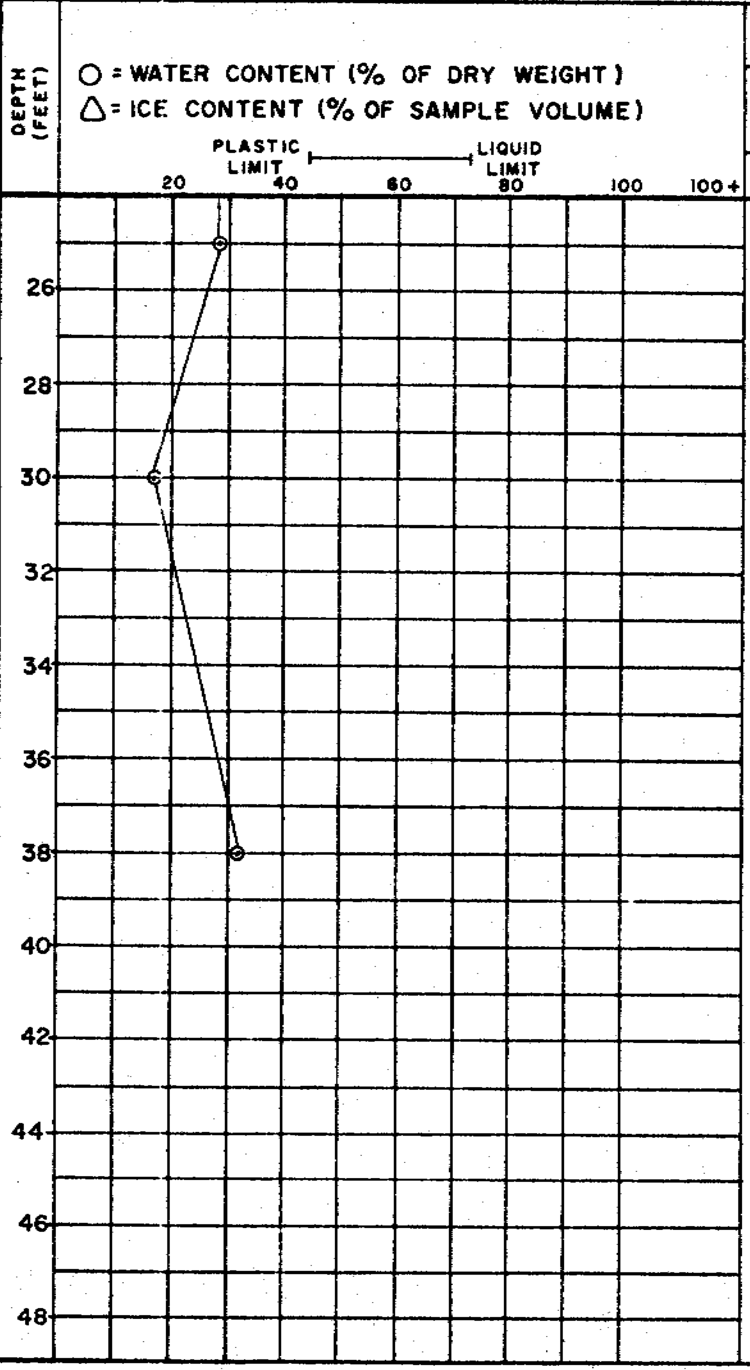
Page 2 of 2

**E.W. BROOKER & ASSOCIATES LTD.** | **DRILL HOLE REPORT** | **DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY**

DWN: ALB
FIELD ENG: NRM
DATE DRILLED: 8/3/73
AIRPHOTO NO: A23003 - 32
CHAINAGE:
OFFSET
CKD: LAB
TECH: TJ
RIG: Mayhew
SURFACE DRAINAGE: Excellent To W
VEGETATION: Thick Spruce Birch 35-40'
ELEV:

| TEST HOLE | BA 91B | |
|---|---|---|
| MILE | B,C,S | NUMBER |
| 649 | B | 3 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 5 | ⧅ | | | ML to SM | SILT TO SAND - Same | F to U | N6 to Unfrozen | | | | | | | |
| 30 | 6 | ⧅ | | | | | | | | | | | | | |
| | | | | | ML to SM | SILT - Grey, Non-Plastic, Sandy | F | NB | | | | | | | |
| 38 | 7 | ⧅ | | | | | | | | | | | | | |
| | | | | | | END OF HOLE 38' | | | | | | | | | |

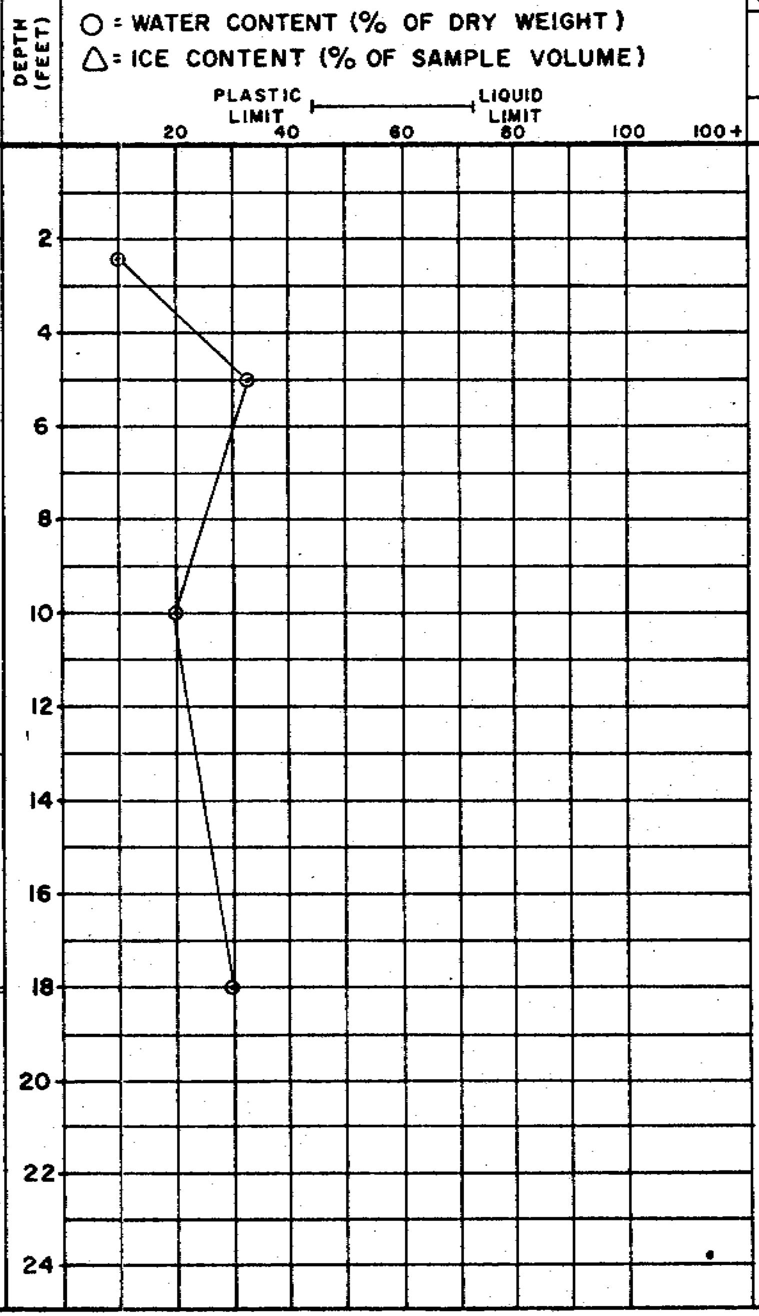


E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA MACKENZIE HIGHWAY

DWN: ALB
CKD: LAB
FIELD ENG: NRM
TECH: TJ
DATE DRILLED 8/3/73
RIG: Mayhew
AIRPHOTO NO: A23003 - 32
SURFACE DRAINAGE: Excellent to W
CHAINAGE:
VEGETATION: Thick Spruce 20-35'
OFFSET
ELEV:
TEST HOLE BA 91B

| MILE | B,C,S | NUMBER |
|---|---|---|
| 649 | B | 4 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| 0 - 2 | | | | | ML | SILT - Lt. Brown<br>- Non-Plastic | F | NB |
| 2 - 13 | 1<br>2<br>3 | | | | ML-SM | SILT to SAND - Lt. Brown<br>- Gravelly<br>- 1' Thick Layers of Clean Gravelly Coarse Sand at Intervals of 4 to 5' Sand Layers are Moist - Unfrozen | F to U | NB -V 0 - 5% to Unfrozen |
| 13 - 18 | 4 | | | | ML | SILT<br>- Lt. Brown<br>- Low Plasticity<br>- Some Sand | F | NB |
| 18 | | | | | | END OF HOLE 18' | | |



| GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|
| | | | | | | |

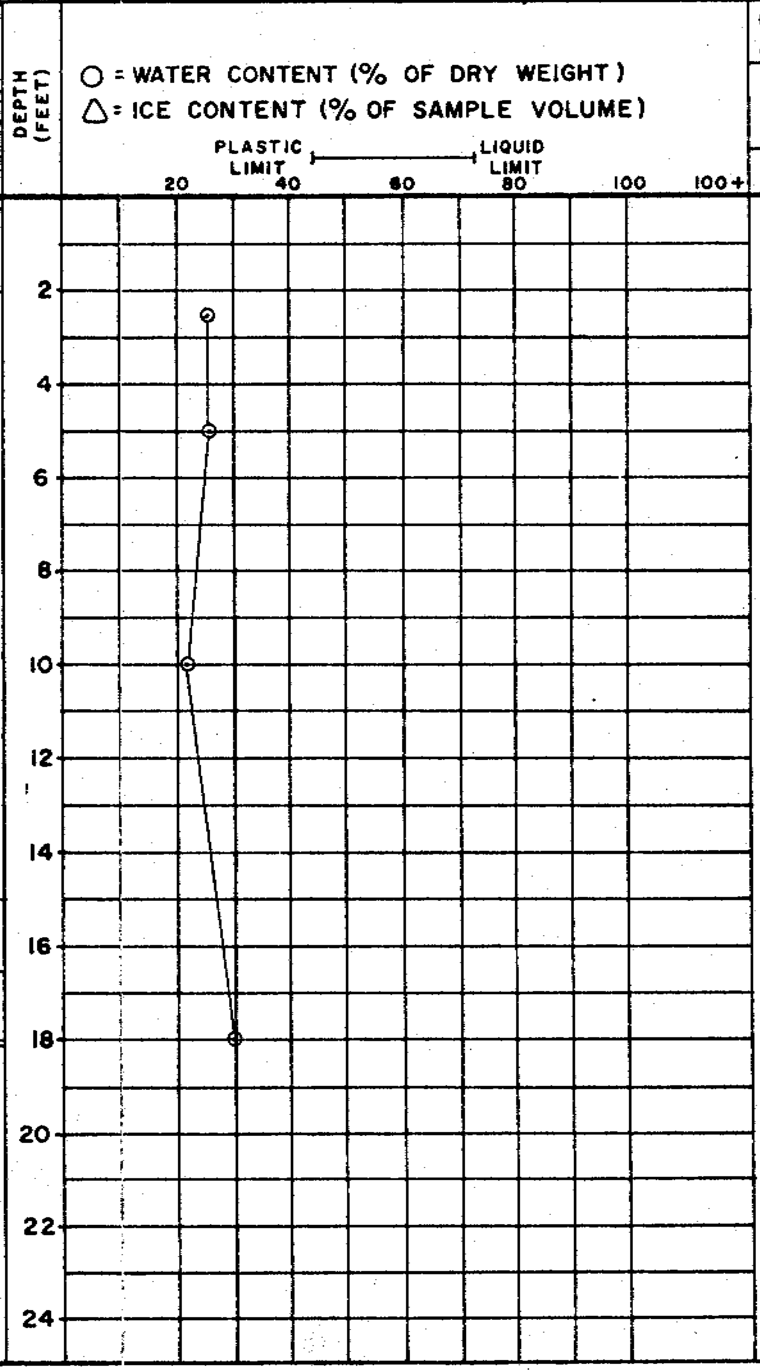
E.W. BROOKER & ASSOCIATES LTD. | DRILL HOLE REPORT | DEPARTMENT OF PUBLIC WORKS, CANADA
MACKENZIE HIGHWAY

DWN: ALB | FIELD ENG: NRM | DATE DRILLED: 8/3/73 | AIRPHOTO NO: A23003 - 32 | CHAINAGE: | OFFSET
CKD: | TECH: TJ | RIG: Mayhew | SURFACE DRAINAGE: Excellent to W | VEGETATION: Thick Spruce 35 - 40' | ELEV:

TEST HOLE BA 91B

| MILE | B,C,S | NUMBER |
|---|---|---|
| 649 | B | 5 |

| DEPTH (FEET) | SAMPLE NUMBER | SAMPLE TYPE | % RECOVERY | PENETRATION RESISTANCE | UNIFIED SOIL SYMBOL | SOIL DESCRIPTION | LIMITS OF FROZEN GROUND | ICE DESCRIPTION | GRAIN-SIZE ANALYSIS CLAY % | SILT % | SAND % | GRAVEL % | WET DENSITY (P.C.F.) | DRY DENSITY (P.C.F.) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | ML | SILT - Lt. Brown<br>- Non-Plastic | F | NB | | | | | | | |
| 2<br>4<br>6<br>8<br>10<br>12<br>14 | 1<br>2<br>3 | | | | ML | SILT - Lt. Brown<br>- Gravelly<br>- Non-Plastic<br>- Trace of Fine Sand | F to U | NB -V (0 - 5%) to Unfrozen | | | | | | | |
| 16 | | | | | SW | SAND - Coarse, Gravelly, Clean, Moist | U | Unfrozen | | | | | | | |
| 18 | 4 | | | | ML | SILT - Lt. Brown<br>- Gravelly | F | NB | | | | | | | |
| 20<br>22<br>24 | | | | | | END OF HOLE 18' | | | | | | | | | |



## TABLE A-4

## SUMMARY OF POTENTIAL BORROW AREA CONDITIONS

## SECTION IV (MILE 668 TO MILE 649)

| BORROW AREA NUMBER | ACCESS MILE | BOREHOLE NUMBERS | ACCESS DISTANCE (FEET) | BORROW MATERIAL | QUALITY OF MATERIAL | EXPECTED PIT CONDITIONS | AVERAGE STRIPPING DEPTH (FEET) | AVERAGE THICKNESS (FEET) | ESTIMATED QUANTITY (CU.YD.) | OVERALL BORROW EVALUATION |
|---|---|---|---|---|---|---|---|---|---|---|
| 63 | (668.5) | 668-B-1 & 5 | 6500<br>(3800)[1] | Limestone | Excellent | Will Require Blasting | 40 | 9+[2] | 11,670/100+[3] | Good to Excellent |
| 64 | 667.7 | 668-B-2,3,4 | 4700<br>(200) | Sand, Silt Till | Poor | Possibly High Ice Content & Wet | 0 | 7 | 28,500 | Poor to Unsuitable |
| 65A | 668.0 | 668-B-6<br>667-B-1 | 1400 | Limestone | Excellent | Will Require Blasting | 1 | 21+ | 62,220/100+ | Excellent |
| 65B | 667.6 | 667-B-2 | 1500 | Limestone | Excellent | Will Require Blasting | 3 | 9+ | 236,700 | Excellent |
| 66 | 668.0 | 667-B-7,8 | 1700<br>(500) | Silt Till | Poor to Unsuitable | Frozen | | | | Unsuitable |
| 67 | 667.3 | 667-B-5,6 | 5400<br>(800) | Silt | Poor to Unsuitable | | | | | Unsuitable |
| 68 | 667.3 | 667-B-11 | 1700 | Sand | Fair | U/F[4] | 0 | 15+ | 116,700 | Poor to Unsuitable |
| 69 | 667.3 | 667-B-9,10 | 1800 | Silt, Clay Till | Poor to Unsuitable | Unfrozen | | | | Unsuitable |
| 70A | 667.3 | 667-B-3 | 1000 | Sand | Fair to Poor | Frozen May be Wet | 0 | 6 | 93,300 | Poor to Unsuitable |
| 70B | 667.3 | 667-B-4 | 2650 | Sand | Fair | U/F May be Wet | 5.5 | 8.5 | 157,400 | Poor to Unsuitable |
| 71 | 666.5<br>(666.6) | 666-B-1 to 4 | 7200<br>(4550) | Shale | Poor | | 2.5 | | Limited Area Uncertain | Poor |
| 72 | 664.7 | 664-B-1,2 | 1100 | Silt and Silt Till | Unsuitable | Frozen | | | | Unsuitable |
| 73A | 663.7 | 664-B-3,4,5 | 4200 | Sand and Sand Silt Till | Poor to Unsuitable | Frozen | 3 | 15+ | 166,700 | Unsuitable To Poor |
| 73B | 663.7 | 664-B-6,7,8 | 2100 | Silt Till | Unsuitable | Frozen High Ice Content | | | | Unsuitable |
| 74 | 662.7 | 662-B-1 to 4 | 1000 | Sand and Gravel | Good | U/F to NF[5] May be Wet | 1 | 9.5 | 183,000 | Fair to Good |
| 75 | 661.7 | 662-B-5 to 9 | 1500 | Sand and Gravel | Good | Irregularly Frozen to NF Some Clay and Silt Beds, Wet | | | | Poor to Unsuitable |
| 76 | 661.7 | 661-B-1,2 | 2800 | Clay and Silt | Unsuitable | | | | | Unsuitable |
| 77 | 659.7 | 661-B-3 to 6 | 400 | Gravel and Sand | Fair to Good | U/F to NF Wet | 0 | 15+ | 300,000+ | Fair to Poor |
| 78 | 659.0 | 659-B-1,2 | 1300<br>(550) | Gravel | Good | Thin | | Thin Deposit | | Unsuitable |
| 79 | 657.7 | 658-B-1,2,3 | 600 | Sand and Gravel | Good to Excellent | Frozen Low Ice Content to NF | 10 | 34+ | Area Uncertain Large | Good |

1. (3800) Distance to borrow area by a route more direct than that used by the Drilling Part which is given above.
2. 9+ Thickness of material in excess of 9 feet. Actual quantity unknown.
3. 11,670/100' On linear features, such as bedrock ridge, quantities are given per 100 feet of ridge length.
4. U/F - unfrozen
5. NF - Non visible ice - friable

### TABLE A-4 (cont'd)

### SUMMARY OF POTENTIAL BORROW AREA CONDITIONS

### SECTION IV (MILE 668 TO MILE 649)

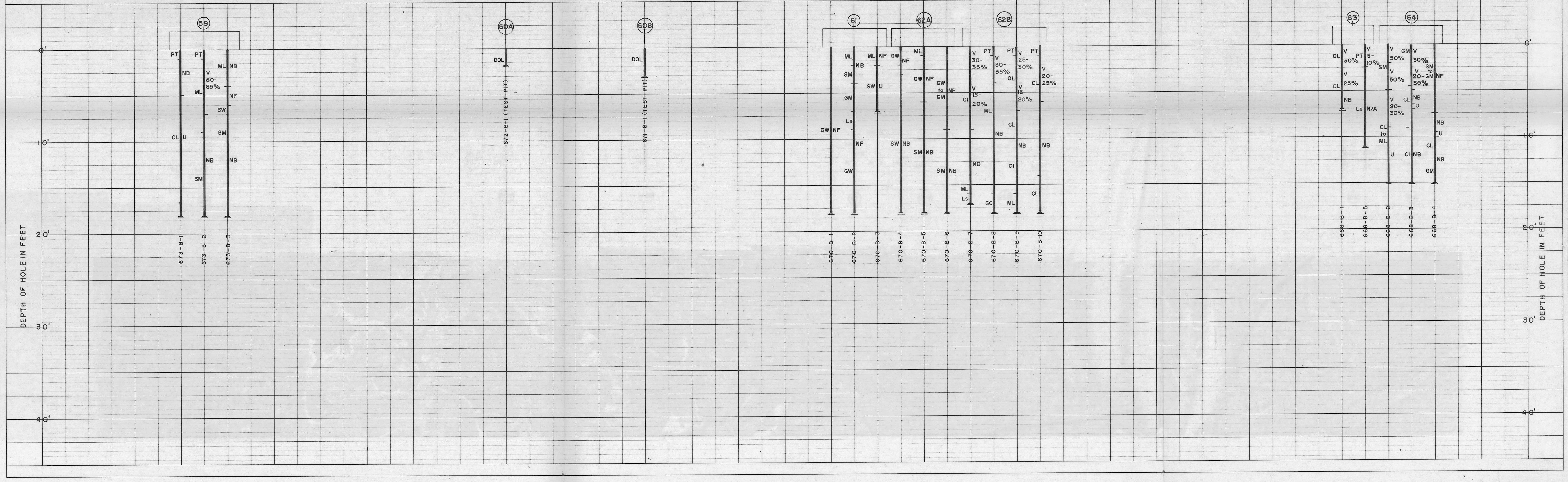
| BORROW AREA NUMBER | ACCESS MILE | BOREHOLE NUMBERS | ACCESS DISTANCE (FEET) | BORROW MATERIAL | QUALITY OF MATERIAL | EXPECTED PIT CONDITIONS | AVERAGE STRIPPING DEPTH (FEET) | AVERAGE THICKNESS (FEET) | ESTIMATED QUANTITY (CU.YD.) | OVERALL BORROW EVALUATION |
|---|---|---|---|---|---|---|---|---|---|---|
| 80 | 657.5 | 658-B-4,5 | 500 | Sand and Gravel | Good to Excellent | NF | 0 | 10 | Uncertain Large | Good to Excellent |
| 81 | 657.1 | 657-B-1,2 | 400 | Clay | Unsuitable | Too Wet & Frozen | | | | Unsuitable |
| 82 | 655.8 | 656-B-1,2 | 500 | Sand | Fair | Wet Below 10' Frozen Low Ice Content to NF | 0 | 18+ | 626,700 | Unsuitable |
| 83 | 654.8 | 655-B-2,3,4 | 400 | Silt | Unsuitable | | | | | Unsuitable |
| 84 | 654.0 | 655-B-1<br>654-B-1 | 3000 or 3300 | Sand | Fair | NF to U/F May be Wet Where Frozen | 0 | 15+ | 366,700+ | Poor to Unsuitable |
| 85 | 654.0 | 654-B-2,3 | 400 | Clay | Unsuitable | Too Wet & Frozen | | | | Unsuitable |
| 86A | 653.4 | 654-B-4<br>653-B-1,2,3 | 400 | Sand | Fair to Good | U/F Locally Wet | 0 | 15+ | 511,100 | Fair to Poor |
| 86B | 653.4 | 653-B-4 | 4200 | Sand | Fair to Good | U/F | 0 | 15+ | 822,200 | Fair to Good |
| 87 | 652.1 | 652-B-2,3,4 | 1100 | Sand | Fair | Irregularly Frozen, Wet | 0 | 7 | Uncertain | Poor to Unsuitable |
| 88 | 651.5 | 652-B-1 | 1650 | Sand | Poor to Fair | U/F, Too Wet | 0 | 6 | Uncertain | Poor to Unsuitable |
| 89 | 650.8 | 651-B-1,2,3 | 400 | Silt & Clay | Unsuitable | Frozen, Wet | | | | Unsuitable |
| 90 | 650 | 651-B-4,5 | 900 | Silt & Clay | Unsuitable | Frozen & Wet | | | | Unsuitable |
| 91A | 649.1 | 650-B-1 | 1100 | Gravel | Good | U/F to NF May be Wet | 4 | 11+ | 260,700 | Good |
| 91B | 649.1 | 649-B-2 to 5 | 1100 | Gravel and Sand | Good | Irregular Distribution | 2 | 16+ | Area Uncertain | Fair |

| DRAWING No. | SHEET No. | TOTAL SHEETS |
|---|---|---|
|  | 62 |  |

| PLAN | SURVEYED | DATE | PLOTTED | DATE | CHECKED | DATE |
|---|---|---|---|---|---|---|
| ALIGNMENT |  |  |  |  |  |  |
| TOPOGR. NOTES |  |  |  |  |  |  |
| DRAINAGE |  |  |  |  |  |  |
| BORROW AREAS |  |  |  |  |  |  |
| STRUCTURES NOTED |  |  |  |  |  |  |

| MOSAIC |  | BY | DATE |
|---|---|---|---|
| FLIGHT No. | FLOWN |  |  |
| PHOTO No. | INTERPRETATION |  |  |
| ORIGINAL SCALE | LINE LOCATED IN FIELD |  |  |

| PROFILE | SURVEYED | DATE | PLOTTED | DATE | CHECKED | DATE |
|---|---|---|---|---|---|---|
| ℄ PROFILE |  |  |  |  |  |  |
| SOILS |  |  |  |  |  |  |
| DESIGN GRADELINE |  |  |  |  |  |  |
| DRAINAGE |  |  |  |  |  |  |
| STRUCTURES NOTED |  |  |  |  |  |  |



REVISED 20/2/73

## TERRAIN LEGEND

| Symbol | Terrain Type | Physiographic Features | Materials Description |
|---|---|---|---|
| AFD | Alluvial Fan Deposit | Cone shaped, gently sloping stream outlet | Poorly sorted silt, sand gravel, some cobbles and boulders |
| AFP | Active Flood Plain | Exposed bars in stream or river channel | Sand and gravel in high energy streams to silt and sand in low energy streams |
| AMP | Alluvial Meander Plain (Mackenzie River Meander Plain) | Flat plain often with sand dunes on it | Sands and silty sands stratified or channel deposits |
| AMP-2 | Alluvial Meander Plain (excluding the Mackenzie River Plain) | Flood plains filling bottom of the stream or river valley | Fine silt, sand or gravel as channel deposits |
| BR | Bedrock | Outcrop to continuous ridge | Exposed rock to rock with generally less than 5 feet of cover |
| DL | Deltaic Sand Plain | At the mouth of a river or creek | Silt topstratum over stratified silty sand and silt with some clay and pebbles |
| E | Esker | Narrow sharp ridge | Sand and/or gravel with some silt inclusions |
| FFP | Fossil Flood Plain | Flat plain may be dissected to rolling topography | Silty topstratum over sand and/or gravel of a flood plain of an inactive stream |
| GLB-1 | Glacial Lake Basin (Better drained type) | Lowland occasionally swampy areas | Ice-rich to to medium plastic silty clay, occasionally with a trace of sand |
| GLB-2 | Glacial Lake Basin (thermokarst type) | Lowlands usually swampy with thaw lakes | Usually peat covered glacio-lacustrine silty clay |
| GM | Ground Moraine (undifferentiated) | Flat to broad gentle slopes | Silt till to clay till usually some sand and gravel |
| HM | Hummocky Moraine | Large hummocks and short ridges with kettles | Mostly till with some sand and/or silt. Peat overlies silty clays in kettle depression |
| HT | High Terraces | Tabular bodies along the sides of and above present or abandoned river channels | Silt covered stratified sand and/or gravel of fluvial or outwash origin |
| K | Kames | Conical hill to short ridge | Complexly stratified sand and/or gravel with minor till or boulders |
| KT | Kame Terrace | Poorly expressed terraces | Dirty poorly sorted sand and/or gravel to till |
| LB | Lacustrine Basin | Postglacial ponded deposits in larger lowlying areas | Organic and inorganic clay, silt and fine sand |
| OW | Outwash Plains or Deltas | Tabular bodies | Sand and/or gravel |
| RKM | Ridge-and-Knoll Moraine | Drumlinized till plain. Rolling large linear features | Molded basal till low plastic silty-clay till |
| SD | Sand Dunes | Elongate Ridges to Barchans | Fine to medium sand |
| TS | Talus Slopes | Steep Slopes | Mainly coarse gravel cobbles and boulders |

### Surficial Features

| | |
|---|---|
| • • • AS | Abandoned Strandlines |
| DR | Drumlinoid forms including flutings and glacial grooves with linear ridges |
| IWP | Ice Wedge Polygons, usually in ice-rich silt |
| RG | Rock and Talus glaciers along the Norman Range. Mixed ice and silt to boulders. |
| RS | Rock Slide to rock avalanche scars on the Norman Range |
| SK | Sinkholes in soluble bedrock |

### Topstratum Phases (Associated with Terrain Types)

| | |
|---|---|
| Df | Thin (0 - 10 feet) of drift over bedrock surface |
| PT | Mixed bog and fen peats in post glacial ponded depression |
| SL | Slopewash or solifluction features. Topstratum of ice-rich poorly sorted silty clay and silty sand to gravel |
| WM | Wave modified, mainly a thin sandy to gravelly washed layer over till |

Complexes are shown as combinations of two terrain types with or without phases that pertain to the parent type.

Terrain Symbols are modified from Canadian Gas Arctic Study Limited Terrain Study for this area.

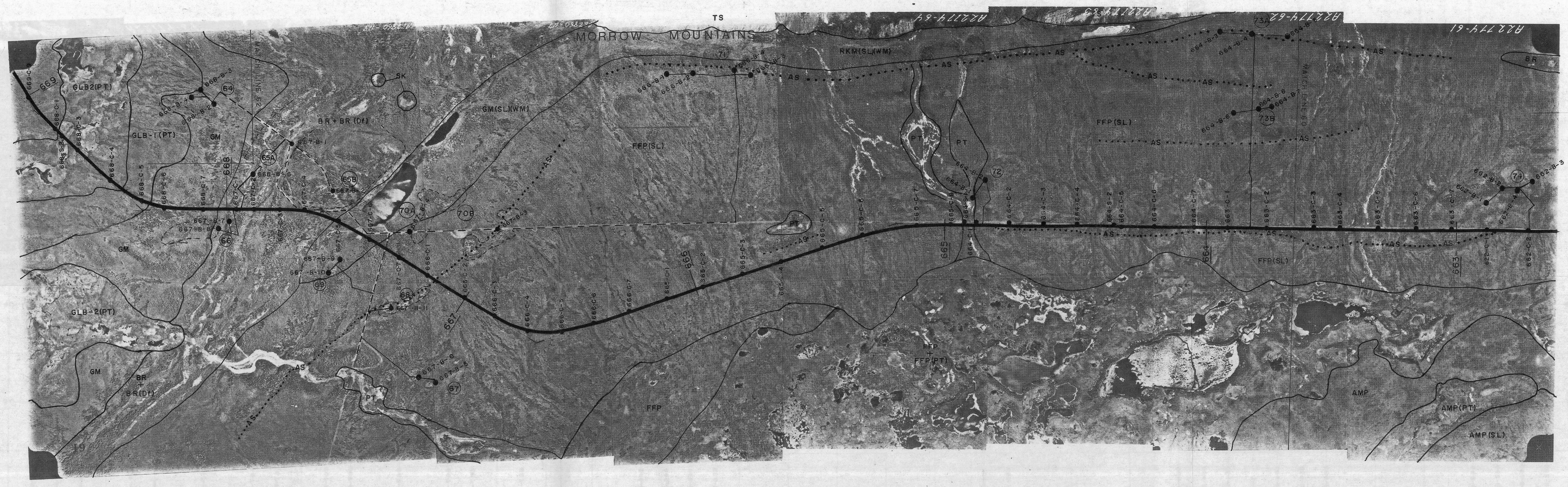
### Legend For Mackenzie Highway Mosaic

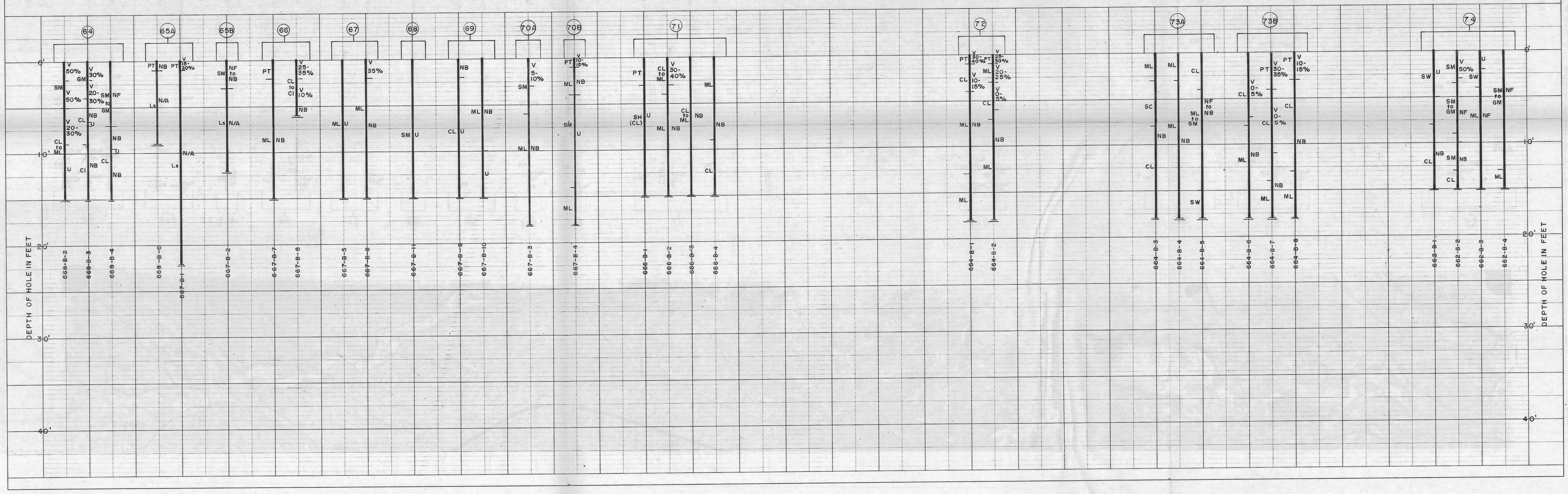
| | |
|---|---|
| ▬ | Mackenzie Highway |
|  | Borrow Areas |
| - - - - - | Access Road to borrow area on pre-existing cutlines |
| —— | Cleared access to borrow areas |
| (18) | Borrow area number |
| 689-C-4 | Borehole number |
| 721 —— | Mileage |
| RKM | Terrain Outlines |

### Borrow Profile Legend

| | | | | | |
|---|---|---|---|---|---|
| G | Gravel | W | Well Graded | ═ | Broken Section |
| S | Sand | P | Poorly Graded | ═ | End of Hole |
| M | Silt | L | Low Plasticity | NS | Not to Scale |
| C | Clay | I | Intermediate Plasticity | U | Unfrozen |
| Ls | Limestone | H | High Plasticity | N/A | Not Available |
| Sh | Shale | PT | Peat | NB) | Standard Ice |
| Dol | Dolomite | (T) | Till | NF) | Description |
| Bl | Boulder | (CL) | Low Plasticity Clayey Shale | V) | Symbols |
| O | Organic Soil | (18) | Borrow Area Number | | |

| DRAWING No. | SHEET No. | TOTAL SHEETS |
|---|---|---|
|  | 61 |  |





REVISED 1/3/73

| PLAN | SURVEYED | DATE | PLOTTED | DATE | CHECKED | DATE |
|---|---|---|---|---|---|---|
| ALIGNMENT |  |  |  |  |  |  |
| TOPOGR. NOTES |  |  |  |  |  |  |
| DRAINAGE |  |  |  |  |  |  |
| BORROW AREAS |  |  |  |  |  |  |
| STRUCTURES NOTED |  |  |  |  |  |  |

| MOSAIC |  | BY | DATE |
|---|---|---|---|
| FLIGHT No. | FLOWN |  |  |
| PHOTO No. | INTERPRETATION |  |  |
| ORIGINAL SCALE | LINE LOCATED IN FIELD |  |  |

| PROFILE | SURVEYED | DATE | PLOTTED | DATE | CHECKED | DATE |
|---|---|---|---|---|---|---|
| ℄ PROFILE |  |  |  |  |  |  |
| SOILS |  |  |  |  |  |  |
| DESIGN GRADELINE |  |  |  |  |  |  |
| DRAINAGE |  |  |  |  |  |  |
| STRUCTURES NOTED |  |  |  |  |  |  |

## TERRAIN LEGEND

| Symbol | Terrain Type | Physiographic Features | Materials Description |
|---|---|---|---|
| AFD | Alluvial Fan Deposit | Cone shaped, gently sloping stream outlet | Poorly sorted silt, sand gravel, some cobbles and boulders |
| AFP | Active Flood Plain | Exposed bars in stream or river channel | Sand and gravel in high energy streams to silt and sand in low energy streams |
| AMP | Alluvial Meander Plain (Mackenzie River Meander Plain) | Flat plain often with sand dunes on it | Sands and silty sands stratified or channel deposits |
| AMP-2 | Alluvial Meander Plain (excluding the Mackenzie River Plain) | Flood plains filling bottom of the stream or river valley | Fine silt, sand or gravel as channel deposits |
| BR | Bedrock | Outcrop to continuous ridge | Exposed rock to rock with generally less than 5 feet of cover |
| DL | Deltaic Sand Plain | At the mouth of a river or creek | Silt topstratum over stratified silty sand and silt with some clay and pebbles |
| E | Esker | Narrow sharp ridge | Sand and/or gravel with some silt inclusions |
| FFP | Fossil Flood Plain | Flat plain may be dissected to rolling topography | Silty topstratum over sand and/or gravel of a flood plain of an inactive stream |
| GLB-1 | Glacial Lake Basin (Better drained type) | Lowland occasionally swampy areas | Ice-rich to to medium plastic silty clay, occasionally with a trace of sand |
| GLB-2 | Glacial Lake Basin (thermokarst type) | Lowlands usually swampy with thaw lakes | Usually peat covered glacio-lacustrine silty clay |
| GM | Ground Moraine (undifferentiated) | Flat to broad gentle slopes | Silt till to clay till usually some sand and gravel |
| HM | Hummocky Moraine | Large hummocks and short ridges with kettles | Mostly till with some sand and/or silt. Peat overlies silty clays in kettle depression |
| HT | High Terraces | Tabular bodies along the sides of and above present or abandoned river channels | Silt covered stratified sand and/or gravel of fluvial or outwash origin |
| K | Kames | Conical hill to short ridge | Complexly stratified sand and/or gravel with minor till or boulders |
| KT | Kame Terrace | Poorly expressed terraces | Dirty poorly sorted sand and/or gravel to till |
| LB | Lacustrine Basin | Postglacial ponded deposits in larger lowlying areas | Organic and inorganic clay, silt and fine sand |
| OW | Outwash Plains or Deltas | Tabular bodies | Sand and/or gravel |
| RKM | Ridge-and-Knoll Moraine | Drumlinized till plain. Rolling large linear features | Molded basal till low plastic silty-clay till |
| SD | Sand Dunes | Elongate Ridges to Barchans | Fine to medium sand |
| TS | Talus Slopes | Steep Slopes | Mainly coarse gravel cobbles and boulders |

### Surficial Features

| | |
|---|---|
| • • • AS | Abandoned Strandlines |
| DR —●— | Drumlinoid forms including flutings and glacial grooves with linear ridges |
| IWP | Ice Wedge Polygons, usually in ice-rich silt |
| RG | Rock and Talus glaciers along the Norman Range. Mixed ice and silt to boulders. |
| RS | Rock Slide to rock avalanche scars on the Norman Range |
| SK | Sinkholes in soluble bedrock |

### Topstratum Phases (Associated with Terrain Types)

| | |
|---|---|
| Df | Thin (0 - 10 feet) of drift over bedrock surface |
| PT | Mixed bog and fen peats in post glacial ponded depression |
| SL | Slopewash or solifluction features. Topstratum of ice-rich poorly sorted silty clay and silty sand to gravel |
| WM | Wave modified, mainly a thin sandy to gravelly washed layer over till |

Complexes are shown as combinations of two terrain types with or without phases that pertain to the parent type.

Terrain Symbols are modified from Canadian Gas Arctic Study Limited Terrain Study for this area.

### Legend For Mackenzie Highway Mosaic

| | |
|---|---|
| ▬ | Mackenzie Highway |
| ⌒ | Borrow Areas |
| - - - - - | Access Road to borrow area on pre-existing cutlines |
| ——— | Cleared access to borrow areas |
| ⑱ | Borrow area number |
| 689-C-4 | Borehole number |
| 721 ——— | Mileage |
| RKM | Terrain Outlines |

### Borrow Profile Legend

| | | | | | |
|---|---|---|---|---|---|
| G | Gravel | W | Well Graded | ═ | Broken Section |
| S | Sand | P | Poorly Graded | ═ | End of Hole |
| M | Silt | L | Low Plasticity | NS | Not to Scale |
| C | Clay | I | Intermediate Plasticity | U | Unfrozen |
| Ls | Limestone | H | High Plasticity | N/A | Not Available |
| Sh | Shale | PT | Peat | NB) | Standard Ice |
| Dol | Dolomite | (T) | Till | NF) | Description |
| Bl | Boulder | (CL) | Low Plasticity Clayey Shale | V) | Symbols |
| O | Organic Soil | ⑱ | Borrow Area Number | | |

| DRAWING No. | SHEET No. | TOTAL SHEETS |
|---|---|---|
|  | 60 |  |

ALIGNMENT
TOPOGR. NOTES
DRAINAGE
BORROW AREAS
STRUCTURES NOTED

BY

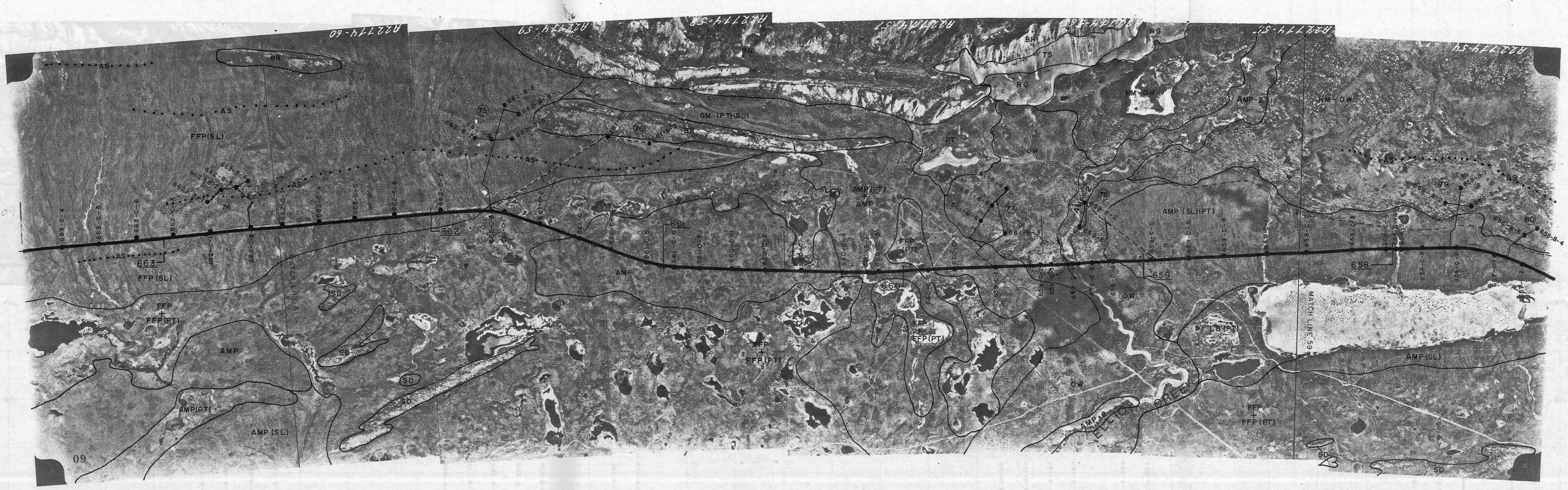
DATE

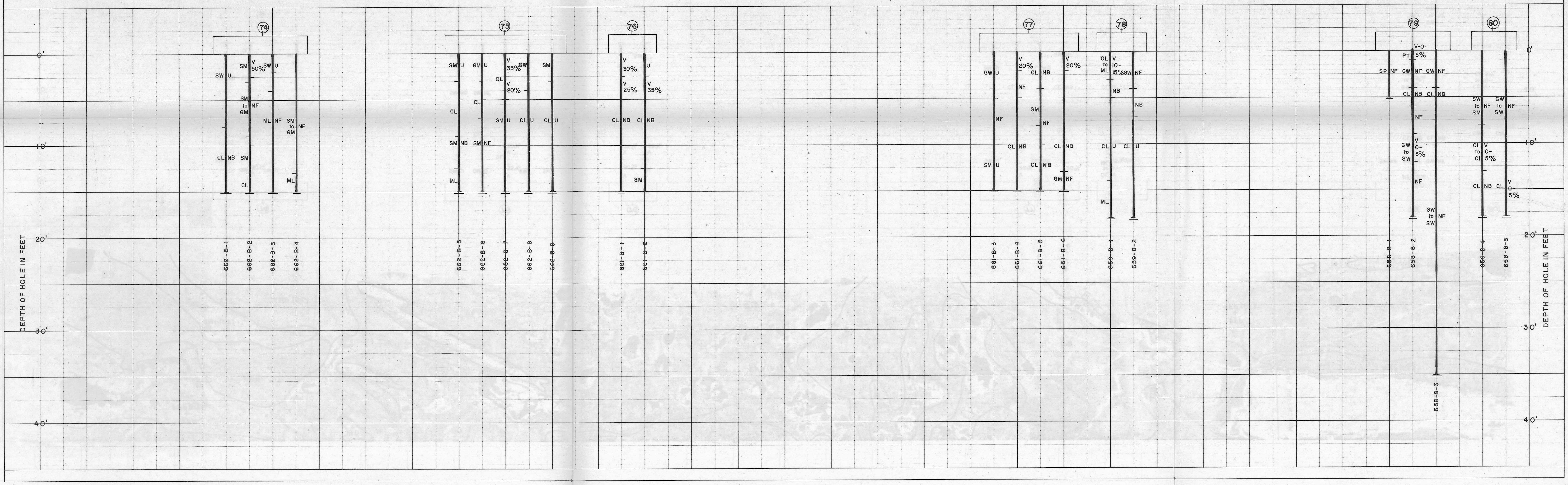
FLOWN
INTERPRETATION
LINE LOCATED IN FIELD

MOSAIC
FLIGHT No.
PHOTO No.
ORIGINAL SCALE

PROFILE
℄ PROFILE
SOILS
DESIGN GRADELINE
DRAINAGE
STRUCTURES NOTED

SURVEYED | DATE | PLOTTED | DATE | CHECKED | DATE





REVISED 1/3/73
REVISED 16/4/73

TERRAIN LEGEND

| Symbol | Terrain Type | Physiographic Features | Materials Description |
|---|---|---|---|
| AFD | Alluvial Fan Deposit | Cone shaped, gently sloping stream outlet | Poorly sorted silt, sand gravel, some cobbles and boulders |
| AFP | Active Flood Plain. | Exposed bars in stream or river channel | Sand and gravel in high energy streams to silt and sand in low energy streams |
| AMP | Alluvial Meander Plain (Mackenzie River Meander Plain) | Flat plain often with sand dunes on it | Sands and silty sands stratified or channel deposits |
| AMP-2 | Alluvial Meander Plain (excluding the Mackenzie River Plain) | Flood plains filling bottom of the stream or river valley | Fine silt, sand or gravel as channel deposits |
| BR | Bedrock | Outcrop to continuous ridge | Exposed rock to rock with generally less than 5 feet of cover |
| DL | Deltaic Sand Plain | At the mouth of a river or creek | Silt topstratum over stratified silty sand and silt with some clay and pebbles |
| E | Esker | Narrow sharp ridge | Sand and/or gravel with some silt inclusions |
| FFP | Fossil Flood Plain | Flat plain may be dissected to rolling topography | Silty topstratum over sand and/or gravel of a flood plain of an inactive stream |
| GLB-1 | Glacial Lake Basin (Better drained type) | Lowland occasionally swampy areas | Ice-rich to to medium plastic silty clay, occasionally with a trace of sand |
| GLB-2 | Glacial Lake Basin (thermokarst type) | Lowlands usually swampy with thaw lakes | Usually peat covered glacio-lacustrine silty clay |
| GM | Ground Moraine (undifferentiated) | Flat to broad gentle slopes | Silt till to clay till usually some sand and gravel |
| HM | Hummocky Moraine | Large hummocks and short ridges with kettles | Mostly till with some sand and/or silt. Peat overlies silty clays in kettle depression |
| HT | High Terraces | Tabular bodies along the sides of and above present or abandoned river channels | Silt covered stratified sand and/or gravel of fluvial or outwash origin |
| K | Kames | Conical hill to short ridge | Complexly stratified sand and/or gravel with minor till or boulders |
| KT | Kame Terrace | Poorly expressed terraces | Dirty poorly sorted sand and/or gravel to till |
| LB | Lacustrine Basin | Postglacial ponded deposits in larger lowlying areas | Organic and inorganic clay, silt and fine sand |
| OW | Outwash Plains or Deltas | Tabular bodies | Sand and/or gravel |
| RKM | Ridge-and-Knoll Moraine | Drumlinized till plain. Rolling large linear features | Molded basal till low plastic silty-clay till |
| SD | Sand Dunes | Elongate Ridges to Barchans | Fine to medium sand |
| TS | Talus Slopes | Steep Slopes | Mainly coarse gravel cobbles and boulders |

Surficial Features

| | |
|---|---|
| • • • AS | Abandoned Strandlines |
| DR —●— | Drumlinoid forms including flutings and glacial grooves with linear ridges |
| IWP | Ice Wedge Polygons, usually in ice-rich silt |
| RG | Rock and Talus glaciers along the Norman Range. Mixed ice and silt to boulders. |
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Topstratum Phases (Associated with Terrain Types)

| | |
|---|---|
| Df | Thin (0 - 10 feet) of drift over bedrock surface |
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Legend For Mackenzie Highway Mosaic

| | |
|---|---|
| ▬▬ | Mackenzie Highway |
|  | Borrow Areas |
| - - - - - | Access Road to borrow area on pre-existing cutlines |
| —— | Cleared access to borrow areas |
| (18) | Borrow area number |
| 689-C-4 | Borehole number |
| 721 —— | Mileage |
| RKM | Terrain Outlines |

Borrow Profile Legend

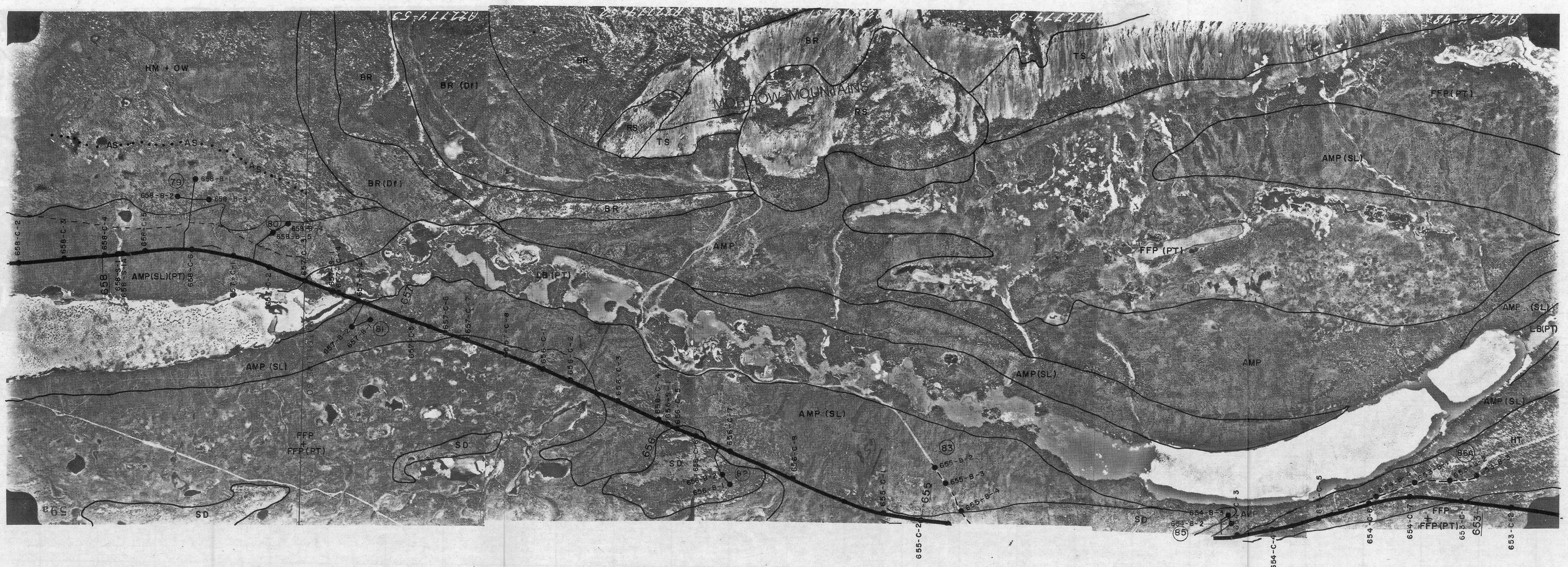
| | | | | | |
|---|---|---|---|---|---|
| G | Gravel | W | Well Graded | ═ | Broken Section |
| S | Sand | P | Poorly Graded | ═ | End of Hole |
| M | Silt | L | Low Plasticity | NS | Not to Scale |
| C | Clay | I | Intermediate Plasticity | U | Unfrozen |
| Ls | Limestone | H | High Plasticity | N/A | Not Available |
| Sh | Shale | PT | Peat | NB) | Standard Ice |
| Dol | Dolomite | (T) | Till | NF) | Description |
| Bl | Boulder | (CL) | Low Plasticity Clayey Shale | V) | Symbols |
| O | Organic Soil | (18) | Borrow Area Number |  |  |

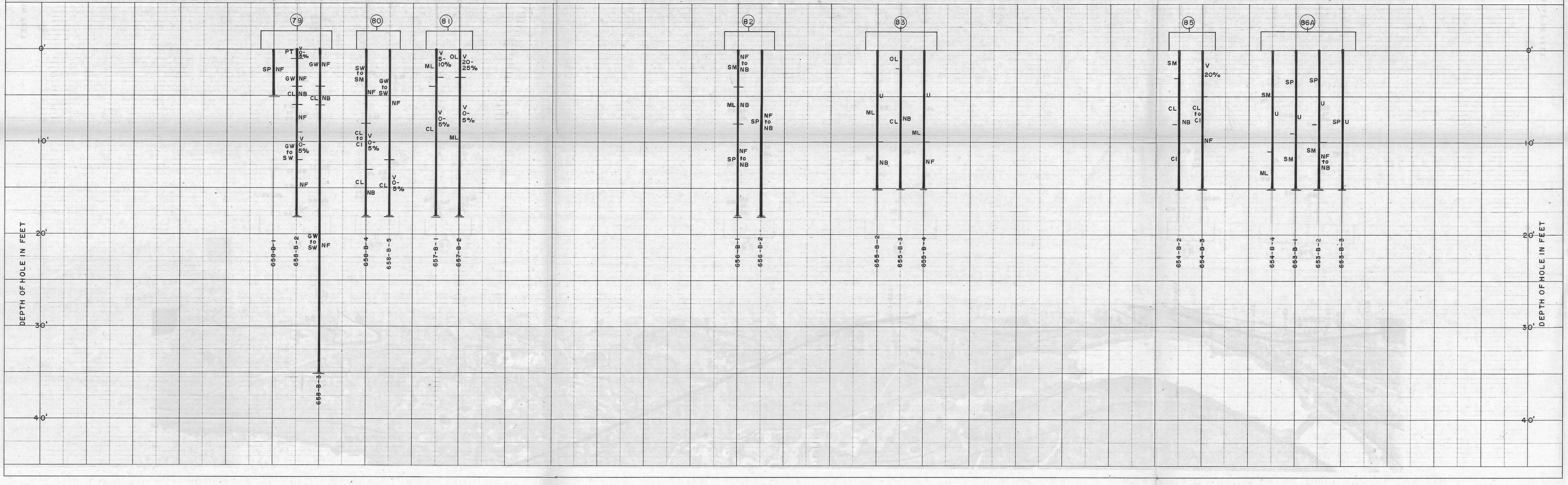
| DRAWING No. | SHEET No. | TOTAL SHEETS |
|---|---|---|
|  | 51a |  |

| PLAN | SURVEYED | DATE | PLOTTED | DATE | CHECKED | DATE |
|---|---|---|---|---|---|---|
| ALIGNMENT |  |  |  |  |  |  |
| TOPOGR. NOTES |  |  |  |  |  |  |
| DRAINAGE |  |  |  |  |  |  |
| BORROW AREAS |  |  |  |  |  |  |
| STRUCTURES NOTED |  |  |  |  |  |  |

| MOSAIC |  | BY | DATE |
|---|---|---|---|
| FLIGHT No. | FLOWN |  |  |
| PHOTO No. | INTERPRETATION |  |  |
| ORIGINAL SCALE | LINE LOCATED IN FIELD |  |  |

| PROFILE | SURVEYED | DATE | PLOTTED | DATE | CHECKED | DATE |
|---|---|---|---|---|---|---|
| ℄ PROFILE |  |  |  |  |  |  |
| SOILS |  |  |  |  |  |  |
| DESIGN GRADELINE |  |  |  |  |  |  |
| DRAINAGE |  |  |  |  |  |  |
| STRUCTURES NOTED |  |  |  |  |  |  |





REVISED 20/2/73

TERRAIN LEGEND

| Symbol | Terrain Type | Physiographic Features | Materials Description |
|---|---|---|---|
| AFD | Alluvial Fan Deposit | Cone shaped, gently sloping stream outlet | Poorly sorted silt, sand gravel, some cobbles and boulders |
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Surficial Features

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Topstratum Phases (Associated with Terrain Types)

| | |
|---|---|
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Terrain Symbols are modified from Canadian Gas Arctic Study Limited Terrain Study for this area.

Legend For Mackenzie Highway Mosaic

| | |
|---|---|
| ▬ | Mackenzie Highway |
|  | Borrow Areas |
| - - - - - | Access Road to borrow area on pre-existing cutlines |
| ——— | Cleared access to borrow areas |
| ⑱ | Borrow area number |
| 689-C-4 | Borehole number |
| 721 ——— | Mileage |
| RKM | Terrain Outlines |

Borrow Profile Legend

| | | | | | |
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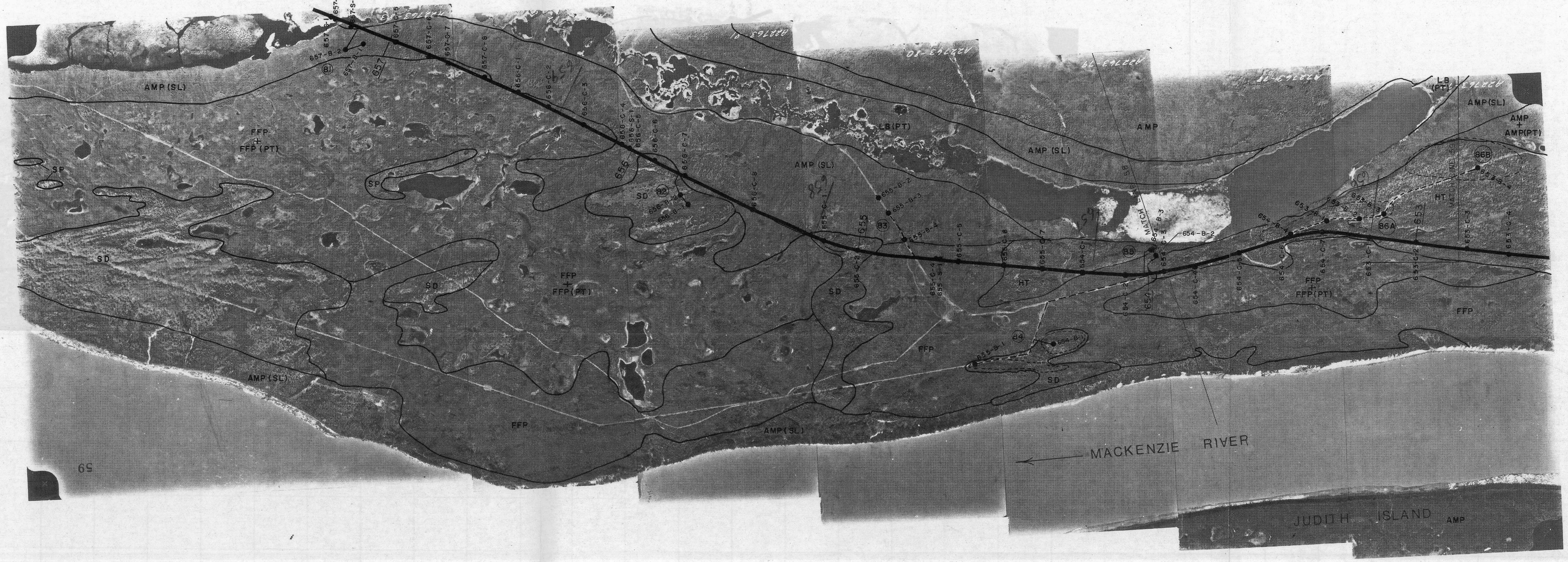
| Sh | Shale | PT | Peat | NB) | Standard Ice |
| Dol | Dolomite | (T) | Till | NF) | Description |
| Bl | Boulder | (CL) | Low Plasticity Clayey Shale | V) | Symbols |
| O | Organic Soil | ⑱ | Borrow Area Number |  |  |

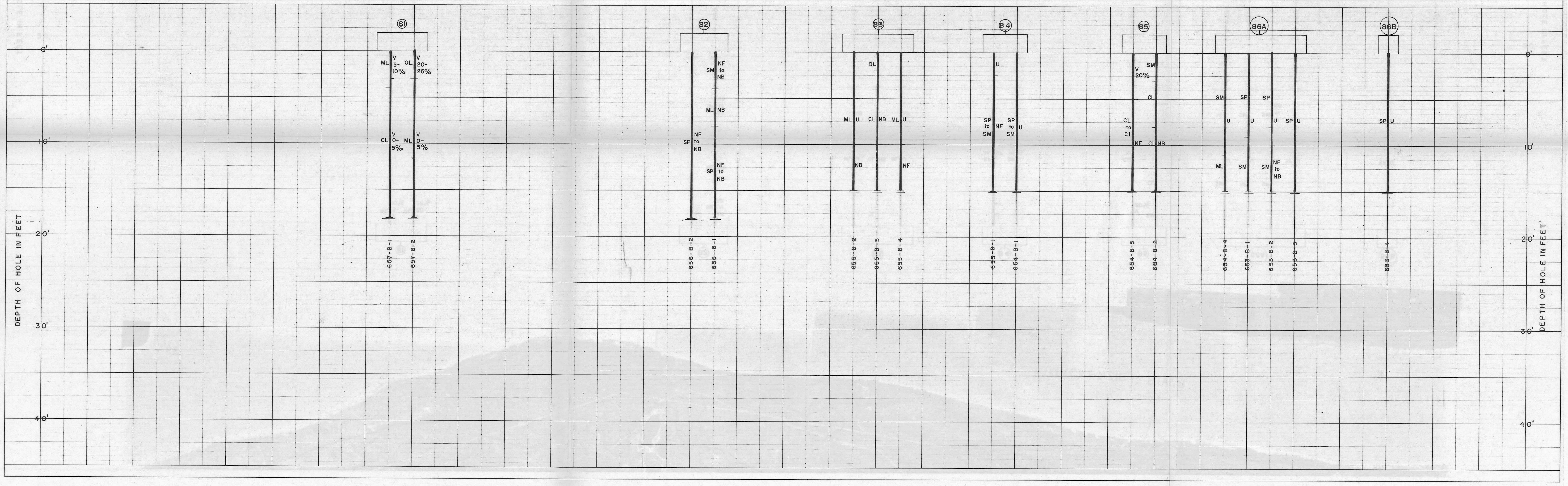
| DRAWING No. | SHEET No. | TOTAL SHEETS |
|---|---|---|
|  | 59 |  |

PROFILE
℄ PROFILE
SOILS
DESIGN GRADELINE
DRAINAGE
STRUCTURES NOTED
SURVEYED DATE PLOTTED DATE CHECKED DATE

MOSAIC
FLIGHT No.
PHOTO No.
ORIGINAL SCALE
FLOWN
INTERPRETATION
LINE LOCATED IN FIELD
BY DATE

ALIGNMENT
TOPOGR. NOTES
DRAINAGE
BORROW AREAS
STRUCTURES NOTED





REVISED 20/2/73
REVISED 16/4/73

## TERRAIN LEGEND

| Symbol | Terrain Type | Physiographic Features | Materials Description |
|---|---|---|---|
| AFD | Alluvial Fan Deposit | Cone shaped, gently sloping stream outlet | Poorly sorted silt, sand gravel, some cobbles and boulders |
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| DL | Deltaic Sand Plain | At the mouth of a river or creek | Silt topstratum over stratified silty sand and silt with some clay and pebbles |
| E | Esker | Narrow sharp ridge | Sand and/or gravel with some silt inclusions |
| FFP | Fossil Flood Plain | Flat plain may be dissected to rolling topography | Silty topstratum over sand and/or gravel of a flood plain of an inactive stream |
| GLB-1 | Glacial Lake Basin (Better drained type) | Lowland occasionally swampy areas | Ice-rich to to medium plastic silty clay, occasionally with a trace of sand |
| GLB-2 | Glacial Lake Basin (thermokarst type) | Lowlands usually swampy with thaw lakes | Usually peat covered glacio-lacustrine silty clay |
| GM | Ground Moraine (undifferentiated) | Flat to broad gentle slopes | Silt till to clay till usually some sand and gravel |
| HM | Hummocky Moraine | Large hummocks and short ridges with kettles | Mostly till with some sand and/or silt. Peat overlies silty clays in kettle depression |
| HT | High Terraces | Tabular bodies along the sides of and above present or abandoned river channels | Silt covered stratified sand and/or gravel of fluvial or outwash origin |
| K | Kames | Conical hill to short ridge | Complexly stratified sand and/or gravel with minor till or boulders |
| KT | Kame Terrace | Poorly expressed terraces | Dirty poorly sorted sand and/or gravel to till |
| LB | Lacustrine Basin | Postglacial ponded deposits in larger lowlying areas | Organic and inorganic clay, silt and fine sand |
| OW | Outwash Plains or Deltas | Tabular bodies | Sand and/or gravel |
| RKM | Ridge-and-Knoll Moraine | Drumlinized till plain. Rolling large linear features | Molded basal till low plastic silty-clay till |
| SD | Sand Dunes | Elongate Ridges to Barchans | Fine to medium sand |
| TS | Talus Slopes | Steep Slopes | Mainly coarse gravel cobbles and boulders |

### Surficial Features

| | |
|---|---|
| • • • AS | Abandoned Strandlines |
| DR | Drumlinoid forms including flutings and glacial grooves with linear ridges |
| IWP | Ice Wedge Polygons, usually in ice-rich silt |
| RG | Rock and Talus glaciers along the Norman Range. Mixed ice and silt to boulders. |
| RS | Rock Slide to rock avalanche scars on the Norman Range |
| SK | Sinkholes in soluble bedrock |

### Topstratum Phases (Associated with Terrain Types)

| | |
|---|---|
| Df | Thin (0 - 10 feet) of drift over bedrock surface |
| PT | Mixed bog and fen peats in post glacial ponded depression |
| SL | Slopewash or solifluction features. Topstratum of ice-rich poorly sorted silty clay and silty sand to gravel |
| WM | Wave modified, mainly a thin sandy to gravelly washed layer over till |

Complexes are shown as combinations of two terrain types with or without phases that pertain to the parent type.

Terrain Symbols are modified from Canadian Gas Arctic Study Limited Terrain Study for this area.

### Legend For Mackenzie Highway Mosaic

| | |
|---|---|
| ▬ | Mackenzie Highway |
|  | Borrow Areas |
| - - - - - | Access Road to borrow area on pre-existing cutlines |
| ——— | Cleared access to borrow areas |
| (18) | Borrow area number |
| 689-C-4 | Borehole number |
| 721 ——— | Mileage |
| RKM | Terrain Outlines |

### Borrow Profile Legend

| | | | | | |
|---|---|---|---|---|---|
| G | Gravel | W | Well Graded | ═ | Broken Section |
| S | Sand | P | Poorly Graded | ═ | End of Hole |
| M | Silt | L | Low Plasticity | NS | Not to Scale |
| C | Clay | I | Intermediate Plasticity | U | Unfrozen |
| Ls | Limestone | H | High Plasticity | N/A | Not Available |
| Sh | Shale | PT | Peat | NB) | Standard Ice |
| Dol | Dolomite | (T) | Till | NF) | Description |
| Bl | Boulder | (CL) | Low Plasticity Clayey Shale | V) | Symbols |
| O | Organic Soil | (18) | Borrow Area Number |  |  |

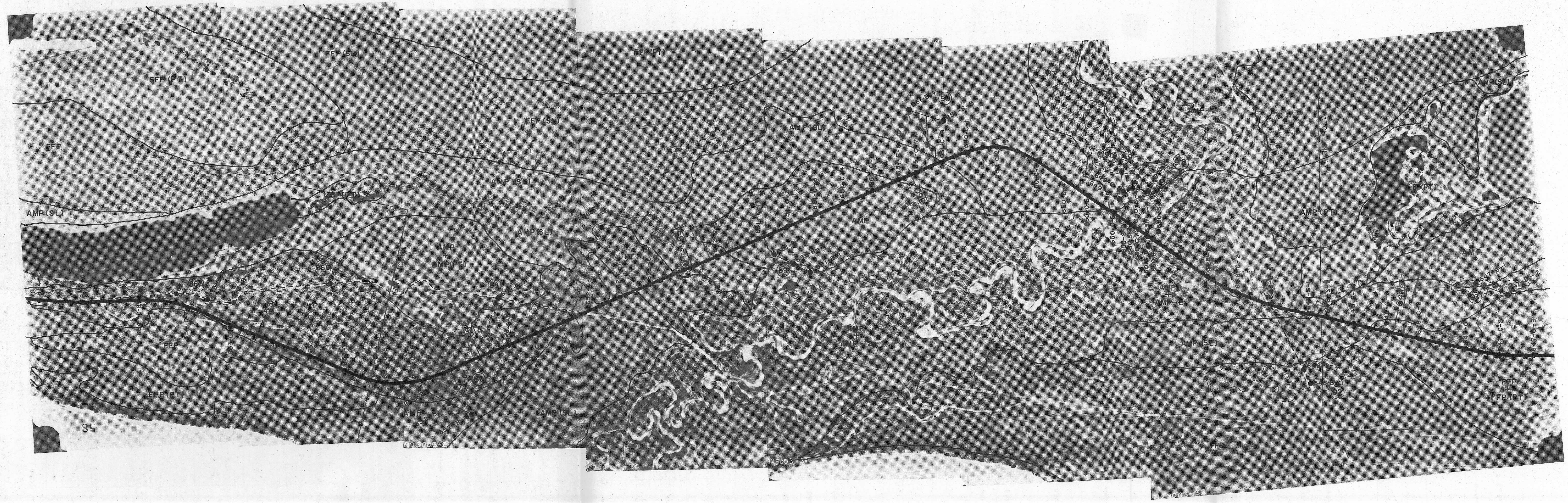
| DRAWING No. | SHEET No. | TOTAL SHEETS |
|---|---|---|
|  | 58 |  |

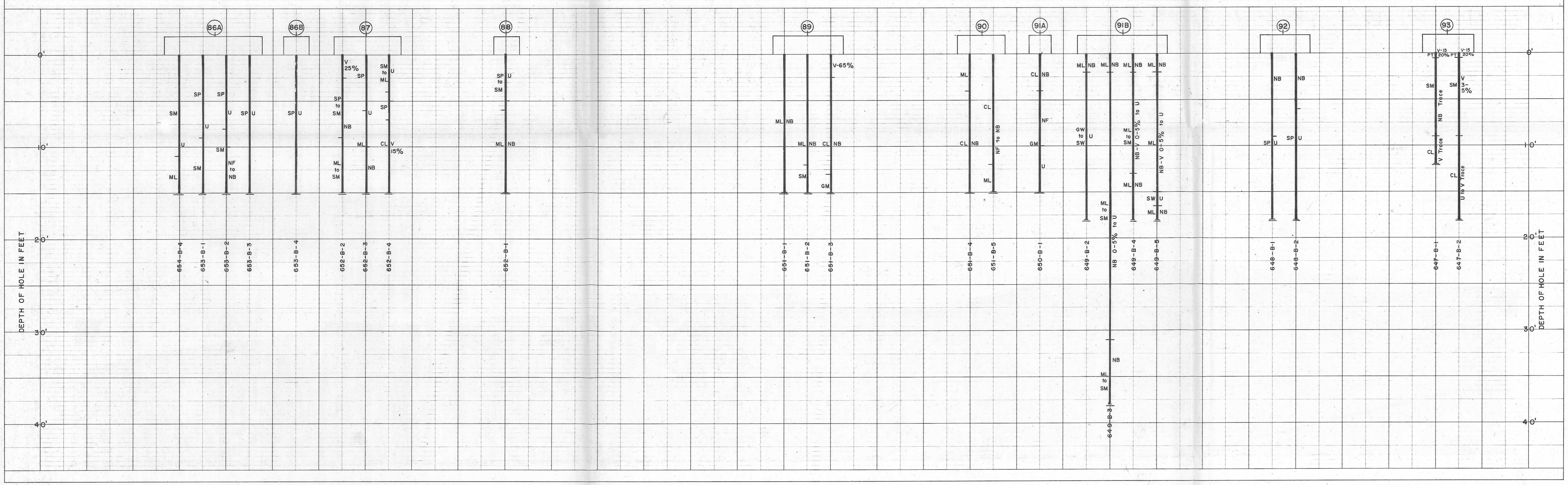
TOPSOIL NOTES
DRAINAGE
BORROW AREAS
STRUCTURES NOTED

FLOWN
INTERPRETATION
LINE LOCATED IN FIELD

FLIGHT No.
PHOTO No.
ORIGINAL SCALE

SOILS
DESIGN GRADELINE
DRAINAGE
STRUCTURES NOTED





# TERRAIN LEGEND

| Symbol | Terrain Type | Physiographic Features | Materials Description |
|---|---|---|---|
| AFD | Alluvial Fan Deposit | Cone shaped, gently sloping stream outlet | Poorly sorted silt, sand gravel, some cobbles and boulders |
| AFP | Active Flood Plain | Exposed bars in stream or river channel | Sand and gravel in high energy streams to silt and sand in low energy streams |
| AMP | Alluvial Meander Plain (Mackenzie River Meander Plain) | Flat plain often with sand dunes on it | Sands and silty sands stratified or channel deposits |
| AMP-2 | Alluvial Meander Plain (excluding the Mackenzie River Plain) | Flood plains filling bottom of the stream or river valley | Fine silt, sand or gravel as channel deposits |
| BR | Bedrock | Outcrop to continuous ridge | Exposed rock to rock with generally less than 5 feet of cover |
| DL | Deltaic Sand Plain | At the mouth of a river or creek | Silt topstratum over stratified silty sand and silt with some clay and pebbles |
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