

DOCUMENT MICROFILMING IDENTIFICATION

G.I.-30 SEPT. 1976

GEOCRES No. 30M3 - 17

DIST. 4 REGION

W.P. No. 126-58-3

CONT. No.

W. O. No. 71-11205C

STR. SITE No.

HWY. No. 406

LOCATION Hwy 406 - FROM QEW TO
WESTCHESTER AVE

No. of PAGES -

OVERSIZE DRAWINGS TO BE INCLUDED WITH THIS REPORT.

REMARKS:

30M3-17

HWY. 406 71-F-205C
QEW TO WESTCHESTER AVE.
W.P. 126 - 58 - 3
H. Q. GOLDER & ASSOC.

BH Series in the 300's.
SENT FROM,

X • 3151 WHARTON WAY, MISSISSAUGA (TORONTO), ONTARIO, CANADA •

• 747 HYDE PARK ROAD, LONDON, ONTARIO, CANADA •

• 196 BRONSON AVENUE, OTTAWA 4, ONTARIO, CANADA •

Golder Associates

CONSULTING GEOTECHNICAL ENGINEERS

TRANSMITTAL FORM

CONSIGNEE: Department of Highways, Ontario.
Materials & Testing Division,
Downsview 464, Ontario.

DATE: May 14, 1971

ATTENTION: Mr. A. G. Stermac, P. Eng.

PROJECT No.: 6398

RE: Highway No. 406 - St. Catharines

Sent by:-

☒ MESSENGER

☐ UNDER SEPARATE COVER

☐ ENCLOSED

No. Copies	Item	Description
	Borehole logs	Preliminary Prints of BH's 1 to 55 inclusive
1	Drawings	Preliminary Plans A, B, & C.
1	Figure	Consolidated Undrained Triaxial Tests
1	Figure	Consolidated Drained Triaxial Tests
1	Figure	Overall Slope Angle VS Height of Natural Slopes in Clay Along Old Welland Canal.

Remarks: A general sketch plan showing approx. locations of all boreholes will be sent to you next in a few days.

Per 

RECORD OF BOREHOLE I

LOCATION STA 270+55 - 63' RIGHT, LINE A

BORING DATE

SEPT. 11-13, 1963

DATUM

GEODETIC

BOREHOLE TYPE

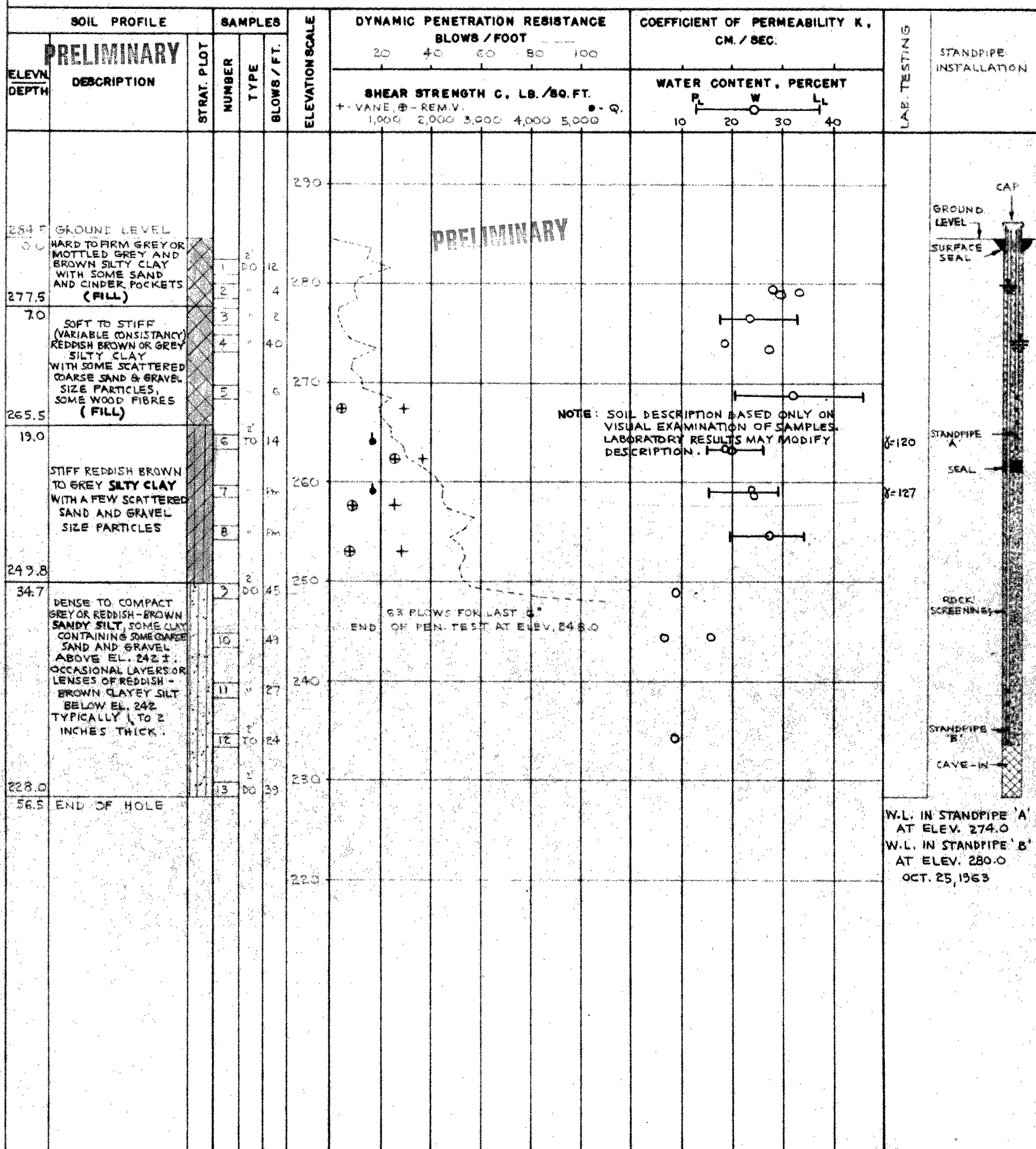
WASH BORING

BOREHOLE DIAMETER

HX CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT 140 LB. DROP 30 INCHES



VERTICAL SCALE

1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.

CHECKED

OFFICE COPY

Dec 31/63

Lab Testing Shown

File 6398

RECORD OF BOREHOLE 2

LOCATION STA. 265+52-2' LEFT, LINE A

BORING DATE SEPT. 13-17, 1963

DATUM GEODETIC

BOREHOLE TYPE

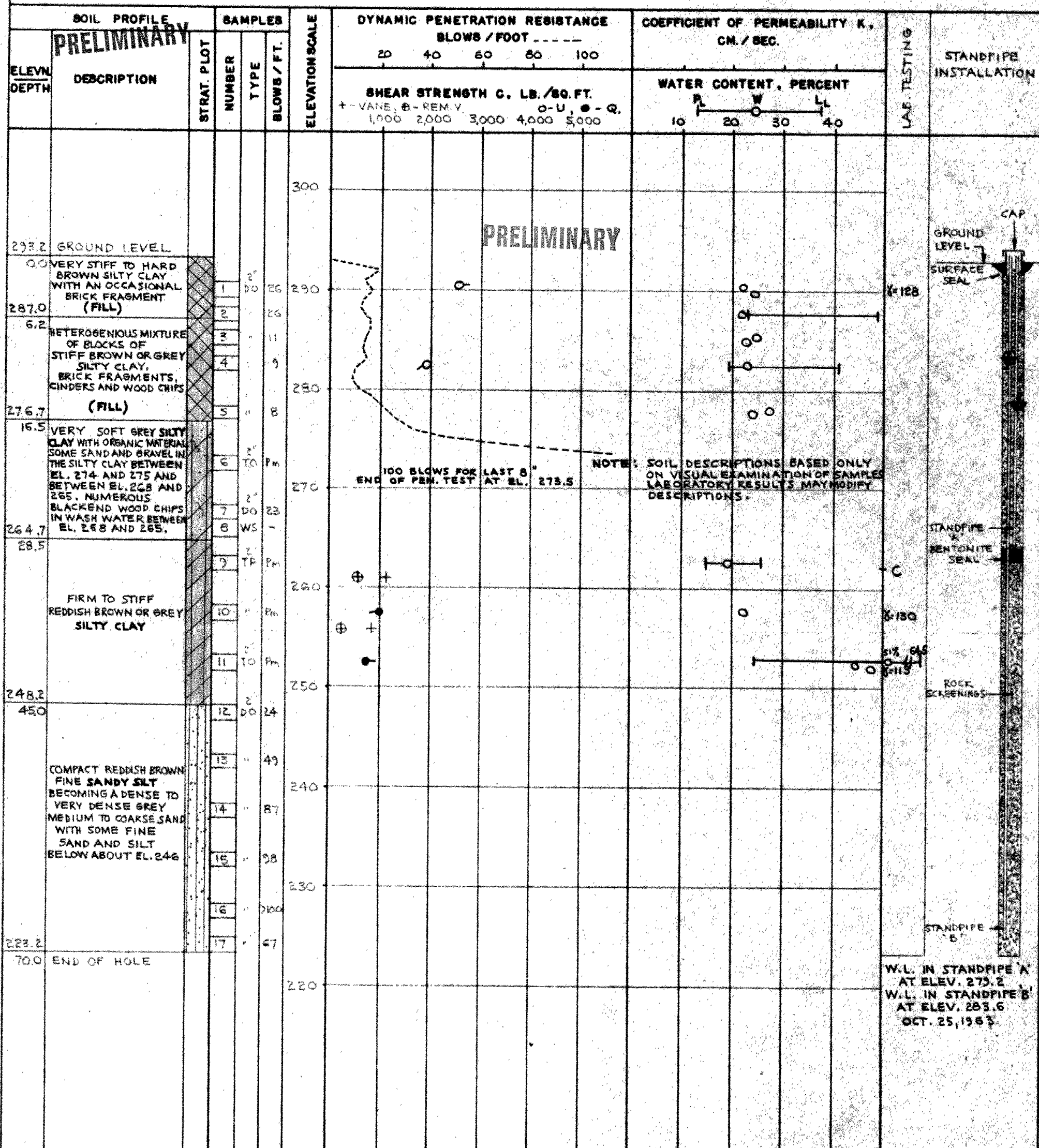
WASH BORING

BOREHOLE DIAMETER

HX CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT 140 LB. DROP 30 INCHES



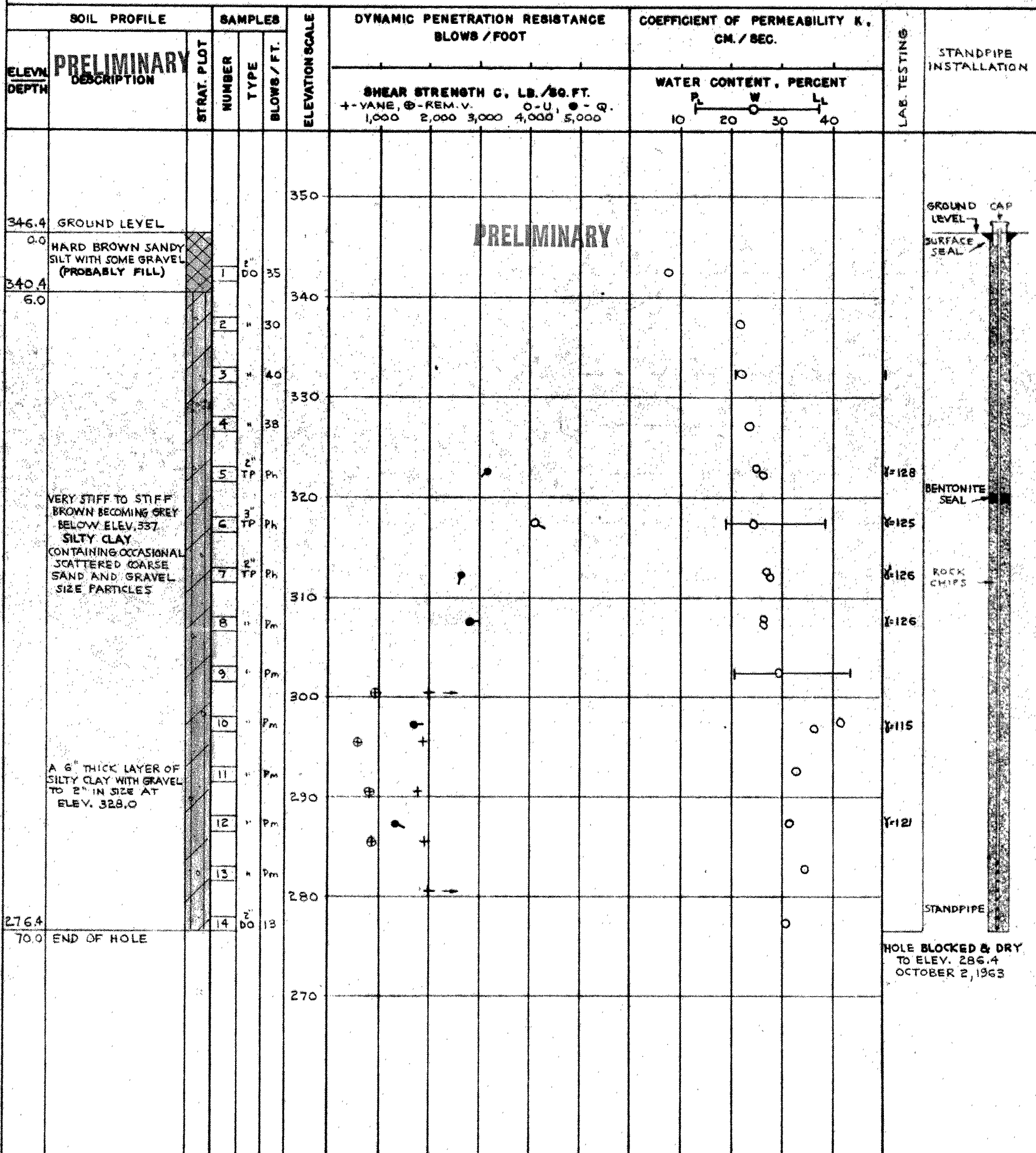
VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

RECORD OF BOREHOLE 3

LOCATION STA. 274+40-134' LEFT, LINE A BORING DATE SEPT. 19 - 20, 1963 DATUM GEODETIC
 BOREHOLE TYPE POWER AUGER BORING BOREHOLE DIAMETER 4.5"
 SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES



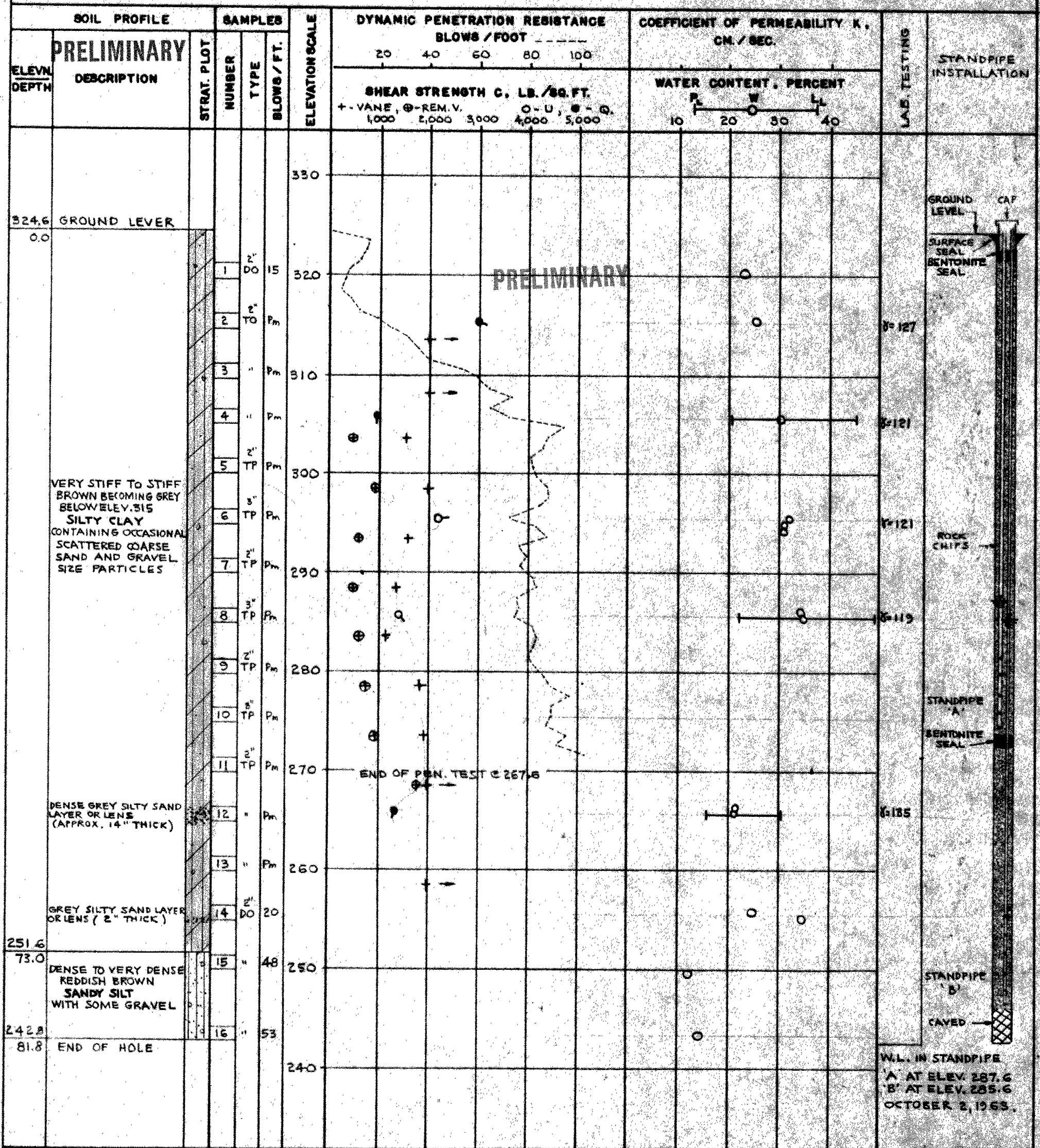
VERTICAL SCALE
1" INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

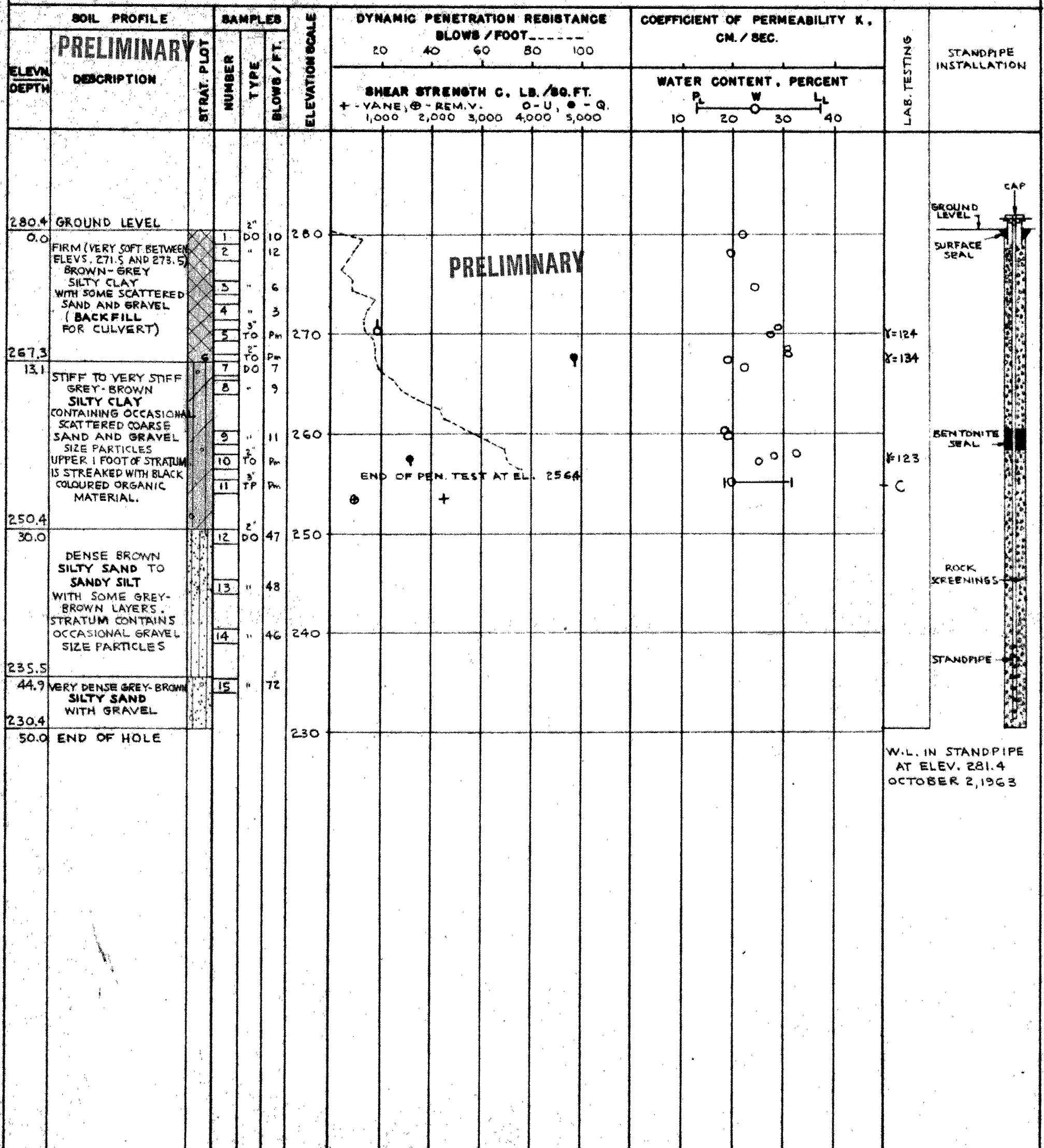
RECORD OF BOREHOLE 4

LOCATION STA. 274+43-245' RIGHT, LINE 'A' BORING DATE SEPT. 17-19, 1963 DATUM GEODETIC
 BOREHOLE TYPE POWER AUGER BORING BOREHOLE DIAMETER 4.5"
 SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES PEN. TEST HAMMER WEIGHT 140 LB. DROP 30 INCHES



RECORD OF BOREHOLE 5

LOCATION STA. 274+49-185 RIGHT, LINE 'A' BORING DATE SEPT. 18-20, 1963 DATUM GEODETIC
 BOREHOLE TYPE WASH BORING BOREHOLE DIAMETER 4X 8 BX CASING
 SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES PEN. TEST HAMMER WEIGHT 140 LB. DROP 30 INCHES



VERTICAL SCALE

1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN M.W.

CHECKED

OVERSIZE DRAWING

RECORD OF BOREHOLE 7

LOCATION STA. 282 + 18 - 82' LEFT, LINE A

BORING DATE SEPT. 24, 1963

DATUM GEODETIC

BOREHOLE TYPE

POWER AUGER BORING

BOREHOLE DIAMETER

4.5"

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

SOIL PROFILE		SAMPLES			ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.				LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS / FT.	SHEAR STRENGTH C, LB. / SQ. FT. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT 10 20 30 40				
286.5	GROUND LEVEL					290										
0.0	VERY STIFF CLAYEY AND SANDY SILT WITH GRAVEL (FILL)		1	DO	9											
281.3																
5.2	FIRM TO STIFF GREY (OCCASIONALLY MOTTLED WITH RED, GREEN & BLACK) SILTY CLAY WITH SOME SAND & GRAVEL, FEW WOOD CHUNKS (FILL OR RIVER DEPOSIT)		2	"	5	280										
273.3																
13.2	VERY STIFF BROWN SILTY CLAY WITH SOME SCATTERED SAND AND GRAVEL SIZE PARTICLES (DESICCATED ZONE)		3	TO Ph		270										
			4	DO	17											
264.5																
22.0			5	TO Ph		260										
	STIFF TO VERY STIFF GREY SILTY CLAY WITH SOME SCATTERED SAND AND GRAVEL SIZE PARTICLES		6	DO	22											
			7	TO Ph		250										
248.0																
38.5			8	DO	52											
	VERY DENSE REDDISH BROWN SANDY SILT WITH SOME GRAVEL (TILL)		9	"	59	240										
			10	"	58											
231.5																
			11	"	56											
55.0	END OF HOLE					230										

GROUND LEVEL

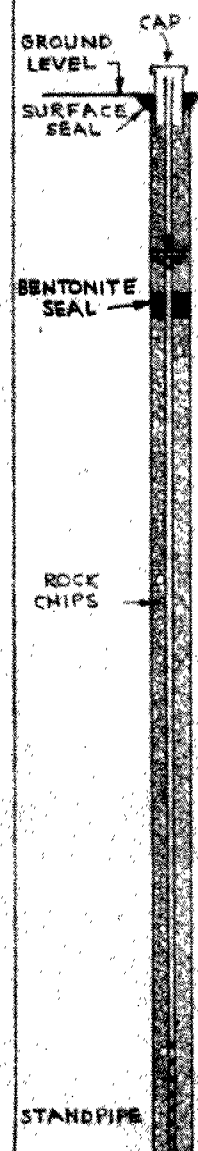
SURFACE SEAL

BENTONITE SEAL

ROCK CHIPS

STANDPIPE

W.L. IN STANDPIPE
AT ELEV. 278.5
OCT. 25, 1963



W.L. IN STANDPIPE
AT ELEV. 278.5
OCT. 25, 1963

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

20.00
 15.00
 2.00
 12.00
 475.00
 1880

2900

$\frac{4000}{125} = 32$ High fill ok

RECORD OF BOREHOLE 8

LOCATION STA. 284+89 - 102' LEFT, LINE 'A'

BORING DATE

SEPT. 25-26, 1963

DATUM

GEODETIC

BOREHOLE TYPE

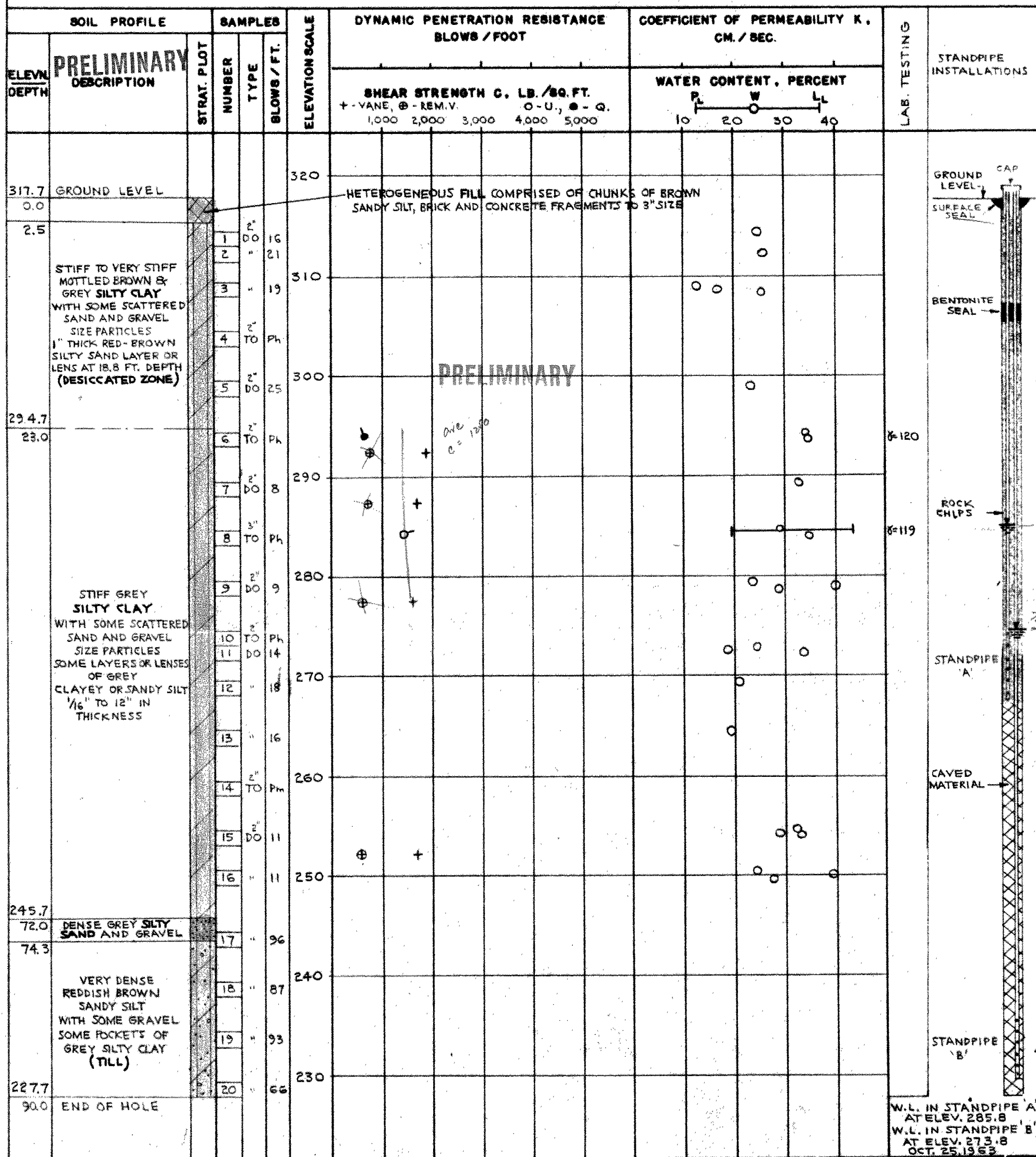
POWER AUGER BORING

BOREHOLE DIAMETER

4.5"

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES



VERTICAL SCALE

1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M. W.

CHECKED

mer 34 3

RECORD OF BOREHOLE 9

LOCATION STA. 288+66 - 22' RIGHT, LINE 'A' BORING DATE SEPT. 27, 1963 DATUM GEODETIC
BOREHOLE TYPE POWER AUGER BORING BOREHOLE DIAMETER 4.5"
SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

SOIL PROFILE		SAMPLES			ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.					LAB. TESTING	STANDPIPE INSTALLATION	
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		SHEAR STRENGTH C, LB./SQ. FT. + - VANE, ⊕ - REM. V. O - U. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT P L W L L 10 20 30 40							
294.0	GROUND LEVEL				300	PRELIMINARY												
0.0					290													
	LOOSE HETEROGENEOUS MIXTURE OF BRICK & CONCRETE FRAGMENTS BROWN SILTY SAND AND GRAVEL (FILL)		1	AS	8													
			2	DO	8													
280.8			3	"	14	280												
13.2	VERY STIFF BROWN SILTY CLAY WITH SOME SCATTERED SAND AND GRAVEL (DESICCATED ZONE) UPPER 2 FT. MOTTLED GREEN GREY AND BLACK COMBINATION		4	TO	17													
269.5			5	DO	15	270												
24.5			6	"	12													
	STIFF TO VERY STIFF GREY SILTY CLAY WITH SOME SCATTERED SAND AND GRAVEL SIZE PARTICLES		7	TO	Pm	260												
	DENSE SILTY SAND LAYERS AT 34.5 TO 35.2 AND 44.7 TO 46.0 FT. DEPTH		8	DO	8													
			9	TO	Pm	250												
			10	DO	14													
246.5			11	"	59													
47.5			12	"	61	240												
	VERY DENSE REDDISH BROWN SANDY SILT WITH SOME GRAVEL (TILL) HARD GREY CLAYEY SILT 63.7 TO 64.5 FT. DEPTH		13	"	69													
229.5			14	"	84	230												
64.5	END OF HOLE																	
						220												

GROUND LEVEL

CAP

SURFACE SEAL

BENTONITE SEAL

ROCK CHIPS

8-145

STANDPIPE

CAVED

W.L. IN STANDPIPE AT ELEV. 270.6
OCT. 25, 1963

VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN M. W.
CHECKED

near our 3#²
@ south shoulder of St Paul's

RECORD OF BOREHOLE 10

LOCATION STA. 291 + 09 - 65' LEFT, LINE 'A' BORING DATE SEPT. 20-23, 1963

DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER H X CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT LB. DROP INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.				LAB. TESTING	STANDPIPE INSTALLATION
ELEV. / DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER		TYPE	BLOWS / FT.	SHEAR STRENGTH C, LB. / SQ. FT. + - VANE, ⊕ - REM. V. ○ - U., ● - Q. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT P W LL 10 20 30 40			
277.1	GROUND LEVEL														
0.0	4" TOPSOIL		1	DO	5										
271.8	LOOSE BROWN SILTY SAND SOME BRICK FRAGMENTS (FILL)		2	"	16										
5.3			3	"	19										
			4	TO	Pm										
			5	TP	Pm										
			6	"	Pm										
			7	"	Pm										
248.1			8	DO	43										
29.0	DENSE TO VERY DENSE GREY SANDY AND CLAYEY SILT WITH SOME GRAVEL SIZE PARTICLES SCATTERED THROUGHOUT FEW SAND LENSES (~ 1/16" THICK) IN UPPER 2-3 FT.		9	"	67										
236.6			10	"	64										
40.5	VERY DENSE STRATIFIED SANDY SILTS BECOMING STIFF LAYERED SILTY CLAY AND CLAYEY SILT WITH SOME LAYERS OF FINE SANDY SILT BELOW ABOUT 44 FT. DEPTH		11	"	33										
225.6			12	"	16										
51.5	END OF HOLE														

PRELIMINARY

GROUND LEVEL

CAP

SURFACE SEAL

BENTONITE SEAL

ROCK SCREENINGS

STANDPIPE

W.L. IN STANDPIPE AT
ELEV. 277.0
OCT. 25, 1963

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

our area
to of slope at Brewery St &
St Paul's crossing

RECORD OF BOREHOLE 11

LOCATION

269+03 6' Right Line "A"

BORING DATE

OCT. 22-24, 1963

DATUM

GEODETIC

BOREHOLE TYPE

WASH BORING

BOREHOLE DIAMETER

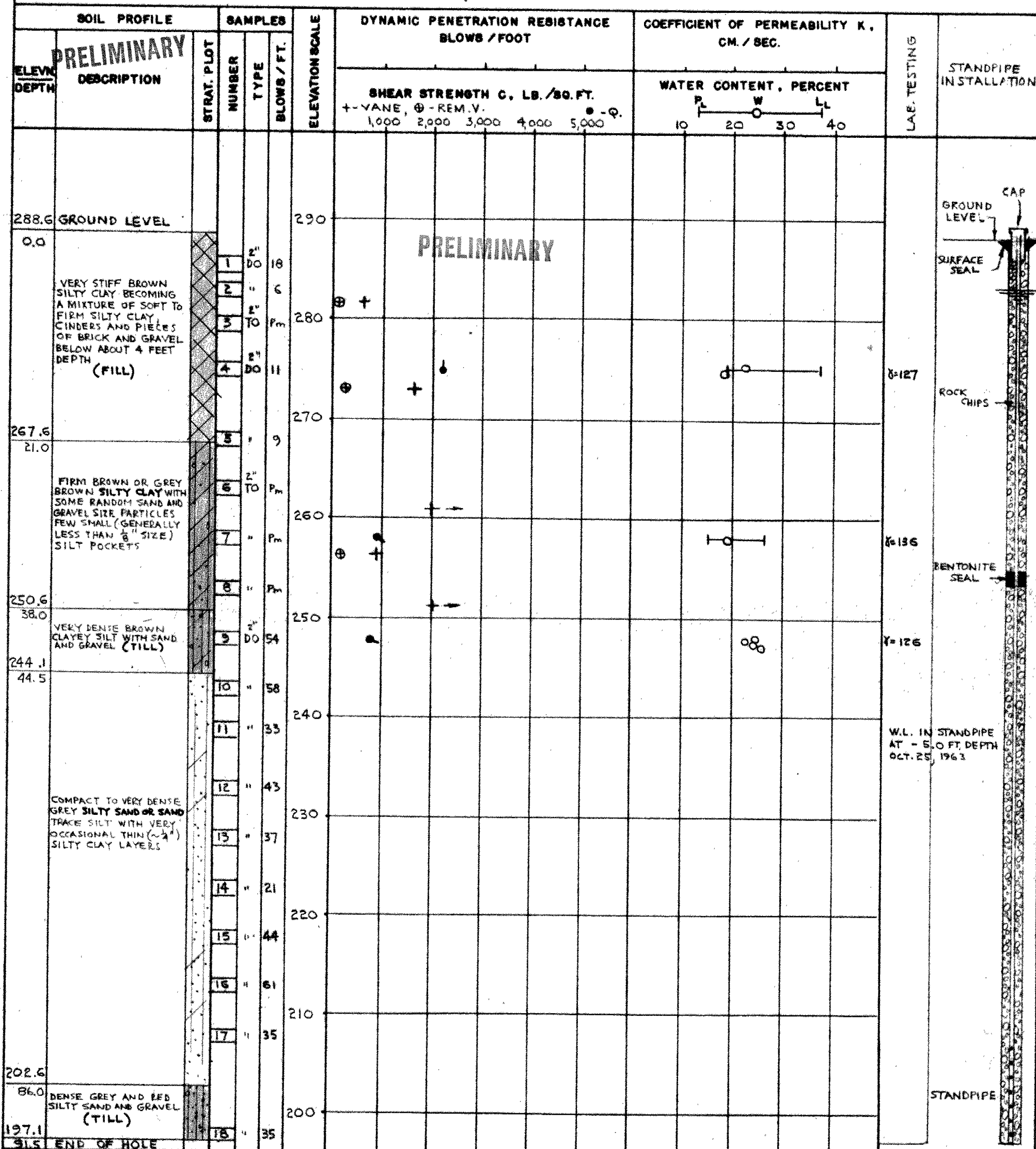
HX & BX CASING

SAMPLER HAMMER WEIGHT 140 LB.

DROP 30 INCHES

PEN. TEST HAMMER WEIGHT. — LB.

DROP — INCHES



VERTICAL SCALE

1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN m w

CHECKED

RECORD OF BOREHOLE 12

LOCATION 267+33 - 34 Left - Line A

BORING DATE OCT. 22-24, 1963

DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER HX & BX CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

SOIL PROFILE			SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		COEFFICIENT OF PERMEABILITY K, CM. / SEC.		LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER	TYPE BLOWS / FT.		SHEAR STRENGTH C, LB. / SQ. FT. + - VANE, ⊕ - REM. V. 1,000 2,000 3,000 4,000 5,000		WATER CONTENT, PERCENT P _L W L _L 10 20 30 40			
292.2	GROUND LEVEL				300						
0.0	FIRM TO VERY STIFF GREY-BROWN SILTY CLAY WITH SOME SAND AND GRAVEL TRACE ORGANIC MATTER AND A FEW PIECES OF BROKEN GLASS (FILL)		1	2" DO	18						
			2	"	21						
			3	"	39						
			4	"	21						
276.7			5	"	9						
15.5	FIRM DARK GREY TO BLACK CLAYEY AND SANDY SILT WITH GRAVEL, ORGANIC MATERIAL, CLINDERS AND PIECES OF GLASS (FILL - POSSIBLY CHANGES TO OLD STREAMBED MATERIAL NEAR BOTTOM OF STRATUM)		6	"	13						
268.5			7	"	7						
23.7			8	"	22						
	STIFF BROWN - GREY (BECOMING FIRM GREY BELOW 29 FT. DEPTH) SILTY CLAY WITH SOME SCATTERED SAND AND GRAVEL SIZE PARTICLES		9	2" TO	Pm						
			10	2" DO	4						
251.2			11	2" TO	Pm						
41.0	DENSE TO VERY DENSE REDDISH BROWN SANDY SILT WITH SOME GRAVEL AND A TRACE OF CLAY		12	2" DO	56						
246.7			13	"	100						
45.5	VERY DENSE GREY- REDDISH BROWN FINE SAND, TRACE SILT		14	"	58						
228.7					230						
63.5											
64.5	END OF HOLE										
	VERY DENSE REDDISH BROWN SILTY SAND & GRAVEL (TILL)				220						

GROUND LEVEL

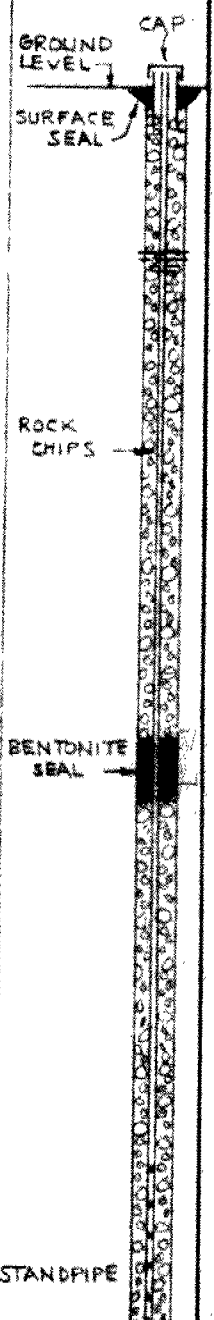
SURFACE SEAL

ROCK CHIPS

BENTONITE SEAL

STANDPIPE

W.L. IN STANDPIPE
AT - 8.8' DEPTH
OCT. 25, 1963



8.8

W.L. IN STANDPIPE
AT - 8.8' DEPTH
OCT. 25, 1963

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN m.c.
CHECKED

RECORD OF BOREHOLE 13

LOCATION *STA. 295+40, 23' LT. - LINE A* BORING DATE SEPT. 23 - 25, 1963 DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER HX & BX CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT LB. DROP INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	COEFFICIENT OF PERMEABILITY K, CM. / SEC.		LAB. TESTING	PIEZOMETER INSTALLATION
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLAT NUMBER	TYPE BLOWS / FT.		SHEAR STRENGTH C, LB. / SQ. FT. 0 - U. 1,000 2,000 3,000 4,000 5,000	WATER CONTENT, PERCENT P _L — W — L _L 10 20 30 40			
273.2	GROUND LEVEL			280					<p>GROUND LEVEL</p> <p>SURFACE SEAL</p> <p>BENTONITE SEAL</p> <p>PIEZOMETER</p> <p>CASED MATERIAL</p>
0.0	CINDERS								
1.0	LOOSE BROWN SAND								
2.5	STIFF BROWN SILTY CLAY (FILL)	1	DO	270					
3.3	VERY LOOSE GREY-BROWN AND BLACK ORGANIC SILTY SAND AND VERY SOFT ORGANIC CLAYEY SILT CONTAINING NUMEROUS ROOTS AND WOOD CHUNKS SOME GRAVEL IN LOWER 2 FT. OF DEPOSIT	2	"						
		3	"						
		4	"						
		5	"						
258.0	SOFT GREY BROWN SILTY CLAY	5	"	260					
255.2		6	TP						
18.0		7	DO	250					
	LOOSE TO COMPACT STRATIFIED SILTS AND SANDS WITH SOME LAYERS OF GREY-BROWN SILTY CLAY (GENERALLY LESS THAN 1" IN THICKNESS) OCCASIONAL GRAVEL SIZE PARTICLES.	8	"						
		9	"						
		10	"						
		11	"						
		12	"						
221.7	END OF HOLE			220					

NOTE: ARTESIAN WATER PRESSURE FIRST NOTICED DURING DRILLING WHEN CASING WAS AT 35 FT. DEPTH.

W.L. IN PIEZOMETER AT 0.0' DEPTH OCT. 25, 1963

PRELIMINARY

($\sigma = 9,150 \text{ LB./SQ. FT.}$)
($\sigma = 9,850 \text{ LB./SQ. FT.}$)

8

X-146
X-141

VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

our area
250 ft east of our 3# 12

RECORD OF BOREHOLE 14

LOCATION STA. 300+25, 25' RT-LANE A

BORING DATE SEPT. 25-27, 1963

DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER 1/2" & 3/4" CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT LB. DROP INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE		COEFFICIENT OF PERMEABILITY K,		LAB. TESTING	PIEZOMETER INSTALLATION
ELEV. / DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER / TYPE		BLOWS / FT.		SHEAR STRENGTH C, LB. / SQ. FT.			
270.9	GROUND LEVEL									
0.0	3" BROWN SANDY TOPSOIL		1 DO	10						
	LOOSE MIXTURE OF CHUNKS OF BROWN, GREY AND BLACK STIFF SILTY CLAY, PIECES OF GLASS, CINDERS, SAND AND SOME ORGANIC MATERIAL (FILL)		2 "	6						
			3 "	4						
			4 "	3						
			5 "	7m						
255.9				6 "	23					
15.0	SOFT SILTY CLAY		7 "	33						
16.5	DENSE BROWN - GREY SANDY AND CLAYEY SILT WITH SOME GRAVEL (TILL) ?		8 "	57						
245.9	COMPACT TO VERY DENSE STRATIFIED SILTS AND SANDS WITH SOME LAYERS OF CLAYEY SILT (GENERALLY 1/8 TO 1" IN THICKNESS)		9 "	28						
25.0			10 "	Wk						
			11 "	35						
			12 "	95						
			13 "	87						
218.9	HARD BROWN SILTY CLAY, SOME SAND AND GRAVEL		14 "	>100						
52.0										
215.6										
55.3	END OF HOLE									

GROUND LEVEL

SURFACE SEAL

BENTONITE SEAL

CEMENT SEAL

BENTONITE SEAL

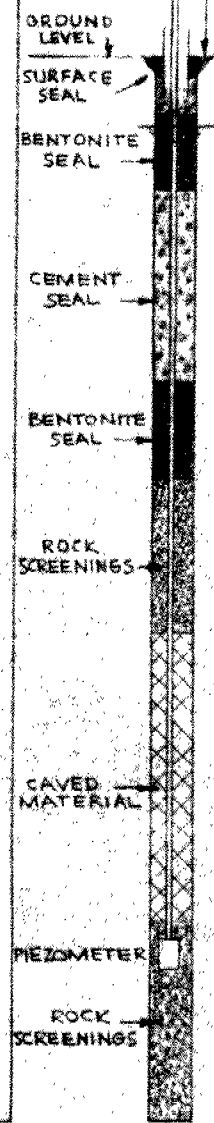
ROCK SCREENINGS

CAVED MATERIAL

PIEZOMETER

ROCK SCREENINGS

W.L. IN PIEZOMETER AT +4.8' HEIGHT OCT. 25, 1963



PRELIMINARY

IS THIS MARGINAL
OR THE SAME STRATA
AS 20' - 35' IN H.A. 32
OR 11.8' - 15.5' H.A. 29
OR 20' - 35' H.A. 29

VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

our area
Near our BH # 13

RECORD OF BOREHOLE 15

LOCATION STA. 305+20, 54' RT. - LINE A

BORING DATE

SEPT. 28 - OCT. 8, 1963

DATUM

GEODETIC

BOREHOLE TYPE POWER AUGER & WASH BORING

BOREHOLE DIAMETER 4.5" & BX CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	COEFFICIENT OF PERMEABILITY K, CM. / SEC.		LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER TYPE		BLOWS / FT.	SHEAR STRENGTH C, LB. / SQ. FT. + - VANE, ⊕ - REM. V. • - Q. 1,000 2,000 3,000 4,000 5,000	WATER CONTENT, PERCENT P _L W L _L 10 20 30 40		
270.6	GROUND LEVEL								
0.0	BROWN CLAYEY SILT WITH SAND, GRAVEL & BOULDERS (FILL)								
2.5	FIRM TO VERY STIFF BROWN TO GREY-GREEN SILTY CLAY WITH OCCASIONAL SAND AND GRAVEL AND A FEW PIECES DECAYED WOOD		1 DO 4						
			2 TO R _h						
261.3			3 DO 16						
9.3									
	COMPACT TO VERY DENSE REDDISH BROWN (GREY BELOW 22 FT. DEPTH) SILTY SAND TO SANDY SILT WITH OCCASIONAL GRAVEL SIZE PARTICLES		4 " 26						
			5 " 100						
			6 " 100						
242.1									
28.5	VERY DENSE REDDISH-BROWN CLAYEY SILT WITH SAND AND GRAVEL (TILL)		7 " 100						
234.8			8 " 100						
35.8	END OF HOLE								

GROUND LEVEL

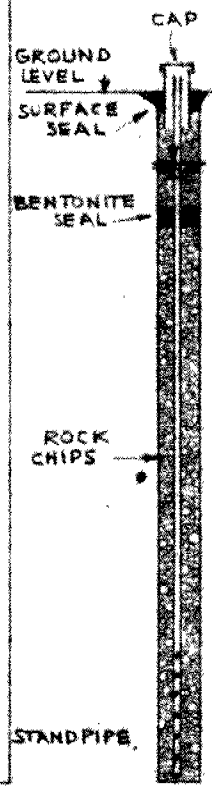
SURFACE SEAL

BENTONITE SEAL

ROCK CHIPS

STANDPIPE

W.L. IN STANDPIPE AT -3.9 FT. DEPTH OCT. 25, 1963



W.L. IN STANDPIPE AT -3.9 FT. DEPTH OCT. 25, 1963

PRELIMINARY

VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

250' east of our 34 # 20
200' south west of our 34 # 15

RECORD OF BOREHOLE 16

LOCATION STA. 298+24, 15' LT. - LINE D

BORING DATE SEPT. 27- OCT. 1, 1963

DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER HX & BX CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

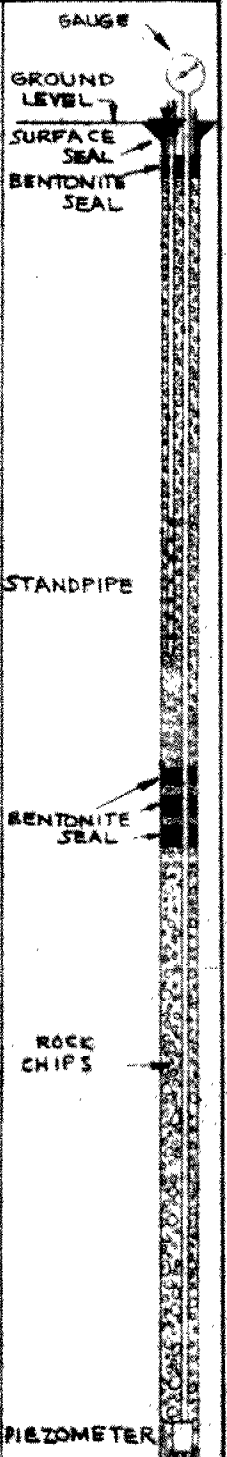
PEN. TEST HAMMER WEIGHT 140 LB. DROP 30 INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.			LAB. TESTING	PIEZOMETER & STANDPIPE INSTALLATION
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER		TYPE	20	40	60	80	100	WATER CONTENT, PERCENT P _L W L _L			
					SHEAR STRENGTH C, LB./SQ. FT.									
270.0	GROUND LEVEL													
0.0	CINDERS, SAND & GRAVEL													
1.0	STIFF BROWN SILTY CLAY													
2.0	LOOSE TO VERY LOOSE MIXTURE OF GREY SAND, CINDERS GRAVEL AND SOME CLAY. ONE PIECE WIRE (FILL)		1	DO	7									
			2	"	4									
261.5			3	"	3									
8.5			4	"	1									
	VERY LOOSE GREY ORGANIC SANDY SILT CONTAINING A FEW PIECES WOOD			2"										
			5	TO	5									
249.2			6	DO	18									
20.8	VERY STIFF BROWN- GREY CLAYEY AND SANDY SILT WITH SOME GRAVEL AND A SAND LAYER 22'-23' DEPTH		7	"	43									
243.8														
26.2	DENSE GREY AND BROWN DILATENT SANDY SILT		8	"	36									
239.0														
31.0	LAYERED VERY STIFF GREY CLAYEY SILT AND SILTY FINE SAND, 1" GRAVEL LAYER AT 31' DEPTH		9	TO	P _m									
233.7			10	DO	25									
36.3														
	COMPACT TO DENSE STRATIFIED GREY SANDY SILTS AND SILTY SANDS WITH SOME THIN (TYPICALLY 1/16") LAYERS OR LENSES OF SOFT GREY CLAY OCCASIONAL GRAVEL		11	"	15									
			12	"	27									
			13	"	28									
			14	"	33									
204.5			15	"	46									
65.5	HARD REDDISH BROWN CLAYEY SILT WITH SOME SAND & GRAVEL, FEW LAYERS OR LENSES OF GREY SAND		16	"	100									
200.0														
70.0	END OF HOLE													
NOTE : DURING DRILLING ARTESIAN WATER PRESSURE NOTED BETWEEN 22 AND 23 FT. DEPTH AND AGAIN BELOW 40 FT. DEPTH TO BOTTOM OF HOLE . WATER LEVEL ROSE TO APPROX. 10 FT. ABOVE GROUND LEVEL WHEN CASING WAS BELOW 40 FT. DEPTH .														

NOTE : BOURDON GAUGE 15"
ABOVE GROUND LEVEL

PRELIMINARY

END OF PEN. TEST & ELEV.



WATER PRESSURE IN
PIEZOMETER 4.0 P.S.I.
OCT. 2, 1963
W.L. IN STANDPIPE AT
GROUND LEVEL
OCT. 2, 1963

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

South side of

river, opposite to our lake # 12 & 13

RECORD OF BOREHOLE 17

LOCATION STA. 311+25 - 64' LEFT LINE 'A' BORING DATE OCT. 8-9, 1963

DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER 8X CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.				LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER TYPE		SHEAR STRENGTH C, LB. / SQ. FT. + - VANE, ⊗ - REM. V. ○ - U. ⊙ - Q. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT P — W — L 10 20 30 40					
270.6	GROUND LEVEL														<p>GROUND LEVEL</p> <p>CAP</p> <p>SURFACE SEAL</p> <p>BENTONITE SEAL</p> <p>ROCK CHIPS</p> <p>STANDPIPE</p> <p>W.L. IN STANDPIPE AT ELEV. 266.1 OCT. 25, 1963</p>
266.6	COMPACT CRUSHED GRADED ROCKFILL		1 DO 13	270											
4.0	SOFT TO FIRM GREY CLAYEY SILT, CONTAINING WOOD FRAGMENTS		2 TO 3 PM												
260.1			4 " PM	260											
10.5	FIRM GREY SILTY CLAY		5 DO 14												
254.1			6 " PM	250											
16.5	VERY DENSE REDDISH BROWN SILT WITH SOME SAND AND CLAY & SCATTERED SHALE FRAGMENTS (TILL)		7 " PM												
245.1															
25.5	END OF HOLE														

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

our area

RECORD OF BOREHOLE 22

LOCATION STA. 331+10, 42' LT. LINE A BORING DATE OCT. 10-11, 1963 DATUM GEODETIC

BOREHOLE TYPE POWER AUGER BORING

BOREHOLE DIAMETER 4.5"

SAMPLER HAMMER WEIGHT 40 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		COEFFICIENT OF PERMEABILITY K, CM. / SEC.		LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	PRELIMINARY DESCRIPTION	NUMBER	TYPE		SHEAR STRENGTH C, LB. / SQ. FT. + - VANE, ⊕ - REM. V. 1,000 2,000 3,000 4,000 5,000		WATER CONTENT, PERCENT P _L W L _L 10 20 30 40			
336.7	GROUND LEVEL									
0.0	VERY STIFF TO STIFF BROWN SILTY CLAY WITH SOME FISSURES, FEW ROOTS IN UPPER PORTION (DESICCATED ZONE)	1	2" DO	20						
		2	" 18							
		3	" 18							
319.2	STIFF TO FIRM GREY OR REDDISH BROWN SILTY CLAY CONTAINING SOME SAND AND GRAVEL SIZE PARTICLES	4	" 11							
17.5		5	2" TO Ph		⊕ +					
		6	2" DO 14		⊕ +					
		7	2" TO Ph							
		8	2" DO 16							
		9	" 17							
		10	2" TO Ph							
		11	2" DO 14							
		12	2" TO Ph		⊕ +					
271.7		13	2" DO 19							
65.0	END OF HOLE									

PRELIMINARY

CAP
GROUND LEVEL
SURFACE SEAL

BENTONITE SEAL

Y=122

ROCK CHIPS

STANDPIPE

W.L. IN STANDPIPE
AT - 37.8' DEPTH
OCT. 25, 1963VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

RECORD OF BOREHOLE 23

LOCATION STA. 334 + 73, 35' RT. - LINE A

BORING DATE OCT. 9 - 10, 1963

DATUM GEODETIC

BOREHOLE TYPE

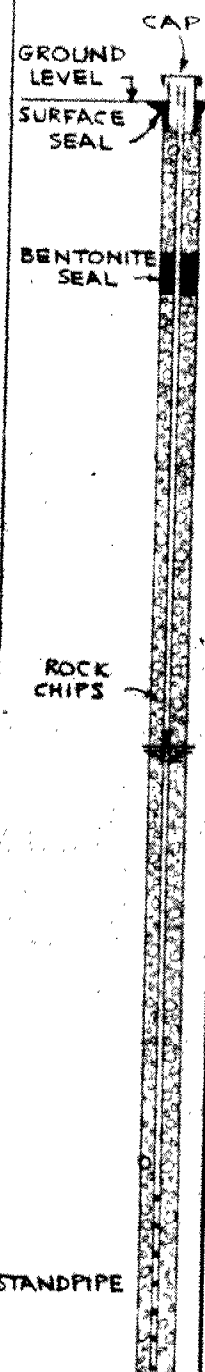
POWER AUGER BORING

BOREHOLE DIAMETER 4.5"

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

SOIL PROFILE		SAMPLES			ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	COEFFICIENT OF PERMEABILITY K, CM. / SEC.		LAB. TESTING	STANDPIPE INSTALLATION	
ELEV./ DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS / FT.	WATER CONTENT, PERCENT				
						SHEAR STRENGTH C, LB./SQ. FT. + - VANE, ⊕ - REM. V. ⊗ - Q. 1,000 2,000 3,000 4,000 5,000		P L W L L 10 20 30 40			
330.8 0.0	GROUND LEVEL										
	VERY STIFF BROWN SILTY CLAY WITH SOME FISSURES CONTAINS A FEW ROOTS IN THE UPPER PORTION (DESICCATED ZONE)		1	2'	DO	30					
			2	"		21					
315.8 15.0			3	"		22					
			4	"		13					
	FIRM TO STIFF GREY OR REDDISH BROWN SILTY CLAY WITH SOME SCATTERED SAND AND GRAVEL SIZE PARTICLES OCCASIONAL LAYERS OF GREY CLAYEY SILT		5	3'	TP	Pm					
			6	2'	DO	7					
			7	2'	TO	Pm					
			8	2'	DO	11					
			9	2'	TO	Pm					
			10	2'	DO	16					
264.3 66.5		END OF HOLE		11	"		73				
					</						



W.L. IN STANDPIPE
AT - 33.3' DEPTH
OCT. 25, 1963

VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

RECORD OF BOREHOLE 24

LOCATION *STN. 344+60, 60' RT. - LINE A* BORING DATE OCT. 8-9, 1963 DATUM GEODETIC

BOREHOLE TYPE POWER AUGER BORING

BOREHOLE DIAMETER 4.5"

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	COEFFICIENT OF PERMEABILITY K, CM. / SEC.		LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. POS.	NUMBER TYPE BLOWS / FT.		SHEAR STRENGTH C, LB. / SQ. FT. + - VANE, ⊕ - REM. V. 1,000 2,000 3,000 4,000 5,000	WATER CONTENT, PERCENT P L W L 10 20 30 40			
329.9	GROUND LEVEL								
0.0	VERY STIFF TO STIFF BROWN SILTY CLAY WITH SOME FISSURES OCCASIONAL SCATTERED SAND AND GRAVEL, FEW ROOTS IN UPPER PORTION (DESICCATED ZONE)		1 DO 29						
			2 " 21						
			3 " 11						
315.4	STIFF GREY OR REDDISH BROWN SILTY CLAY WITH SOME SCATTERED SAND AND GRAVEL SIZE PARTICLES OCCASIONAL POCKETS (1/16" TO 1/2") OF GREY SILT AND A FEW LAYERS OR LENSES OF FINE SANDY SILT WITH INCREASING DEPTH		4 TP Pm						
14.5			5 DO 10						
			6 2" TO Pm						
			7 2" DO 9						
			8 " 10	⊕ +					
			9 2" TO Pm	⊕ +					
			10 2" DO 10	⊕ +					
			11 " 10	⊕ +					
			12 " 12						
			13 " 22						
265.1									
64.8	END OF HOLE								

PRELIMINARY

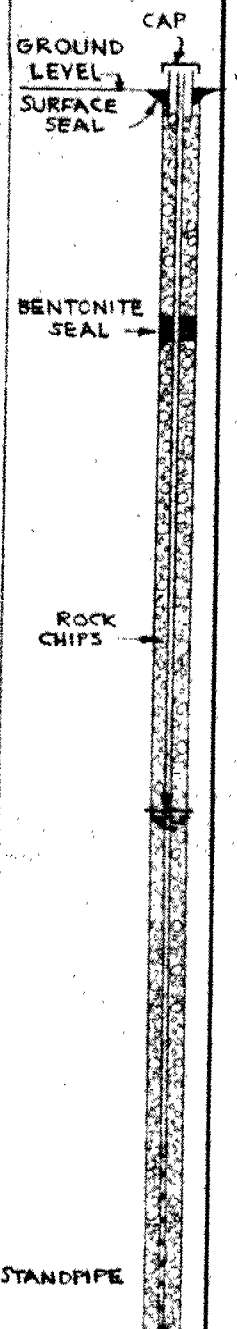
GROUND LEVEL
SURFACE SEAL

BENTONITE SEAL

ROCK CHIPS

STANDPIPE

W.L. IN STANDPIPE
AT - 37.3' DEPTH
OCT. 25, 1963

W.L. IN STANDPIPE
AT - 37.3' DEPTH
OCT. 25, 1963VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN *M. W.*
CHECKED

RECORD OF BOREHOLE 25

LOCATION STA. 342+70, 63' RT. - LINE A

BORING DATE OCT. 7-8, 1963

DATUM GEODETIC

BOREHOLE TYPE POWER AUGER BORING

BOREHOLE DIAMETER 4.5"

SAMPLER HAMMER WEIGHT 40 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.		LAB. TESTING	STANDPIPE INSTALLATION	
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER		TYPE	BLOWS / FT.	SHEAR STRENGTH C, LB. / SQ. FT. + - VANE, @ - REM. V. 1,000 2,000 3,000 4,000 5,000				WATER CONTENT, PERCENT P L W L L 10 20 30 40			
310.8	GROUND LEVEL													
0.0	4" TOPSOIL													
	HARD BROWN SILTY CLAY WITH SOME FISSURES (DESICCATED ZONE)		1	2"	DO	44								
			2	"		23								
			3	"		25								
296.8	STIFF GREY OR REDDISH BROWN SILTY CLAY WITH SOME SAND AND GRAVEL SIZE PARTICLES SCATTERED THROUGHOUT FEW LAYERS OR LENSES OF GREY CLAYEY SILT		4	2"	TO Ph									
14.0			5	2"	DO	14								
			6	2"	TO Pm									
			7	2"	DO	11								
			8	3"	TO Pm									
			9	2"	DO	22								
			10	"		21								
256.3														
54.5		END OF HOLE												

GROUND LEVEL

SURFACE SEAL

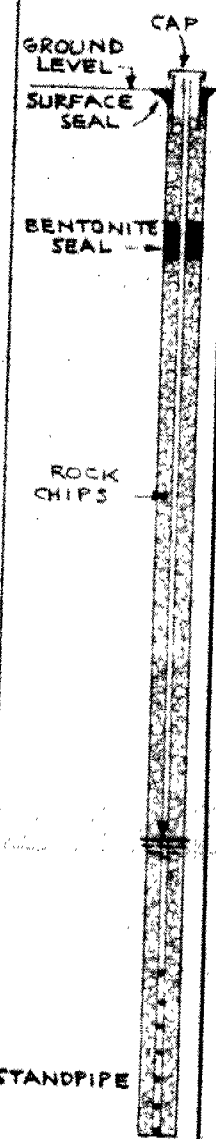
BENTONITE SEAL

ROCK CHIPS

STANDPIPE

W. L. IN STANDPIPE
AT -38.8' DEPTH
OCT. 25, 1963

PRELIMINARY



W.L. IN STANDPIPE
AT -38.8' DEPTH
OCT. 25, 1963

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

RECORD OF BOREHOLE 26

LOCATION STA. 354+95, 11' RT-LINE A

BORING DATE OCT. 4-7, 1963

DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER 1/2 X 8 X CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

SOIL PROFILE		SAMPLES			ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.				LAB. TESTING	STANDPIPE INSTALLATION
ELEVATION DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS / FT.	SHEAR STRENGTH C, LB. / SQ. FT. + - VANE, ⊕ - REM. V. ○ - U, ⊗ - Q. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT P _L W L _L 10 20 30 40				
291.0	GROUND LEVEL															
0.0																
	VERY STIFF TO STIFF BROWN SILTY CLAY WITH SOME FISSURES FEW POCKETS OF GREY SILT (DESICCATED ZONE)		1	DO	15											
			2	"	11											
			3	"	15											
			4	"	9											
278.0			5	TP	Pm											
13.0			6	"	Pm											
			7	TO	Pm											
	FIRM TO STIFF GREY SILTY CLAY WITH SOME SAND AND GRAVEL SCATTERED THROUGHOUT		8	"	Pm											
			9	"	Pm											
			10	"	Pm											
			11	DO	24											
			12	TO	Pm											
236.0			13	DO	Pm											
55.0	STIFF REDDISH BROWN CLAYEY SILT WITH SOME SAND AND GRAVEL		14	"	>100											
231.0			15	"	80											
60.0	VERY DENSE REDDISH BROWN SILT WITH SOME SAND AND GRAVEL AND TRACE CLAY (TILL)		16	"	>100											
220.9																
70.1	END OF HOLE															

GROUND LEVEL

SURFACE SEAL

BENTONITE SEAL

ROCK CHIPS

BENTONITE SEAL

ROCK CHIPS

STANDPIPE

W.L. IN STANDPIPE
AT -18.6' DEPTH
OCT. 25, 1963

VERTICAL SCALE

1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN M.W.

CHECKED

RECORD OF BOREHOLE 27

LOCATION Sta. 359+48, 152' RT-LINE A

BORING DATE OCT. 3-4, 1963

DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER HX CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.				LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER		TYPE	BLOWS / FT.	SHEAR STRENGTH C, LB. / SQ. FT. + - VANE, ⊕ - REM. V. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT P _L W L _L 10 20 30 40			
260.1	GROUND LEVEL														
0.0	VERY LOOSE GREY SANDY AND CLAYEY SILT		1	3" TP	Pm										
255.6			2	"	Pm										
4.5	SOFT GREY SILTY CLAY		3	"	Pm										
248.3			4	"	Pm										
11.8	BLACK FIBROUS ORGANIC MATERIAL MIXED WITH SOME SILT AND SAND		5	2" DO	11										
245.6	COMPACT LAYERED BLACK AND BROWN SAND AND RED-BROWN SILT WITH GRAVEL		6	"	100										
14.5			7	"	100										
240.6															
19.5	VERY DENSE DARK BROWN SILT WITH SOME SAND AND GRAVEL														
234.3															
25.8	END OF HOLE														

VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN JH. 10/1
CHECKED

RECORD OF BOREHOLE 28

LOCATION STA. 359+09, 32' RT. - LINE A

BORING DATE OCT. 1-3, 1963

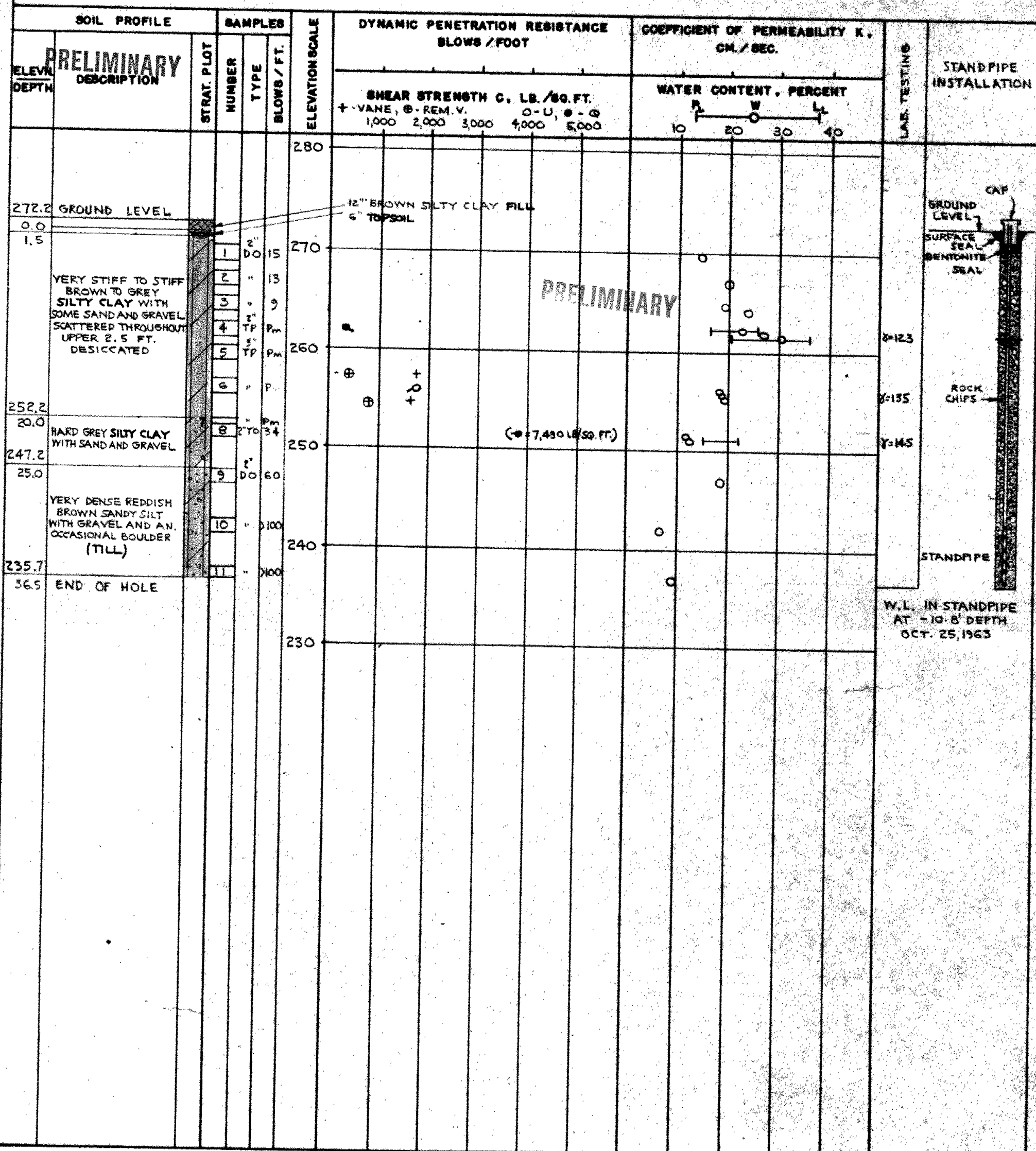
DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER 14 X 8 BX CASING

SAMPLER HAMMER WEIGHT 140 LB. - DROP 30 INCHES

PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

VERTICAL SCALE
1 INCH TO 10' 0"

GOLDER & ASSOCIATES

DRAWN J.W.
CHECKED

RECORD OF BOREHOLE 29

LOCATION STA. 377+55, 223' RT. - LINE A BORING DATE OCT. 5-7, 1963

DATUM GEODETIC

BOREHOLE TYPE POWER AUGER BORING

BOREHOLE DIAMETER 4.5"

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

SOIL PROFILE		SAMPLES			ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.				LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		SHEAR STRENGTH C. LB. / SQ. FT. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT 10 20 30 40					

260.8	GROUND LEVEL															
0.0	SILTY SAND AND GRAVEL WITH SOME ROCK FRAGMENTS (FILL)															
257.8																
3.0			1	DO	5											
			2	TO	P _m											
	SOFT TO FIRM GREENISH GREY SILTY CLAY CONTAINING ORGANIC MATERIAL AND SOME POCKETS OF SILTY SAND		3	TP	P _m											
			4	TP	P _m											
242.8																
18.0	COMPACT GREY SILTY SAND		5	DO	55											
18.7			6	"	>100											
	VERY DENSE REDDISH BROWN CLAYEY SILT WITH SOME SAND AND GRAVEL (TILL)		7	"	>100											
	BECOMING A SILT, TRACE CLAY AND FINE SAND BELOW 31 FT. DEPTH.		8	"	>100											
225.8																
35.0	END OF HOLE															

PRELIMINARY

W.L. IN STANDPIPE
AT - 5.5' DEPTH
OCT. 25, 1963

GROUND LEVEL

CAP

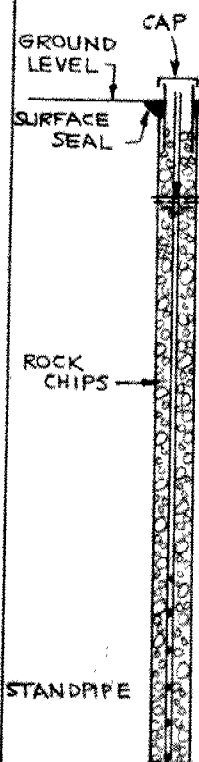
SURFACE SEAL

ROCK CHIPS

STANDPIPE

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKEDW.L. IN STANDPIPE
AT - 5.5' DEPTH
OCT. 25, 1963

RECORD OF BOREHOLE 30

LOCATION STA. 379+06, 4' LT. - LINE A

BORING DATE OCT. 4, 1963

DATUM GEODETIC

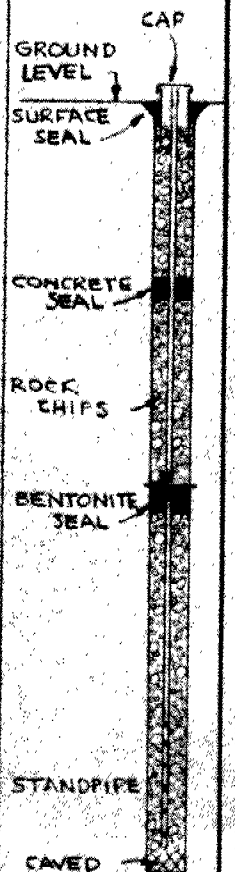
BOREHOLE TYPE POWER AUGER BORING

BOREHOLE DIAMETER 4.5"

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		COEFFICIENT OF PERMEABILITY K, CM. / SEC.		LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER TYPE		BLOWS / FT.	SHEAR STRENGTH C, LB. / SQ. FT. 1,000 2,000 3,000 4,000 5,000	WATER CONTENT, PERCENT 10 20 30 40			
319.0	GROUND LEVEL									
0.0	HARD BROWN SILTY CLAY WITH SOME FISSURES, OCCASIONAL SAND AND GRAVEL SIZE PARTICLES, FEW ROOTS IN UPPER PORTION (DESICCATED ZONE)		2'							
		1	DO	44						
		2	"	64						
		3	"	53	310					
303.0		4	"	60						
16.0	STIFF TO VERY STIFF GREY SILTY CLAY WITH SOME SCATTERED SAND AND GRAVEL SIZE PARTICLES		2'							
		5	TO Ph	300						
		6	DO	15						
		7	"	15	290					
		8	TO Ph							
279.0		9	2'	18	280					
40.0	END OF HOLE									



W.L. IN STANDPIPE
AT - 20.3' DEPTH
OCT. 25, 1963

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

RECORD OF BOREHOLE 31

LOCATION STA. 383+00, 43' RT. - TAN. LINE A

BORING DATE OCT 4, 1963

DATUM GEODETIC

BOREHOLE TYPE

POWER AUGER BORING

BOREHOLE DIAMETER 4.5"

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT LB. DROP INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	COEFFICIENT OF PERMEABILITY K, CM. / SEC.		LAB. TESTING	STANDPIPE INSTALLATION	
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER		TYPE	BLOWS / FT.	WATER CONTENT, PERCENT			
					SHEAR STRENGTH C, LB. / SQ. FT.		P L W L L			
					1,000 2,000 3,000 4,000 5,000		10 20 30 40			
318.8	GROUND LEVEL									
0.0	VERY STIFF TO HARD BROWN SILTY CLAY WITH SOME FISSURES, OCCASIONAL SAND & GRAVEL SIZE PARTICLES FEW ROOTS IN UPPER PORTION (DESICCATED ZONE)		1	2"	DO	26				
			2	"		23				
			3	"		35				
			4	"		45				
303.8										
15.0	VERY STIFF GREY SILTY CLAY WITH SOME SCATTERED SAND AND GRAVEL SIZE PARTICLES		5	"		27				
			6	"		20				
			7	2"	TO Ph					
			8	2"	DO	19				
			9	"		19				
278.8										
40.0	END OF HOLE									

GROUND LEVEL

CAP

SURFACE SEAL

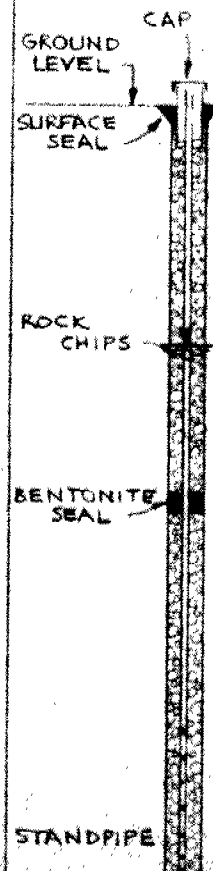
ROCK CHIPS

BENTONITE SEAL

STANDPIPE

W.L. IN STANDPIPE
AT - 12.6' DEPTH
OCT. 25, 1963

PRELIMINARY

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN m.w.
CHECKED

RECORD OF BOREHOLE 32

LOCATION STA. 386+20, 66' RT. - LINE A

BORING DATE OCT. 4-5, 1963

DATUM GEODETIC

BOREHOLE TYPE POWER AUGER BORING

BOREHOLE DIAMETER 4.5"

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		COEFFICIENT OF PERMEABILITY K, CM. / SEC.		LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER TYPE		BLOWS / FT.	SHEAR STRENGTH C, LB. / SQ. FT. 1,000 2,000 3,000 4,000 5,000	WATER CONTENT, PERCENT P L W L L			
317.6	GROUND LEVEL									
0.0	YELLOW BROWN SANDY SILT									
2.5	HARD BROWN SILTY CLAY WITH SOME FISSURES, FEW ROOTS IN UPPER PORTION OCCASIONAL SAND & GRAVEL SIZE PARTICLES (DESICCATED ZONE)		1 DO	57						
			2 "	49						
			3 "	47						
304.1			4 "	32						
13.5			5 "	26						
	HARD TO VERY STIFF GREY SILTY CLAY WITH SOME SCATTERED SAND AND GRAVEL SIZE PARTICLES		6 2" TO Ph							
			7 DO	20						
			8 "	17						
277.6			9 2" TO Ph							
40.0	END OF HOLE									

PRELIMINARY

GROUND LEVEL

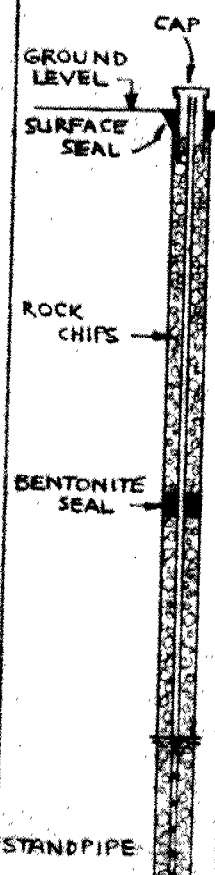
SURFACE SEAL

ROCK CHIPS

BENTONITE SEAL

W.L. IN STANDPIPE AT - 32.7' DEPTH OCT. 25, 1963

PRELIMINARY

W.L. IN STANDPIPE
AT - 32.7' DEPTH
OCT. 25, 1963VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN BY W.S.
CHECKED

RECORD OF BOREHOLE 33

LOCATION STA. 391+00, 105' RT. - LINE A

BORING DATE OCT. 3, 1963

DATUM GEODETIC

BOREHOLE TYPE

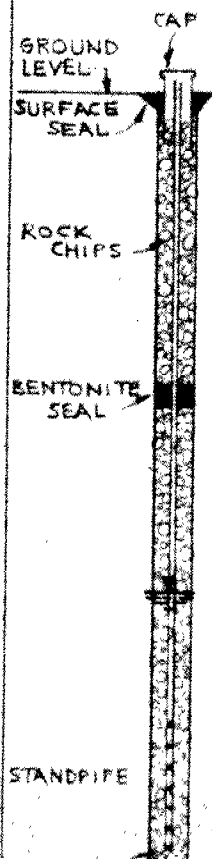
POWER AUGER BORING

BOREHOLE DIAMETER 4.5"

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

SOIL PROFILE			SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.				LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		SHEAR STRENGTH C, LB. / SQ. FT. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT 10 20 30 40					
314.9 0.0	GROUND LEVEL		1	DO	47											W.L. IN STANDPIPE AT ~ 25.9' DEPTH OCT. 25, 1963
	HARD BROWN SILTY CLAY WITH SOME FISSURES, OCCASIONAL SCATTERED SAND AND GRAVEL SIZE PARTICLES FEW ROOTS IN UPPER PORTION (DESICCATED ZONE)		2	"	46											
			3	"	42											
			4	"	58											
297.4 17.5	VERY STIFF GREY SILTY CLAY WITH SOME SCATTERED SAND AND GRAVEL SIZE PARTICLES		5	"	18											
			6	TO	PL											
			7	DO	29											
			8	TO	PH											
274.2 40.0			END OF HOLE	9	DO	33										

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

RECORD OF BOREHOLE 34

LOCATION STA. 395+72, 74' RT. - LINE A

BORING DATE OCT. 2-3, 1963

DATUM GEODETIC

BOREHOLE TYPE

POWER AUGER BORING

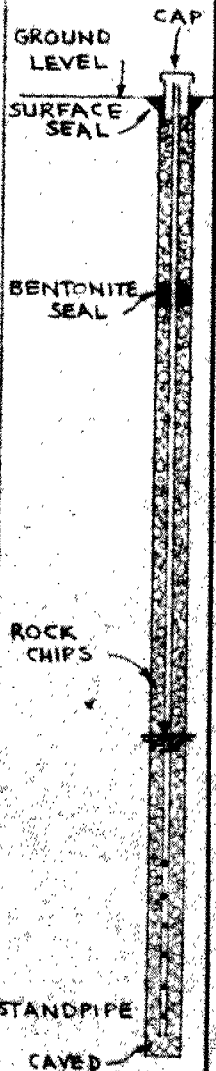
BOREHOLE DIAMETER 4.5"

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.				LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER		TYPE	SHEAR STRENGTH C, LB. / SQ. FT.					WATER CONTENT, PERCENT				

PRELIMINARY



VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

RECORD OF BOREHOLE 35

LOCATION STA. 399+70, 173' RT. - LINE A

BORING DATE SEPT. 30 - OCT. 1, 1963

DATUM GEODETIC

BOREHOLE TYPE POWER AUGER BORING

BOREHOLE DIAMETER 4.5"

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE		COEFFICIENT OF PERMEABILITY K, CM./SEC.		STANDPIPE INSTALLATION
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER		TYPE	BLOWS / FT.	SHEAR STRENGTH C, LB./SQ. FT.	WATER CONTENT, PERCENT	
310.7	GROUND LEVEL								
0.0	HARD BROWN SILTY CLAY WITH SOME FISSURES. FEW ROOTS IN UPPER PORTION (DESICCATED ZONE)		1	DO	59				
			2	"	68				
			3	"	63				
295.9			4	"	25				
14.8	STIFF TO HARD GREY SILTY CLAY TO CLAYEY SILT CONTAINING SOME SCATTERED SAND AND GRAVEL SIZE PARTICLES		5	"	23				
			6	TO Ph					
			7	DO	41				
			8	"	26				
			9	"	41				
			10	"	24				
258.7			11	"	17				
52.0			12	TO Ph					
	END OF HOLE								

PRELIMINARY

STANDPIPE DESTROYED OCT. 25, 1963

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN MW.
CHECKED

RECORD OF BOREHOLE 36

LOCATION STA. 406+70, 134' RT.-LINE A

BORING DATE OCT. 2, 1963

DATUM GEODETIC

BOREHOLE TYPE POWER AUGER BORING

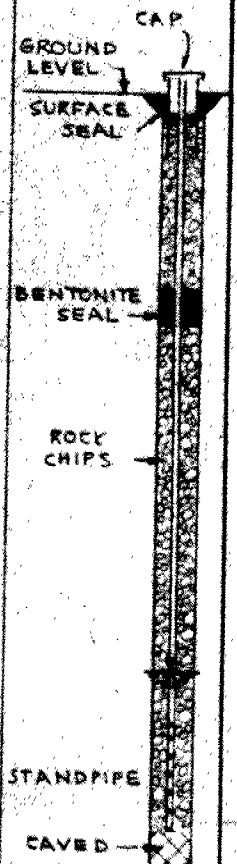
BOREHOLE DIAMETER 4.5"

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

SOIL PROFILE			SAMPLES			ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT			COEFFICIENT OF PERMEABILITY K, CM. / SEC.			LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE	BLOWS / FT.		SHEAR STRENGTH C, LB. / SQ. FT.			WATER CONTENT, PERCENT <div><div>P</div><div>W</div><div>LL</div><div>10</div><div>20</div><div>30</div><div>40</div></div>				
308.3	GROUND LEVEL													
0.0	HARD BROWN SILTY CLAY WITH SOME FISSURES, OCCASIONAL SAND AND GRAVEL SIZE PARTICLES FEW ROOTS IN UPPER PORTION (DESICCATED ZONE)		1	2"	DO	51								
			2	"		80								
			3	"		75								
296.3	STIFF TO HARD GREY SILTY CLAY WITH SOME SAND AND GRAVEL		4	2"	TO	Ph								
12.0			5	2"	DO	33								
			6	"		33								
			7	"		37								
			8	2"	TO	40								
			9	2"	DO	55								
268.3														
40.0	END OF HOLE													

PRELIMINARY

W.L. IN STANDPIPE
AT - 30.0' DEPTH
OCT. 25, 1963VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

RECORD OF BOREHOLE 37

LOCATION STA. 911+95, 143' CT-LINE A

BORING DATE OCT. 1-2, 1963

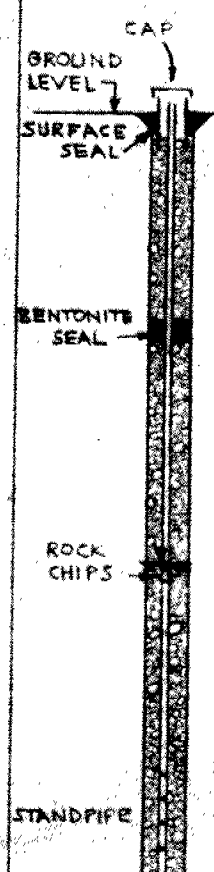
DATUM GEODETIC

BOREHOLE TYPE POWER AUGER BORING

BOREHOLE DIAMETER 4.5"

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	COEFFICIENT OF PERMEABILITY K, CM. / SEC.		LAB. TESTING	STANDPIPE INSTALLATION
ELEV. / DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT NUMBER	TYPE BLOWS / FT.		SHEAR STRENGTH C, LB. / SQ. FT.	WATER CONTENT, PERCENT 10 20 30 40			
306.8	GROUND LEVEL								
0.0	HARD BROWN SILTY CLAY WITH SOME FISSURING, SOME SCATTERED GRAVEL SIZE PARTICLES FEW ROOTS IN UPPER PORTION (DESICCATED ZONE)	1	2" DO	49					
		2	"	50					
		3	"	52					
		4	"	47					
291.1	STIFF TO HARD GREY SILTY CLAY TO CLAYEY SILT CONTAINING SOME SCATTERED SAND AND GRAVEL SIZE PARTICLES	5	2" TO Ph						
15.7		6	2" DO	48					
		7	"	38					
		8	2" TO	50					
268.8	DENSE GREY SILTY SAND, TRACE CLAY	9	2" DO	48					
38.0									
40.2	END OF HOLE								

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

RECORD OF BOREHOLE 38

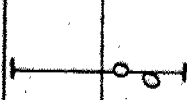
LOCATION *STA. 300+49, SB' RT-TAN. LINE A* BORING DATE *SEPT. 30, 1963* DATUM *GEODETIC*
BOREHOLE TYPE *POWER AUGER BORING* BOREHOLE DIAMETER *4.5"*
SAMPLER HAMMER WEIGHT *140 LB.* DROP *30 INCHES* PEN. TEST HAMMER WEIGHT *-* LB. DROP *-* INCHES

SOIL PROFILE		SAMPLES			ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.				REMARKS
ELEV. / DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		SHEAR STRENGTH C, LB. / SQ. FT. + - VANE, ⊕ - REM. V. • - Q. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT P _L W L _L 10 20 30 40				
272.9	GROUND LEVEL														
0.0	BROWN-BLACK SANDY AND CLAYEY SILT, SOME GRAVEL														
269.6															
3.3	VERY STIFF BROWN SILTY CLAY WITH SOME SAND AND GRAVEL (DESICCATED ZONE)		1	DO	14										
			2	"	15										
			3	"	13										
260.9															
12.0	VERY STIFF GREY SILTY CLAY WITH SOME SAND		4	TO	P _m										
253.8															
19.1	VERY DENSE REDDISH BROWN BECOMING GREY BELOW 25 FT. DEPTH SANDY SILT WITH SOME GRAVEL		5	"	P _m										
			6	DO	61										
			7	"	92										
			8	"	50										
234.7															
38.2	END OF HOLE														

PRELIMINARY

NOTE: NO WATER LEVEL
OBSERVATION PIPE
INSTALLED IN THIS
BOREHOLE.

PRELIMINARY



125
NOTE: NO WATER LEVEL
OBSERVATION PIPE
INSTALLED IN THIS
BOREHOLE.

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN *m w.*
CHECKED

RECORD OF BOREHOLE 39

LOCATION STA. 338+50, 94' RT. - LINE A

SPRING DATE

OCT. 16-17, 1963

DATUM

GEODETIC

BOREHOLE TYPE

WASH BORING

BOREHOLE DIAMETER

HX & BX CASING

SAMPLER HAMMER WEIGHT 140 LB.

DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.				LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT NUMBER	TYPE BLOWS / FT.		SHEAR STRENGTH C, LB. / SQ. FT. + - VANE, ⊕ - REM. V. ○ - U., ● - Q. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT P — W — L 10 20 30 40					
299.4	GROUND LEVEL														
0.0	VERY STIFF BROWN SILTY CLAY, FEW FISSURES (DESICCATED ZONE)	1	2" DO 10												
295.4		2	" 6												
4.0		3	2" TO Pm												
		4	3" TO Pm												
	STIFF TO VERY STIFF GREY SILTY CLAY WITH SOME SCATTERED SAND AND GRAVEL SIZE PARTICLES	5	2" TO Pm												
		6	2" DO 3												
		7	2" TO Pm												
		8	2" DO 7												
		9	2" TO Pm												
257.4		10	2" DO 100												
42.0	VERY DENSE REDDISH BROWN SILT, TRACE CLAY, WITH SAND GRAVEL AND OCCASIONAL BOULDERS (TILL)	11	WS -												
		12	DO 100												
		13	" DO 100												
239.4															
60.0	END OF HOLE														

PRELIMINARY

GROUND LEVEL

SURFACE SEAL

ROCK CHIPS

BENTONITE SEAL

STANDPIPE

W.L. IN STANDPIPE AT -11.5' DEPTH OCT. 25, 1963

CAP
GROUND LEVEL
SURFACE SEAL

γ=125

γ=122

γ=120

ROCK CHIPS

γ=127

BENTONITE SEAL

γ=131

STANDPIPE

W.L. IN STANDPIPE
AT -11.5' DEPTH
OCT. 25, 1963

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

RECORD OF BOREHOLE 40

LOCATION STA. 368+76, 44' RT. - LINE A BORING DATE OCT. 25 - 26, 1963 DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER HX & BX CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST	HAMMER WEIGHT	LB.	DROP	INCHES
1	10	10	10	10
2	10	10	10	10
3	10	10	10	10
4	10	10	10	10
5	10	10	10	10
6	10	10	10	10
7	10	10	10	10
8	10	10	10	10
9	10	10	10	10
10	10	10	10	10
11	10	10	10	10
12	10	10	10	10
13	10	10	10	10
14	10	10	10	10
15	10	10	10	10
16	10	10	10	10
17	10	10	10	10
18	10	10	10	10
19	10	10	10	10
20	10	10	10	10
21	10	10	10	10
22	10	10	10	10
23	10	10	10	10
24	10	10	10	10
25	10	10	10	10
26	10	10	10	10
27	10	10	10	10
28	10	10	10	10
29	10	10	10	10
30	10	10	10	10
31	10	10	10	10
32	10	10	10	10
33	10	10	10	10
34	10	10	10	10
35	10	10	10	10
36	10	10	10	10
37	10	10	10	10
38	10	10	10	10
39	10	10	10	10
40	10	10	10	10
41	10	10	10	10
42	10	10	10	10
43	10	10	10	10
44	10	10	10	10
45	10	10	10	10
46	10	10	10	10
47	10	10	10	10
48	10	10	10	10
49	10	10	10	10
50	10	10	10	10
51	10	10	10	10
52	10	10	10	10
53	10	10	10	10
54	10	10	10	10
55	10	10	10	10
56	10	10	10	10
57	10	10	10	10
58	10	10	10	10
59	10	10	10	10
60	10	10	10	10
61	10	10	10	10
62	10	10	10	10
63	10	10	10	10
64	10	10	10	10
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66	10	10	10	10
67	10	10	10	10
68	10	10	10	10
69	10	10	10	10
70	10	10	10	10
71	10	10	10	10
72	10	10	10	10
73	10	10	10	10
74	10	10	10	10
75	10	10	10	10
76	10	10	10	10
77	10	10	10	10
78	10	10	10	10
79	10	10	10	10
80	10	10	10	10
81	10	10	10	10
82	10	10	10	10
83	10	10	10	10
84	10	10	10	10
85	10	10	10	10
86	10	10	10	10

[illegible]

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN *M. C.*
CHECKED

RECORD OF BOREHOLE 41

LOCATION STA. 375+70, 102' RT. - LINE H BORING DATE OCT. 18-19, 1963

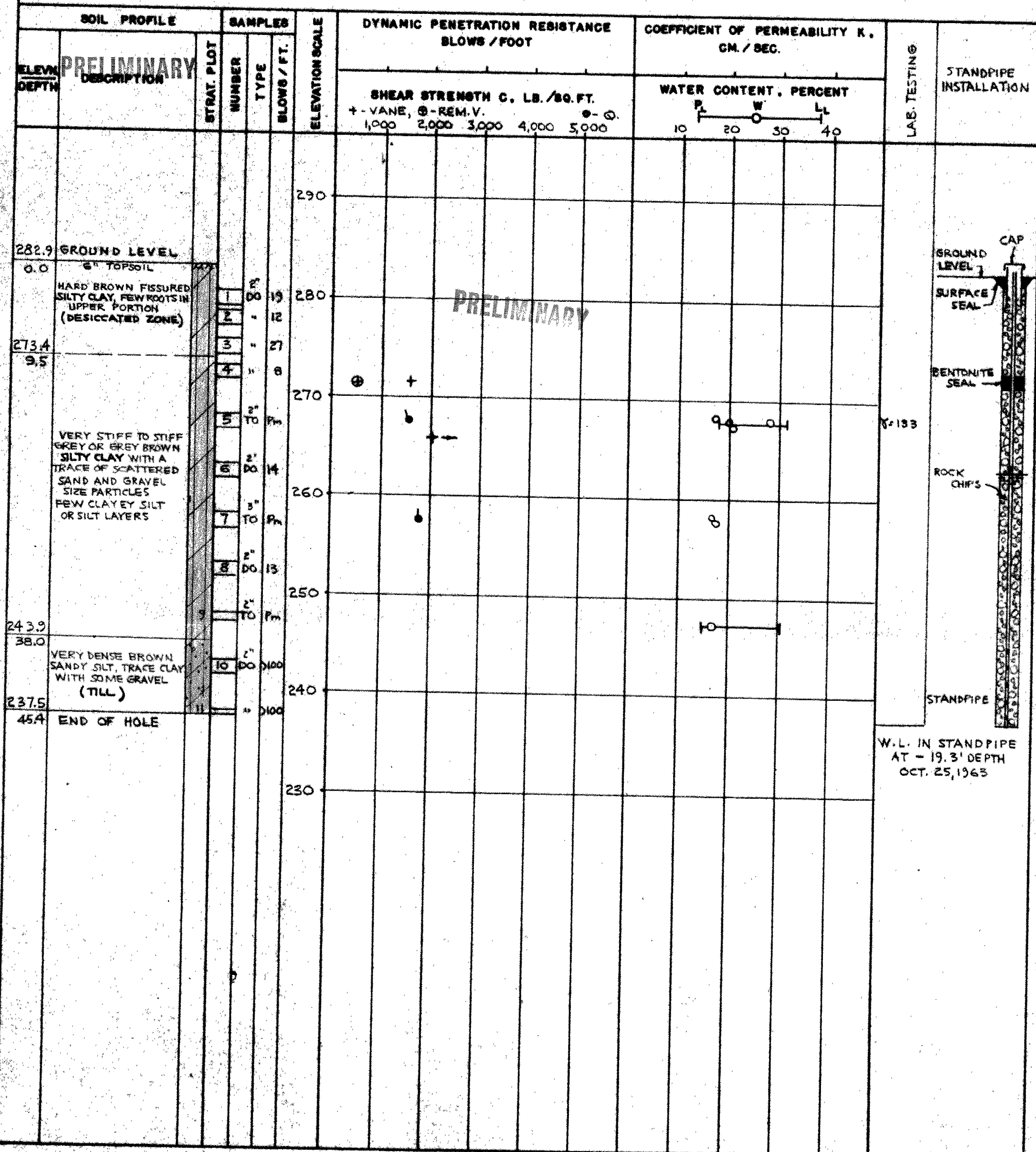
DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER HX & BX CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

RECORD OF BOREHOLE 42

LOCATION STA. 356+32, 116' RT. LINE A ^{TAM}

BORING DATE

OCT. 11-15, 1963

DATUM

GEODETIC

BOREHOLE TYPE

WASH BORING

BOREHOLE DIAMETER

HX & BX CASING

SAMPLER HAMMER WEIGHT 140 LB.

DROP 30 INCHES

PEN. TEST HAMMER WEIGHT - LB.

DROP - INCHES

SOIL PROFILE		SAMPLES			ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.				LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	DESCRIPTION	STRAT. PLAT	NUMBER	TYPE		SHEAR STRENGTH C, LB. / SQ. FT. + - VANE Φ - REM. V. Φ - U. Φ - Q. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT P_L W L_L 10 20 30 40					
260.5	GROUND LEVEL															
258.0	LOOSE CINDER FILL															
2.5	STIFF GREY SILTY CLAY BECOMING A SOFT SPONGY DARK GREY CLAYEY SILT WITH SOME POCKETS OF MEDIUM SAND AND A FEW WHITE SHELLS BELOW 4.5 FT. DEPTH (FLOODPLAIN OR ESTUARINE DEPOSIT)?		1	DO	11											
			2	TO	P _m											
			3	"	P _m											
			4	"	P _m											
245.0				5	TO	P _m										
15.5	STIFF GREY SILTY CLAY SOME GRAVEL															
240.5	LOOSE TO DENSE LAYERED REDDISH BROWN AND GREY SILT, GREY CLAYEY SILT, REDDISH BROWN SILTY FINE SAND AND REDDISH BROWN SILTY SAND AND GRAVEL		6	DO	-											
20.0			7	"	28											
			8	"	49											
			9	"	52											
36.0	VERY DENSE REDDISH BROWN SANDY SILT		10	AS	-											
220.3			11	DO	100											
40.2	END OF HOLE															

PRELIMINARY

W.L. IN STANDPIPE AT +0.7' HEIGHT OCT. 25, 1963

VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN *m.w.*
CHECKED

RECORD OF BOREHOLE 43

LOCATION SA. 370+02, 55' LT.-LINE A

BORING DATE OCT. 16, 1963

DATUM GEODETIC

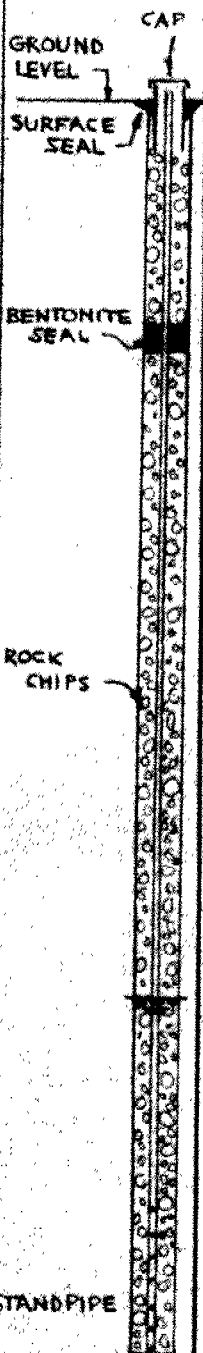
BOREHOLE TYPE POWER AUGER BORING

BOREHOLE DIAMETER 4.5 "

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		COEFFICIENT OF PERMEABILITY K, CM. / SEC.		LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER TYPE		BLOWS / FT.	SHEAR STRENGTH C, LB. / SQ. FT. 1,000 2,000 3,000 4,000 5,000	WATER CONTENT, PERCENT P L W L 10 20 30 40			
322.2	GROUND LEVEL									
0.0	4" TOPSOIL									
	HARD BROWN SILTY CLAY WITH SOME FISSURES, UPPER PORTION CONTAINS SOME ROOTS AND IS PREDOMINATELY SILTY, FEW SCATTERED GRAVEL SIZE PARTICLES (DESICCATED ZONE)		1 DO	37						
312.7			2 "	38						
9.5			3 "	53						
			4 "	20						
			5 TO	PM						
	VERY STIFF TO FIRM GREY OR GREY BROWN SILTY CLAY WITH SOME SCATTERED SAND AND GRAVEL SIZE PARTICLES OCCASIONAL SILTY SAND POCKETS GENERALLY NOT GREATER THAN 1/8" IN SIZE. SOME GREY AND REDDISH BROWN COLOUR STRATIFICATION BETWEEN ABOUT 45 AND 52 FT. DEPTH.		6 DO	18						
			7 TO	PM						
			8 DO	16						
			9 TO	PM						
			10 DO	17						
			11 TO	PM						
			12 DO	18						
257.2			13 "	25						
65.0	END OF HOLE									



W.L. IN STANDPIPE
AT - 47.0' DEPTH
OCT. 25, 1963

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

RECORD OF BOREHOLE 44

LOCATION STA. 361+00, 140' LT. - LINE A

BORING DATE OCT. 11-15, 1963

DATUM GEODETIC

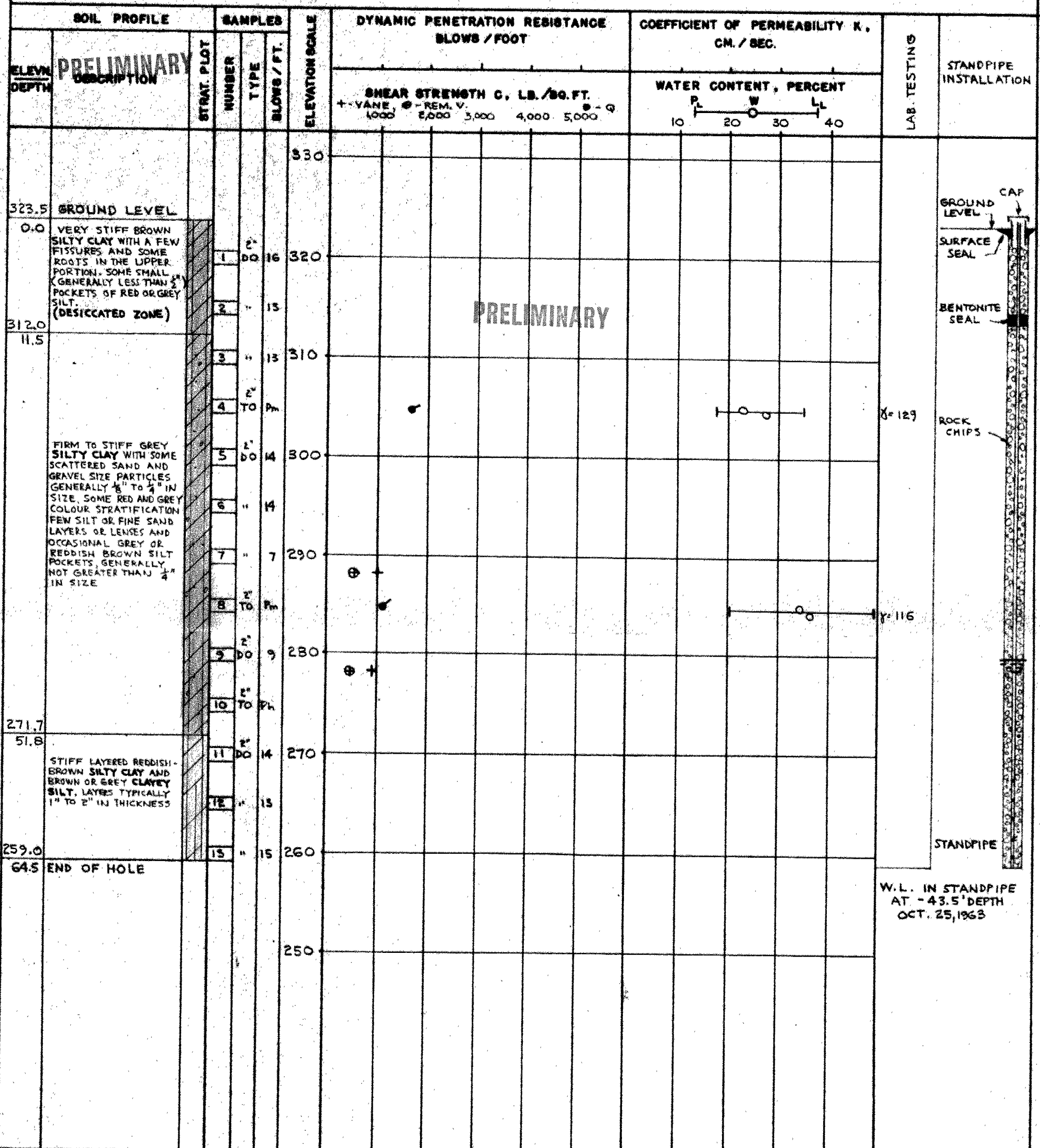
BOREHOLE TYPE

POWER AUGER BORING

BOREHOLE DIAMETER 4.5"

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN M W
CHECKED

RECORD OF BOREHOLE 45'

LOCATION *STA. 337+25, 2' RT. - LINE A* BORING DATE OCT. 16-19, 1963 DATUM GEODETIC

BOREHOLE TYPE POWER AUGER BORING

BOREHOLE DIAMETER 4.5"

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT LB. DROP INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.		LAB. TESTING	STANDPIPE INSTALLATION
ELEVATION DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLAT	NUMBER TYPE		SHEAR STRENGTH C, LB. / SQ. FT. + - VANE, @ - REM. V. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT P _L W L _L 10 20 30 40			
327.6	GROUND LEVEL												
0.0	TOP SOIL												
	HARD TO VERY STIFF BROWN SILTY CLAY WITH A FEW FISSURES, SOME ROOTS IN UPPER PORTION (DESICCATED ZONE)		1 DO 32										
			2 " 27										
			3 " 22										
307.6			4 " 18										
20.0	STIFF TO FIRM GREY OR GREY-BROWN SILTY CLAY WITH SOME SAND AND GRAVEL SIZE PARTICLES SCATTERED THROUGHOUT. SOME GREY SILT POCKETS (TO 1/2" SIZE) 2" THICK SAND LAYER OR LENSE AT 49' DEPTH.		5 2" TO Ph										
			6 DO 18										
			7 2" TO Ph										
			8 DO 13										
			9 2" TO Ph										
			10 DO 8										
			11 " 11										
			12 2" TO Ph										
			13 DO 26										
254.6			14 " 74										
73.0													
252.6													
75.0	END OF HOLE												
	VERY DENSE REDDISH- BROWN SANDY SILT TRACE CLAY WITH GRAVEL (TILL)												

GROUND LEVEL

CAP

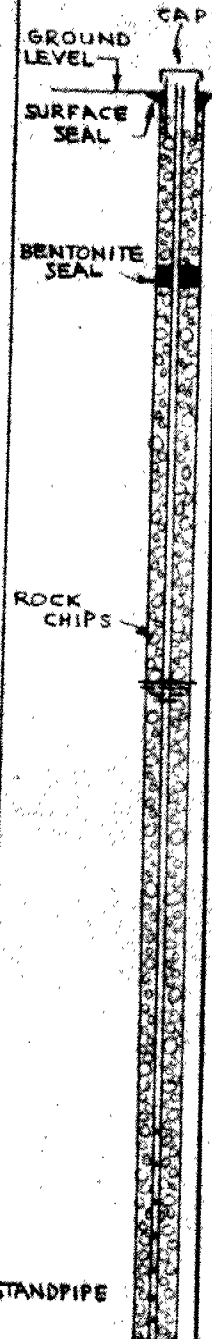
SURFACE SEAL

BENTONITE SEAL

ROCK CHIPS

STANDPIPE

W.L. IN STANDPIPE
AT -30.3' DEPTH
OCT. 25, 1963



γ=129

γ=120

W.L. IN STANDPIPE
AT -30.3' DEPTH
OCT. 25, 1963

VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN J.W.
CHECKED

RECORD OF BOREHOLE 46

LOCATION STA. 390+80, 3' RIGHT - LINE "A" BORING DATE OCT. 17-18, 1963 DATUM GEODETIC

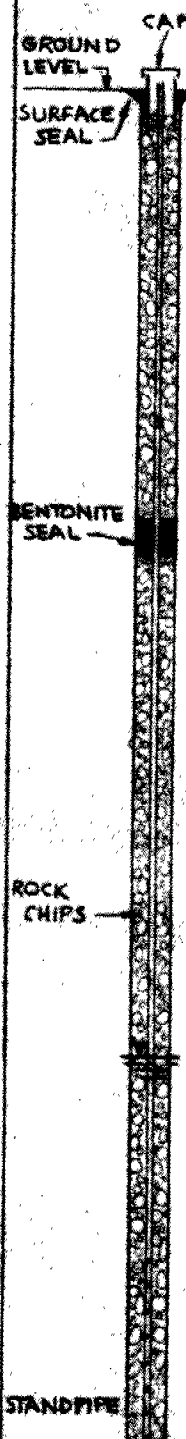
BOREHOLE TYPE POWER AUGER BORING

BOREHOLE DIAMETER 4.5 "

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT	COEFFICIENT OF PERMEABILITY K, CM. / SEC.		LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER TYPE		BLOWS / FT.	SHEAR STRENGTH C, LB. / SQ. FT.	WATER CONTENT, PERCENT P — W — L		
311.4	GROUND LEVEL								
0.0									
	HARD MOTTLED BROWN FISSURED CLAYEY SILT WITH SOME FINE SAND SOME ROOTS AND TWIGS IN UPPER PORTION (DESICCATED ZONE)		1	DO	42				
			2	"	40				
			3	"	48				
			4	"	34				
282.4			5	"	40				
22.0			6	"	40				
	HARD TO STIFF GREY CLAYEY SILT WITH A FEW SCATTERED SAND AND GRAVEL SIZE PARTICLES OCCASIONAL GREY SILT OR SILTY FINE SAND LAYERS BELOW ABOUT 48 FT. DEPTH		7	"	27				
			8	"	22				
			9	"	42				
			10	"	46				
			11	"	60				
			12	"	30				
			13	"	38				
245.4			14	"	100				
66.0	DENSE REDDISH-BROWN SILTY FINE SAND								
242.2									
69.2									
70.2	END OF HOLE								
	VERY DENSE REDDISH BROWN SANDY AND CLAYEY SILT WITH GRAVEL (TILL)								

VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN M. W.
CHECKED

RECORD OF BOREHOLE 47

LOCATION STA. 421+62, 10' LEFT - LINE "A" BORING DATE

OCT. 25 - 28 1963

DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER 4X 8 BX CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT		COEFFICIENT OF PERMEABILITY K, CM. / SEC.		LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER TYPE		BLOWS / FT.	SHEAR STRENGTH C. LB. / SQ. FT.	WATER CONTENT, PERCENT P _L W L _L 10 20 30 40			
304.6	GROUND LEVEL				310					
0.0	HARD BROWN CLAYEY SILT TO SILT WITH SOME FISSURES FEW ROOTS IN UPPER PORTION (DESICCATED ZONE)		1 2" DO	55	300					
			2 CS	50						
			3 DO	50						
			4 "	46						
			5 "	100						
291.1										
13.5	VERY STIFF TO FIRM GREY CLAYEY SILT TO SILTY CLAY WITH A FEW SCATTERED SAND AND GRAVEL SIZE PARTICLES ONE 8 INCH BOULDER AT 43 FT. DEPTH LAYERED SILTY CLAY AND CLAYEY SILT BELOW ABOUT 60 FT. DEPTH		6 "	23	290					
			7 "	20						
			8 "	29	280					
			9 "	29						
			10 "	26	270					
			11 "	29						
			12 AX CORE	-						
			13 DO	44	260					
			14 "	18						
			15 "	11						
			16 "	12	250					
			17 "	9						
239.6					240					
65.0	VERY DENSE REDDISH - BROWN SANDY AND CLAYEY SILT WITH GRAVEL (TILL)		18 "	100						
			19 "	100						
			20 "	100						
			21 "	100	230					
229.1										
75.5	END OF HOLE									
					220					

GROUND LEVEL

SURFACE SEAL

BENTONITE SEAL

ROCK CHIPS

STANDPIPE

W.L. IN STANDPIPE
AT ELEV. 2667
NOV. 1, 1963

 CAP
 GROUND LEVEL
 SURFACE SEAL

BENTONITE SEAL

ROCK CHIPS

STANDPIPE

 W.L. IN STANDPIPE
 AT ELEV. 2667
 NOV. 1, 1963

 VERTICAL SCALE
 1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

 DRAWN *M. W.*
 CHECKED

RECORD OF BOREHOLE 48

LOCATION STA. 305+45, 55' RIGHT-TAN. LINED BORING DATE NOV. 1 - 4, 1963

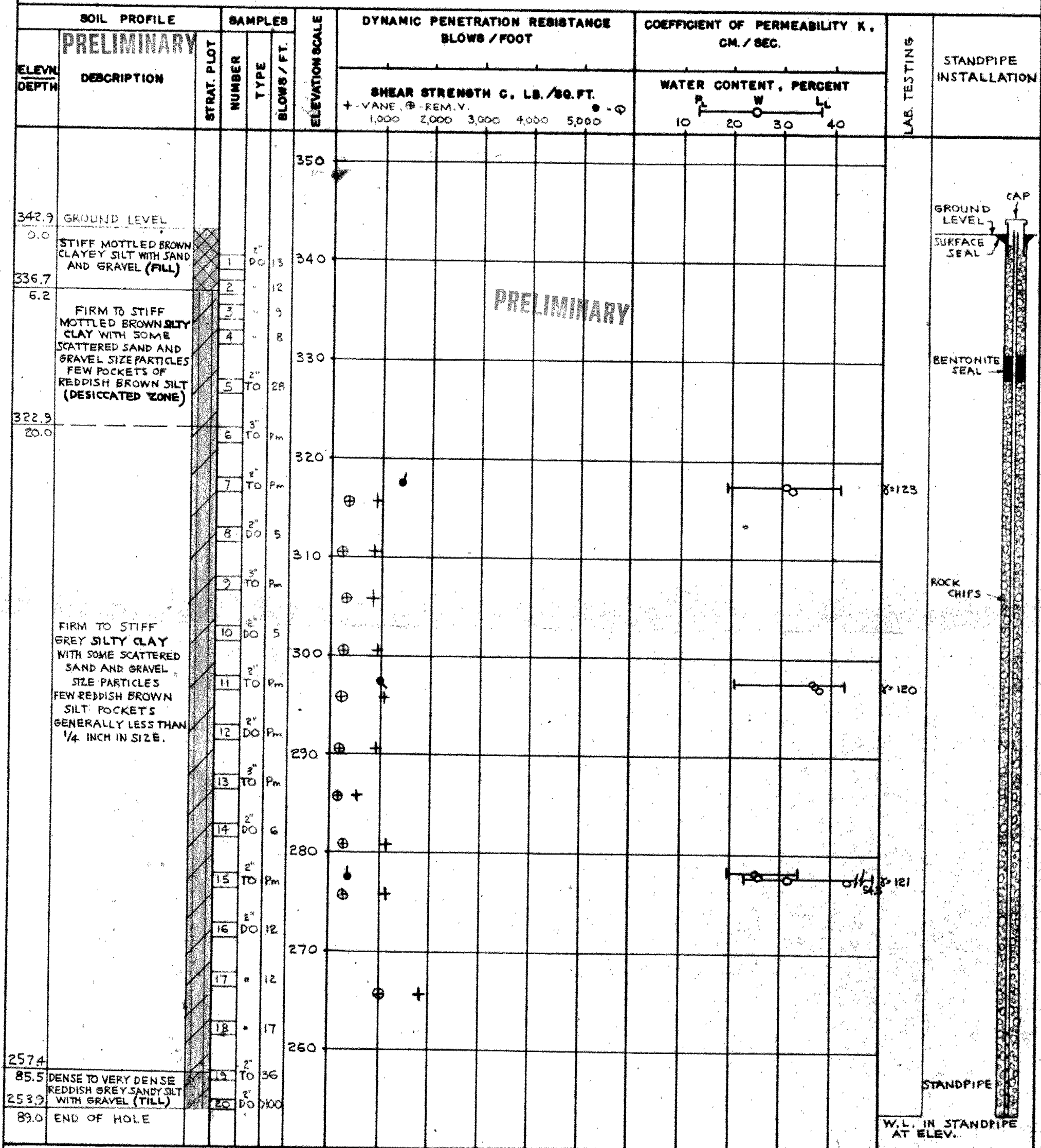
DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER HX

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN MW
CHECKED

RECORD OF BOREHOLES 49 & 50

LOCATION SEE BELOW BORING DATE OCT. 28-30, 1963 DATUM GEODETIC
BOREHOLE TYPE WASH BORING BOREHOLE DIAMETER 1/2 X 3/4 CASING
SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.					LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER		TYPE	BLOWS / FT.	SHEAR STRENGTH C, LB./SQ. FT. + - VANE, ⊕ - REM. V. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT P _L W L _L 10 20 30 40				
PRELIMINARY																
49/ LOCATION: STA. 306+28, 63' RIGHT - LINE "D"																
270.1	GROUND LEVEL		1	2"	DO	10										
267.4			2	"		7										
267.4			3	"		3										
	SOFT TO FIRM DARK GREY BECOMING A MOTTLED GREY AND BROWN BELOW ABOUT 7 FT. DEPTH AND DARK GREY AGAIN BELOW 14 FT. DEPTH CLAYEY SILT UPPER PART CONTAINS TWIGS, FEW SCATTERED GRAVEL SIZE PARTICLES BELOW ABOUT 14 FT.		4	2"	TO Pm											
			5	2"	DO	2										
			6	"		24										
251.1			7	"		100										
19.0	VERY DENSE GREY TO REDDISH - BROWN SILT WITH SOME FINE SAND AND TRACE CLAY. CONTAINS SCATTERED RED AND GREY COLOURED ROCK FRAGMENTS (TILL)		8	"		100										
238.6			9	"		74										
31.5	END OF HOLE															
50/ LOCATION: STA. 314+78, 130' RIGHT - LINE "D"																
275.9	GROUND LEVEL		1	2"	DO	9										
0.0	STIFF TO VERY STIFF MOTTLED GREY & BROWN SILTY CLAY, FEW ROOTS & TWIGS AND SMALL SHALE FRAGMENTS		2	"		16										
267.8			3	"		14										
8.1	RUSTY BROWN SANDY SILT, OCCASIONAL GRAVEL		4	"		13										
9.5	COMPACT TO DENSE REDDISH - GREY FINE SAND, TRACE SILT.		5	"		17										
259.2			6	"		46										
16.7	VERY DENSE REDDISH BROWN SANDY & CLAYEY SILT, SOME GRAVEL (TILL)		7	"		100										
255.3																
20.6	END OF HOLE															
W.L. IN STANDPIPE AT ELEV. 267.1 NOV. 1, 1963																
W.L. IN STANDPIPE AT ELEV. 275.7 NOV. 1, 1963																

VERTICAL SCALE
1 INCH TO 10' 0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

RECORD OF BOREHOLE 51

LOCATION STA. 322+05, 64' RIGHT - LINE D BORING DATE OCT. 29, 1963

DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER 8x CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

SOIL PROFILE		SAMPLES			ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.				LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		SHEAR STRENGTH C, LB. / SQ. FT. + - VANE, ⊕ - REM. V. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT P — W — L _L 10 20 30 40					
268.8	GROUND LEVEL				280											
0.0	STIFF BECOMING SOFT TO FIRM BELOW ABOUT 4 FT. DEPTH, SILTY CLAY TO CLAYEY SILT WITH SOME ROOTS AND TWIGS		1	BY CASING	270											
	CLAYEY SILT WITH SOME ROOTS AND TWIGS		2	"												
	1/4" SAND & GRAVEL LAYER AT 3.5 FT. DEPTH		3	"	260											
259.3																
9.5	VERY DENSE REDDISH BROWN SANDY AND CLAYEY SILT WITH SOME GRAVEL (TILL)		4	"												
			5	"												
248.8			6	BY CORE	250											
20.0	END OF HOLE				240											

GROUND LEVEL

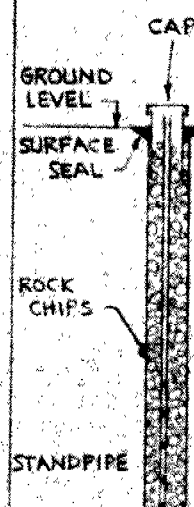
SURFACE SEAL

ROCK CHIPS

STANDPIPE

CAP

W.L. IN STANDPIPE AT ELEV. 268.1 NOV. 1, 1963



W.L. IN STANDPIPE
AT ELEV. 268.1
NOV. 1, 1963

VERTICAL SCALE
1 INCH TO 10' - 0"

GOLDER & ASSOCIATES

DRAWN *Mr. Lee*
CHECKED

RECORD OF BOREHOLE 52

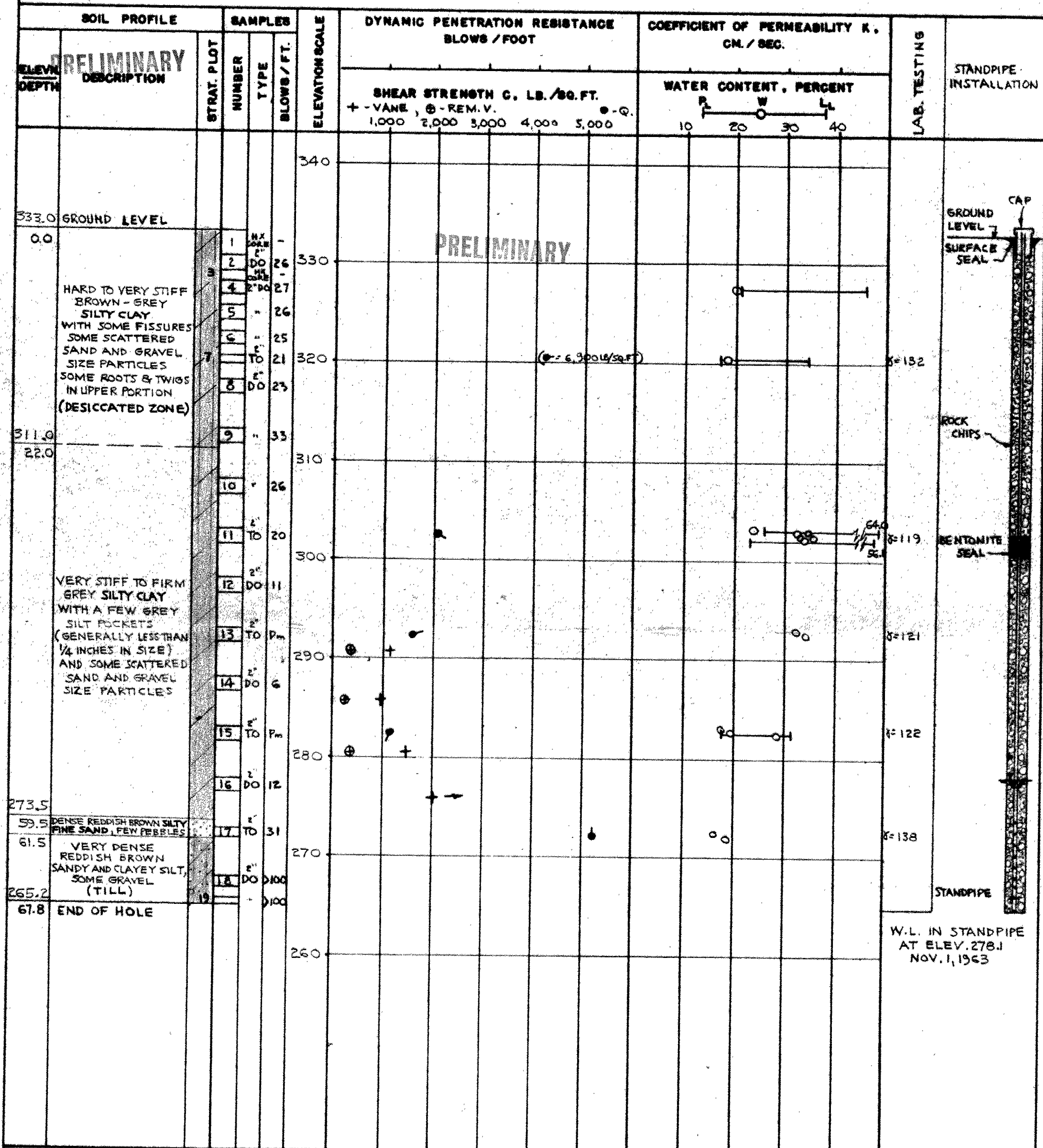
LOCATION STA. 324 + 80, 15' LEFT - LINE "D" BORING DATE OCT 30-31, 1963 DATUM GEODETIC

BOREHOLE TYPE WASH BORING

BOREHOLE DIAMETER HX & BX CASING

SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

RECORD OF BOREHOLE 53

LOCATION STA. 313+95, 75' LEFT - LINE "D"

BORING DATE

OCT. 30 - NOV. 1, 1963

DATUM

GEODETIC

BOREHOLE TYPE

WASH BORING

BOREHOLE DIAMETER

HX CASING

SAMPLER HAMMER WEIGHT 140 LB.

DROP 30 INCHES

PEN. TEST HAMMER WEIGHT

LB. DROP

INCHES

SOIL PROFILE		SAMPLES			ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.				LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		SHEAR STRENGTH C, LB. / SQ. FT. + - VANE, ⊕ - REM. V. ⊙ - Q. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT P _L W L _L 10 20 30 40					
333.3	GROUND LEVEL				340											
0.0	VERY STIFF MOTTLED BROWN TO BROWN SILTY CLAY WITH SOME FISSURES CONTAINS A FEW GRAVEL SIZE PARTICLES SOME ROOTS & TWIGS IN UPPER PORTION (DESICCATED ZONE)		1	2'	18											
			2	"	16											
			3	"	18											
			4	"	21											
			5	"	23											
314.3	VERY STIFF TO STIFF GREY SILTY CLAY WITH SOME LAYERS OF CLAYEY SILT AND OCCASIONAL SCATTERED SAND AND GRAVEL SIZE PARTICLES. FEW THIN SAND SEAMS BELOW ABOUT 50' DEPTH		6	2'	18											
19.0			7	DO	11											
			8	2'	15											
			9	DO	13											
			10	2'	16											
			11	DO	10											
			12	2'	12											
278.5			13	DO	100											
54.8		VERY DENSE REDDISH- BROWN SANDY SILT WITH SOME GRAVEL (TILL)		14	"	100										
271.3																
62.0	END OF HOLE				270											
					260											

GROUND LEVEL

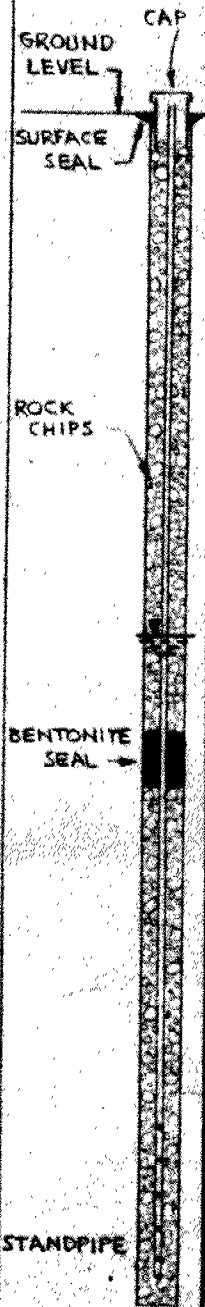
SURFACE SEAL

ROCK CHIPS

BENTONITE SEAL

STANDPIPE

W.L. IN STANDPIPE
AT ELEV. 306.5
NOV. 1, 1963



W.L. IN STANDPIPE
AT ELEV. 306.5
NOV. 1, 1963

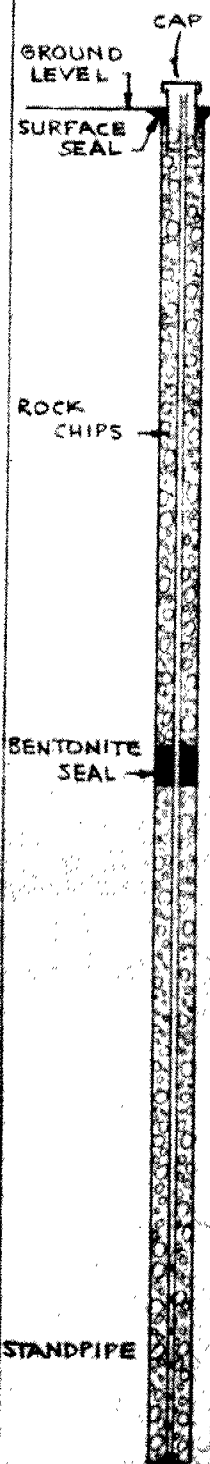
VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN m.w.
CHECKED

RECORD OF BOREHOLE 54

LOCATION STA. 264+71, 137' RIGHT-LINE BORING DATE NOV-6-8, 1963 DATUM GEODETIC
BOREHOLE TYPE WASH BORING BOREHOLE DIAMETER HX & BX CASING
SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

SOIL PROFILE		SAMPLES		ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.				LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	DESCRIPTION	STRAT. PLOT	NUMBER TYPE		SHEAR STRENGTH C, LB. / SQ. FT. + - VANE, ⊕ - REM. V. ○ - U., ● - Q. 1,000 2,000 3,000 4,000 5,000					WATER CONTENT, PERCENT P W L 10 20 30 40					
297.4	GROUND LEVEL			300											
0.0	FIRM MOTTLED BROWN SILTY SANDY CLAY WITH ROOTS, TWIGS, CINDERS AND PEBBLES (FILL)		1 2" DO	292.9											
4.5	LOOSE TO COMPACT HETEROGENEOUS MIXTURE OF GREY SILTY SAND, CINDERS, PIECES OF WOOD AND GLASS (FILL)		2 " 8												
			3 " 5	290											
			4 " 3												
282.4			5 " 5												
15.0	LOOSE GREY SILTY SAND MIXED WITH SOFT BROWN SILTY CLAY, SOME CINDERS (FILL)		6 " 6	280											
273.4			7 3" TO Pm												
24.0	FIRM TO STIFF GREY OR REDDISH GREY SILTY CLAY WITH A FEW SCATTERED SAND AND GRAVEL SIZE PARTICLES FEW PIECES OF WOOD AT 29 FT. DEPTH 2 INCH THICK SAND LAYER AT 38 FT. DEPTH		8 " Pm	270											
			9 " Pm												
			10 2" DO	260											
250.4			11 2" TO Pm												
47.0	COMPACT TO VERY DENSE GREY OR REDDISH GREY SILTY FINE TO MEDIUM SAND TRACE CLAY, BECOMING A LITTLE COARSER TEXTURED BELOW ABOUT 66 FT. DEPTH BOTTOM INCH HAS A TILL STRUCTURE		12 DO 26	250											
			13 " >100												
			14 " >100	240											
			15 " >100												
227.1			16 " >100	230											
70.3	END OF HOLE			220											

VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

RECORD OF BOREHOLE 55

LOCATION STA. 311+65, 128' RIGHT- LINE "D" BORING DATE NOV. 5, 1963 DATUM GEODETIC
BOREHOLE TYPE WASH BORING BOREHOLE DIAMETER HX & BX CASING
SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES PEN. TEST HAMMER WEIGHT - LB. DROP - INCHES

SOIL PROFILE		SAMPLES			ELEVATION SCALE	DYNAMIC PENETRATION RESISTANCE BLOWS / FOOT					COEFFICIENT OF PERMEABILITY K, CM. / SEC.				LAB. TESTING	STANDPIPE INSTALLATION
ELEV. DEPTH	PRELIMINARY DESCRIPTION	STRAT. PLOT	NUMBER	TYPE		BLOWS / FT.	SHEAR STRENGTH C, LB. / SQ. FT.					WATER CONTENT, PERCENT <div><div>P</div><div>W</div><div>L</div><div>L</div><div>10</div><div>20</div><div>30</div><div>40</div></div>				
272.8	GROUND LEVEL															
0.0	HARD TO FIRM BROWN SILTY CLAY WITH SOME GRAVEL FEW ROOTS AND TWIGS		1	HX CASING - 2"	270											
266.8			2	DO												
			3	3" TO												
6.0			4	2" DO												
	COMPACT TO VERY DENSE REDDISH GREY FINE SANDY SILT, TRACE CLAY WITH SOME GRAVEL		5	"	260											
254.3			6	"												
18.5	END OF HOLE		7	"	250											

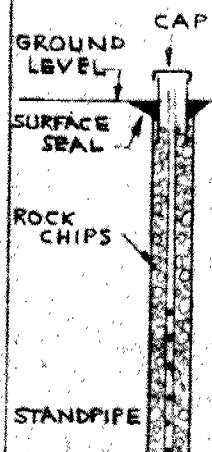
GROUND
LEVEL

SURFACE
SEAL

ROCK
CHIPS

STANDPIPE

CAP

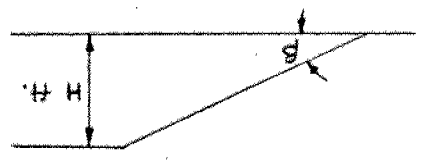


VERTICAL SCALE
1 INCH TO 10'-0"

GOLDER & ASSOCIATES

DRAWN M.W.
CHECKED

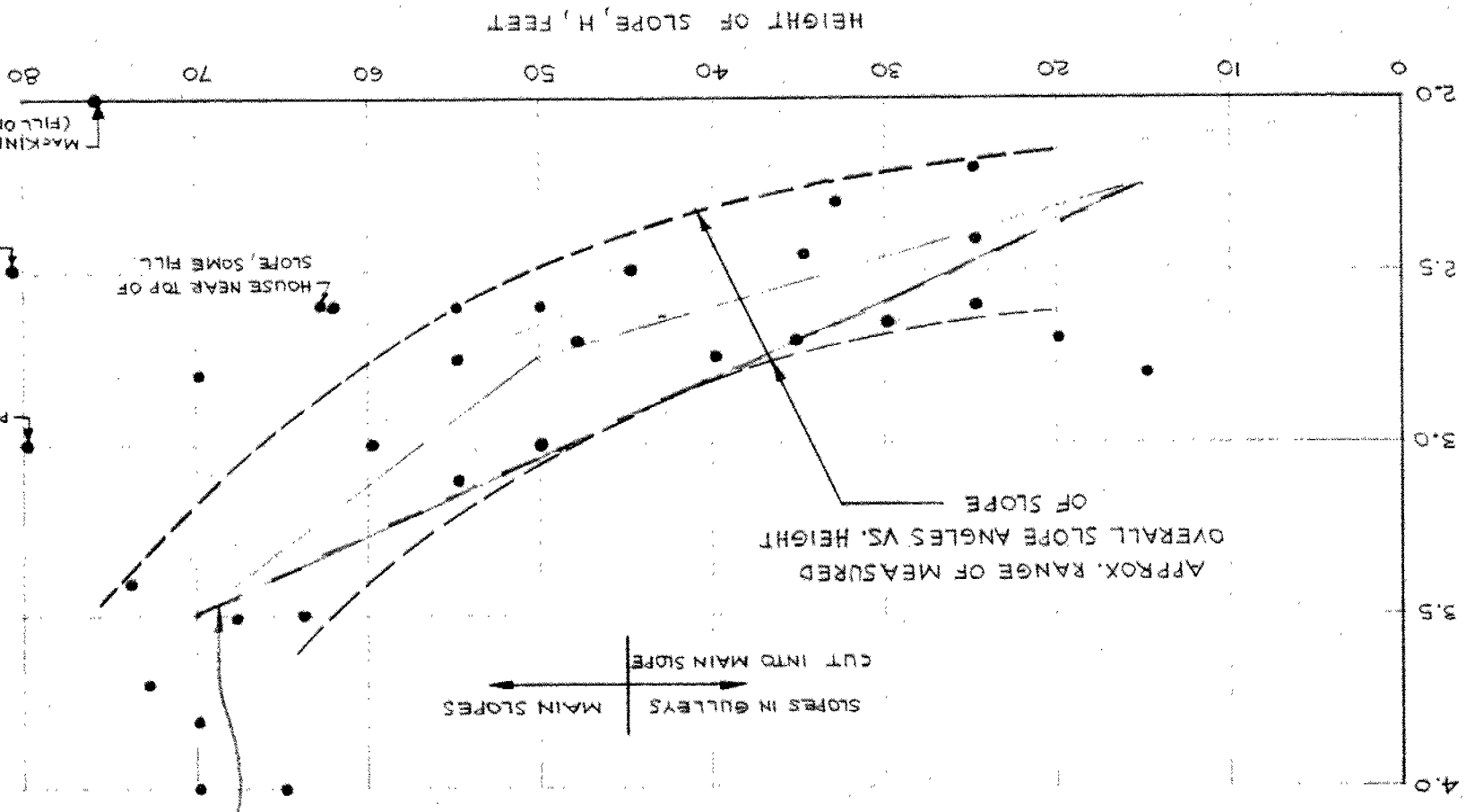
NOTES: SLOPES GENERALLY TREE COVERED.



MAIN SLOPES
SLOPES IN GULLEYS
CUT INTO MAIN SLOPE

APPROX. RANGE OF MEASURED
OVERALL SLOPE ANGLES VS. HEIGHT
OF SLOPE

$\cot \beta$ FOR OVERALL SLOPE



OVERALL SLOPE ANGLE VS. HEIGHT OF NATURAL SLOPES IN CLAY ALONG OLD WELLAND CANAL
ST. CATHARINES
ONTARIO

01 21/63
1/28

RECOMMENDED LINE FOR
PRELIMINARY DESIGN OF
CUT SECTIONS IN CLAY

PARK AREA, NATURAL
SLOPE ALTERED.
C.N.R. BRIDGE OVER
TWELVE MILE CREEK
(FAILED)
MACKINNON SLOPE
(FILL ON SLOPE)

SENT FROM,,

X • 3151 WHARTON WAY, MISSISSAUGA (TORONTO), ONTARIO, CANADA •

• 747 HYDE PARK ROAD, LONDON, ONTARIO, CANADA •

• 196 BRONSON AVENUE, OTTAWA 4, ONTARIO, CANADA •

Golder Associates

CONSULTING GEOTECHNICAL ENGINEERS

TRANSMITTAL FORM

CONSIGNEE: Department of Highways, Ontario,
Materials & Testing Division,
Dowdview 464, Ontario.

DATE: May 14, 1971

ATTENTION: Mr. A.G. Stermac, P. Eng.

PROJECT No.: 6398

RE: Highway # 406 - St. Catharines

Sent by:-

☒

MESSENGER

☐

UNDER SEPARATE COVER

☐

ENCLOSED

No. Copies	Item	Description
1	Print Print Each	Sketch showing locations of all borings of 3 detailed boring plans

Remarks:

Per 

OVERSIZE DRAWING

RECORD OF BOREHOLE C

LOCATION STA 272+15.75' LEFT LINE A

BORING DATE SEPT. 21, 1965

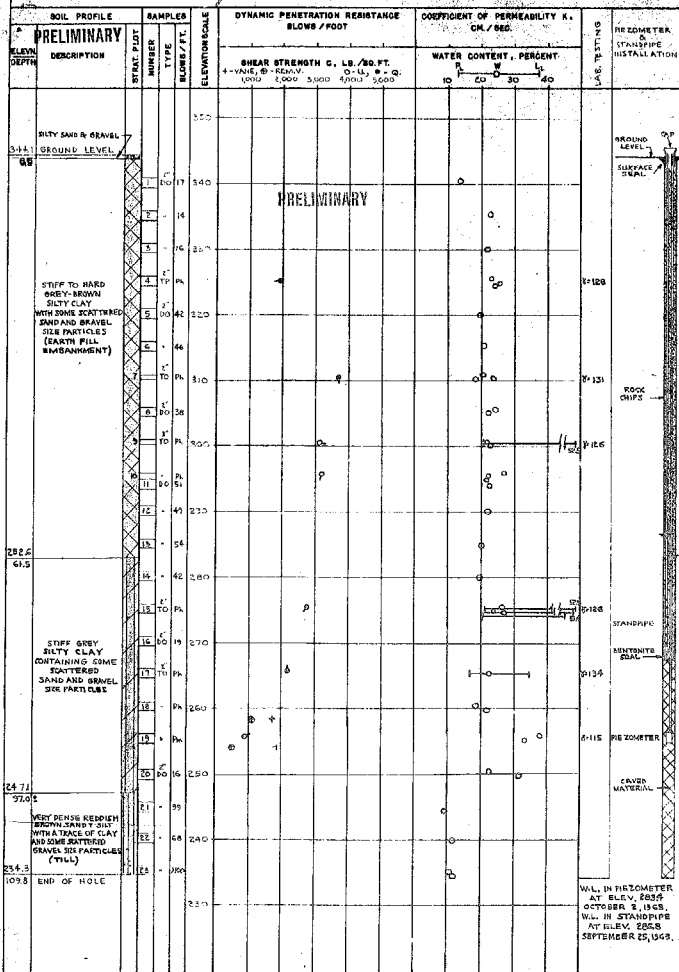
DATUM GEODETIC

BOREHOLE TYPE POWER AUGER BORING

BOREHOLE DIAMETER 4.5"

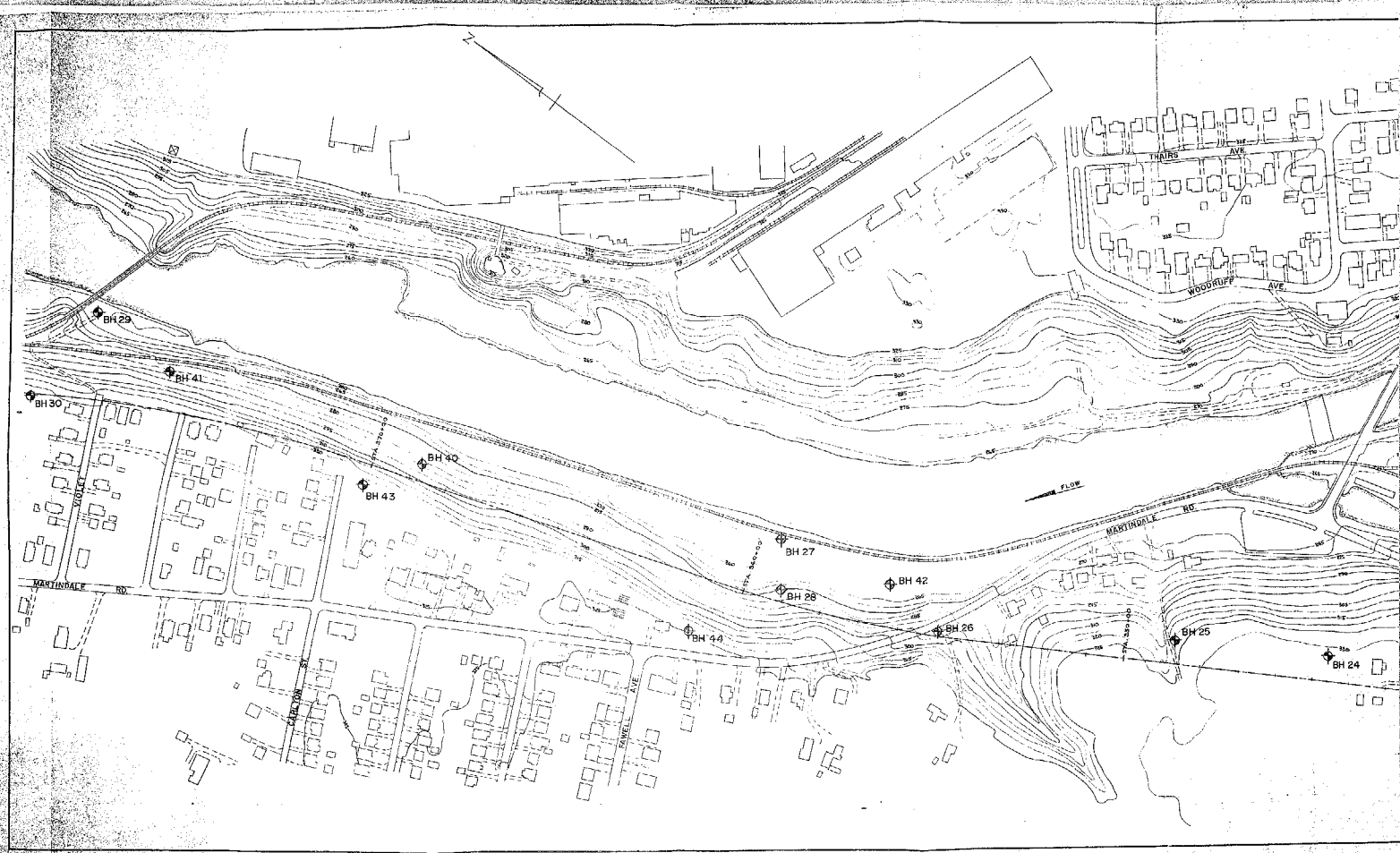
SAMPLER HAMMER WEIGHT 140 LB. DROP 30 INCHES

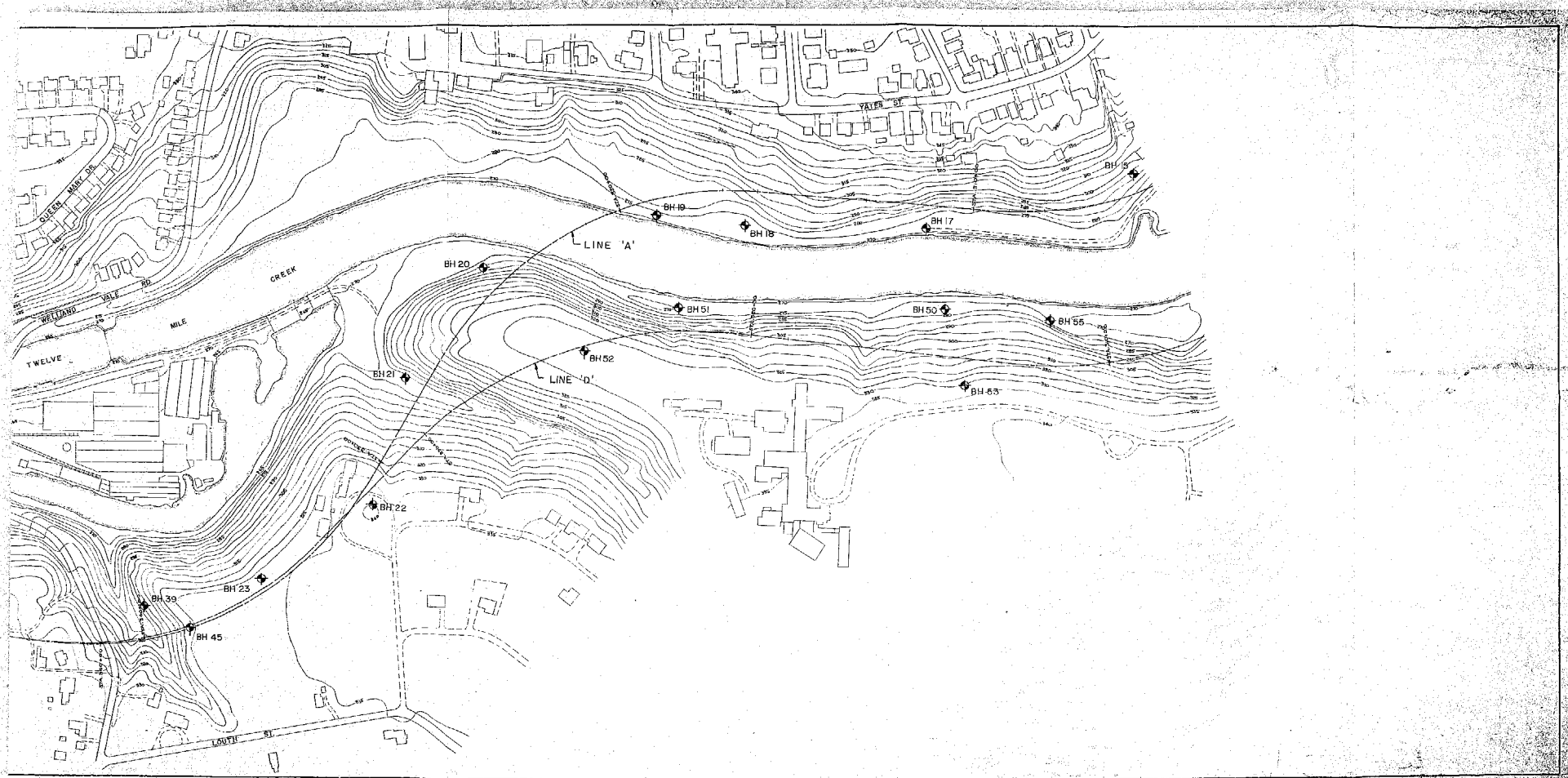
PEN. TEST HAMMER WEIGHT — LB. DROP — INCHES

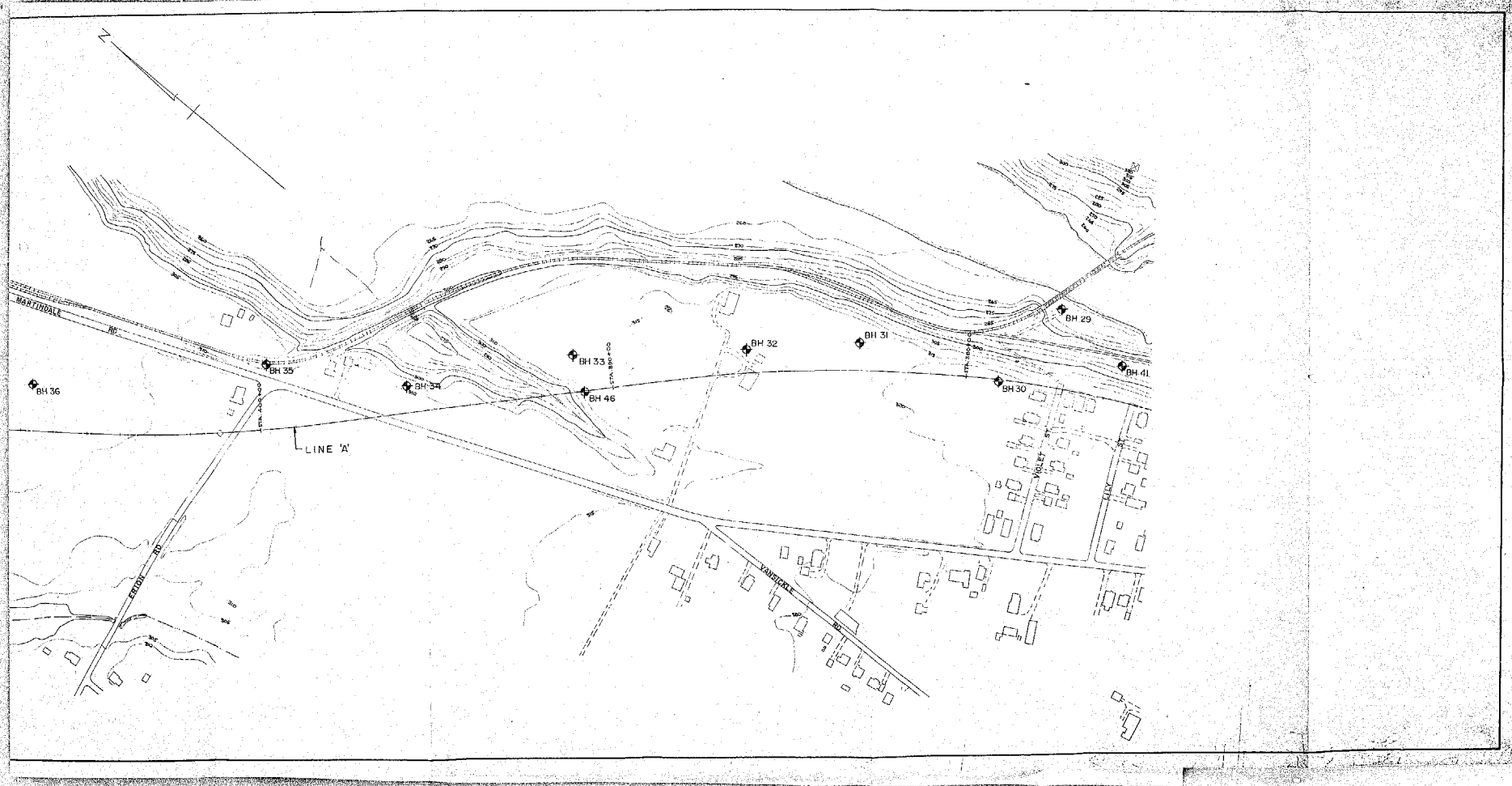
VERTICAL SCALE
1 INCH TO 10' 0"

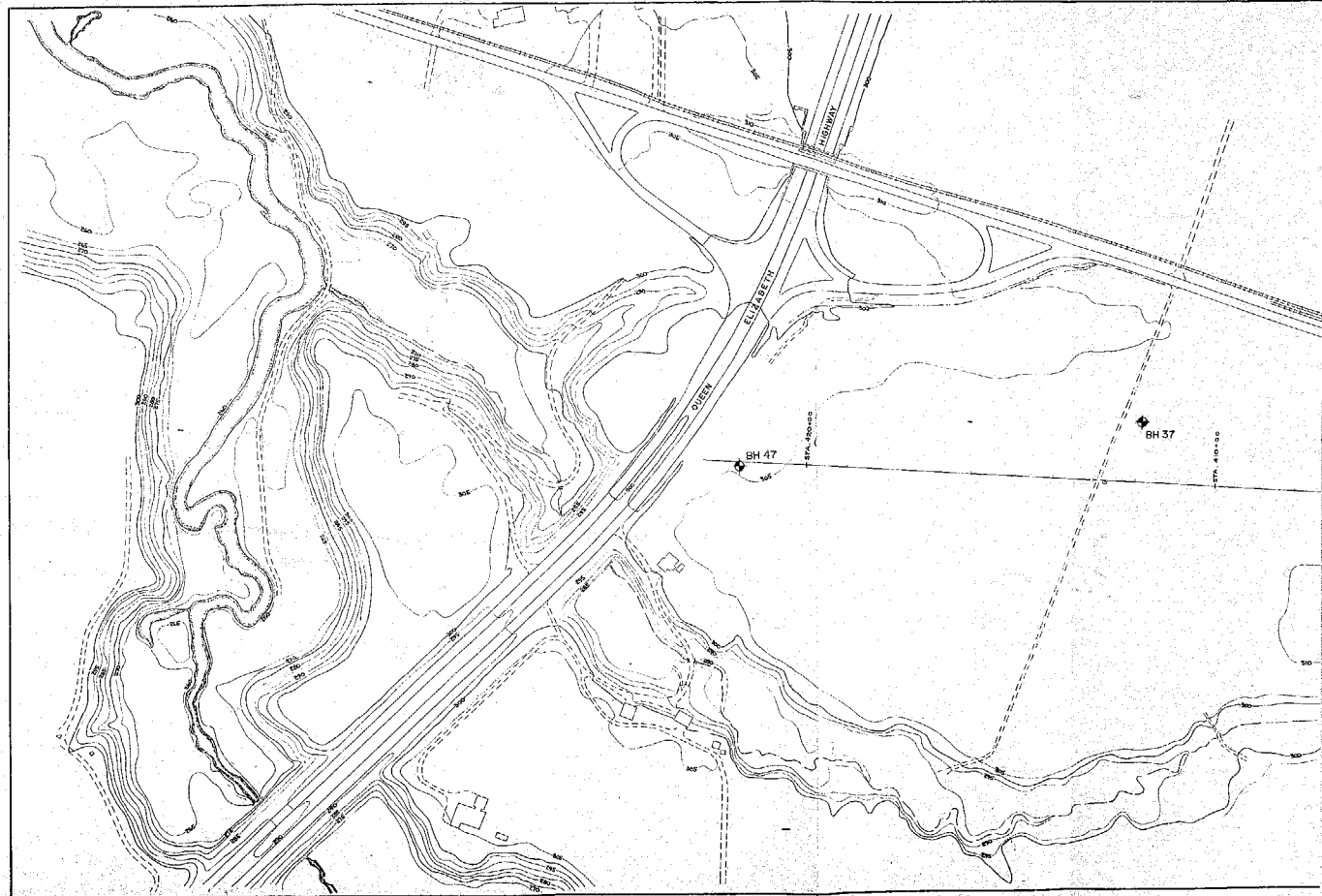
GOLDER & ASSOCIATES

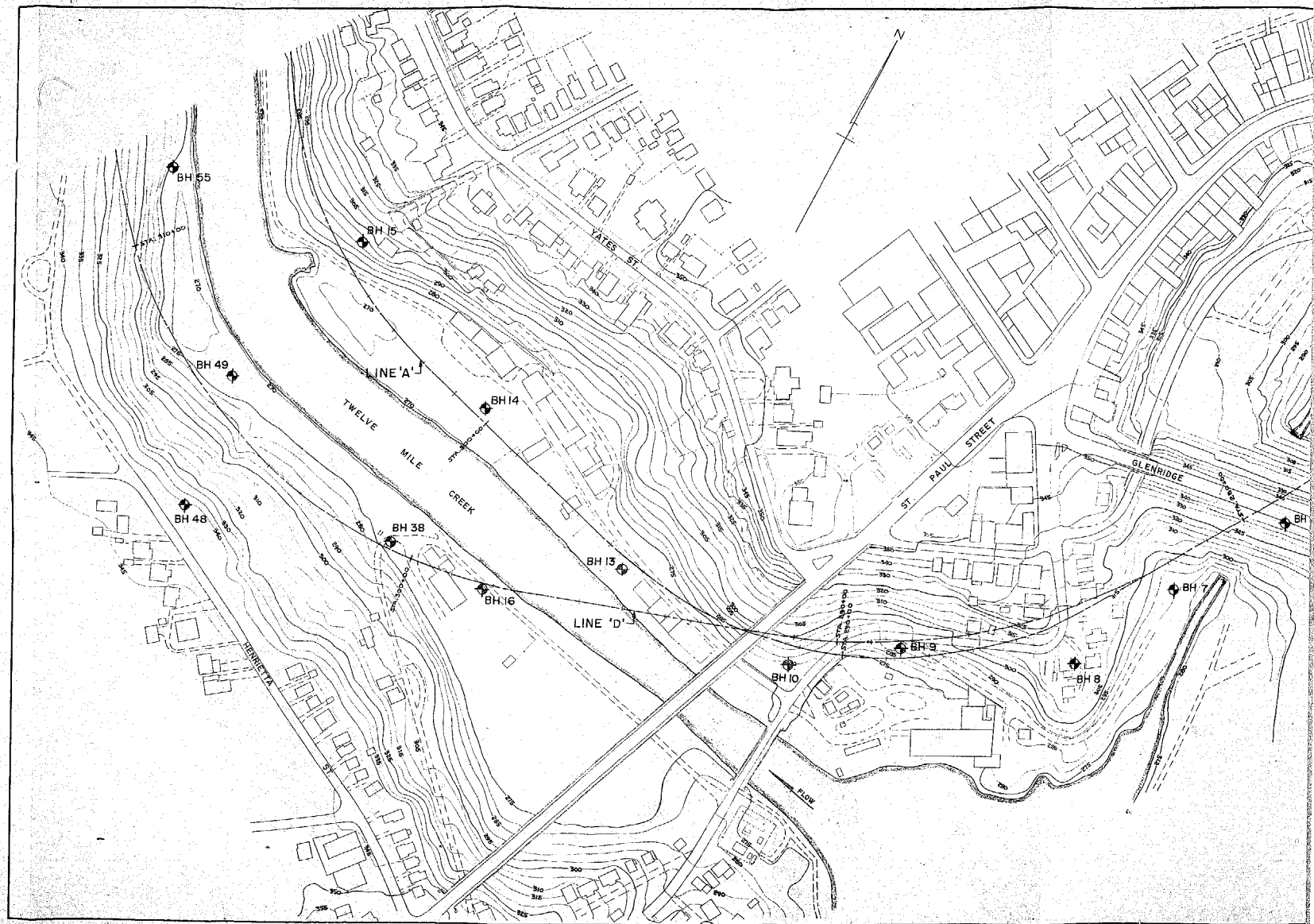
DRAWN BY W.J.
CHECKED

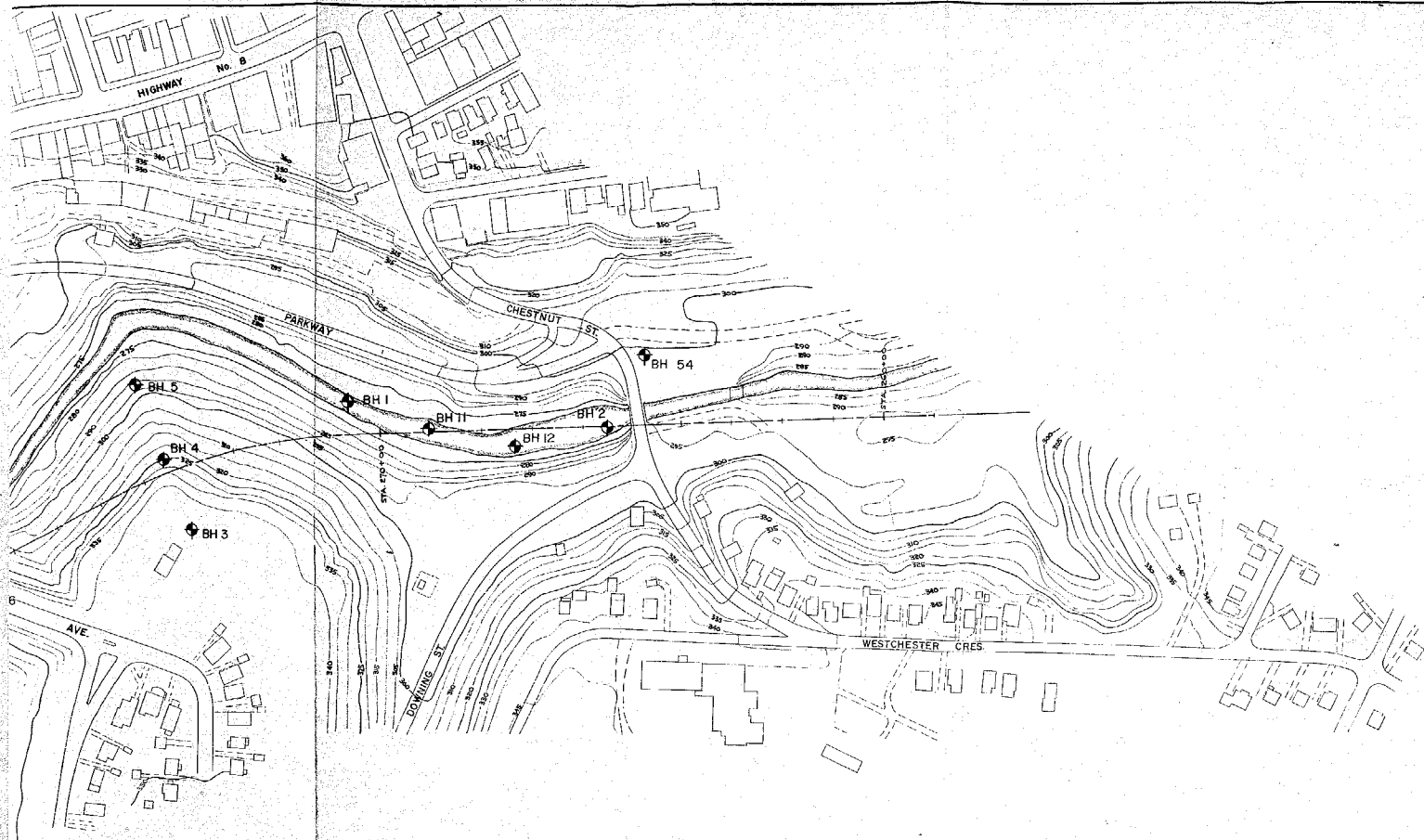






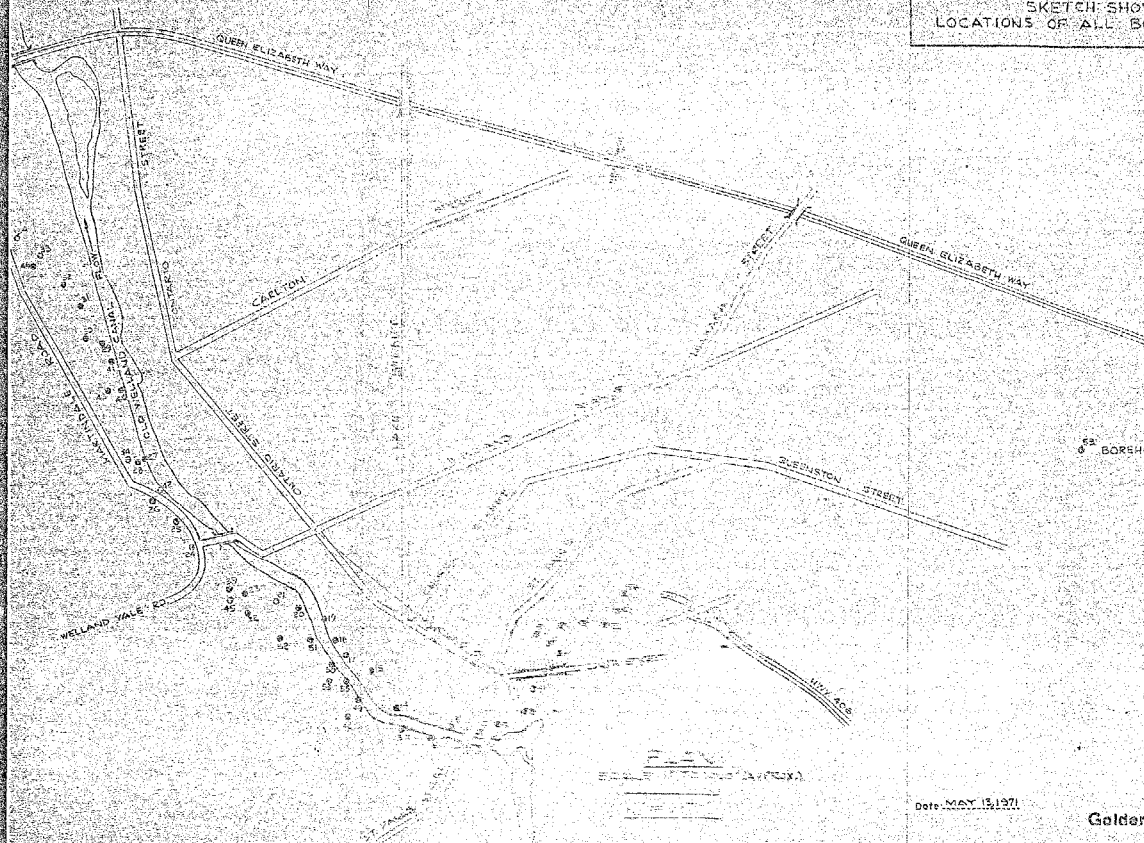






SKETCH SHOWING
LOCATIONS OF ALL BORINGS.

FIGURE 1



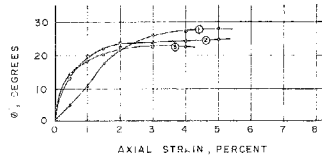
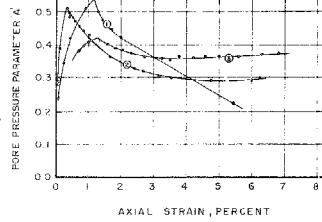
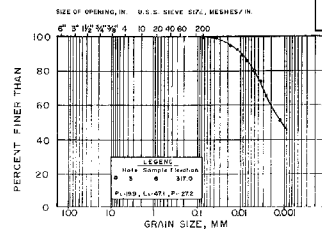
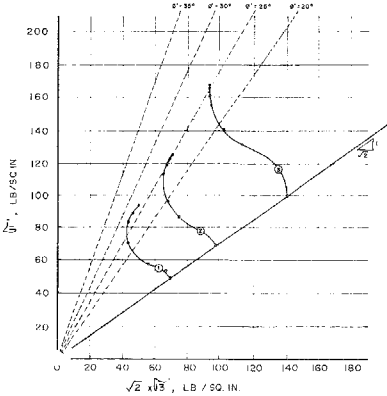
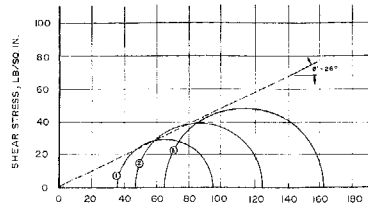
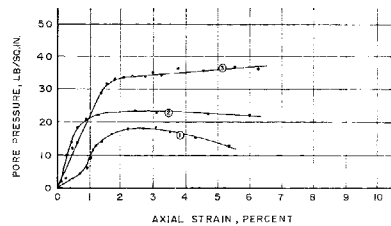
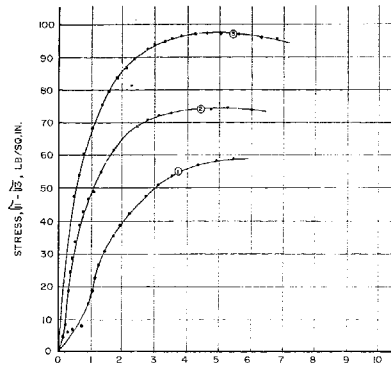
LEGEND

6" BOREHOLE IN PLAN.

Date MAY 13, 1971

Golden Associates

Drawn *[Signature]*
CHKD. -----
APPD. -----



CONSOLIDATED UNDRAINED TRIAXIAL TESTS, QC'S.

FIGURE

TABLE

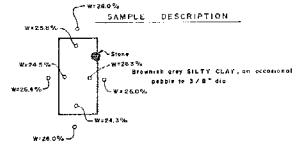
TEST STAGE	RATE OF STRAIN	TIME TO FAILURE	INITIAL VOID RATIO
①	1%/hr	3 1/2 hrs.	0.780
②	1%/hr	3 1/2 hrs.	0.635
③	1%/hr	3 1/2 hrs.	0.592

NOTE

The samples tested were saturated by applying a back pressure of 50 lb/sq in.

LEGEND

Borehole No. 3, Sample No. 6, Elevation 317.0



GOLDER & ASSOCIATES

Made by M.W.
Checked by

CONSOLIDATED DRAINED TRIAXIAL TESTS, S's.

FIGURE

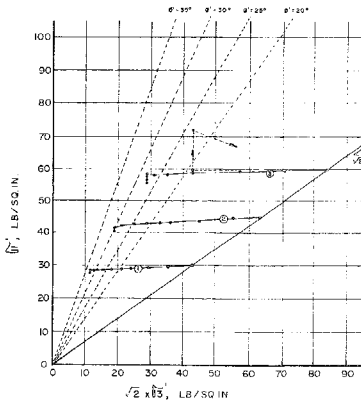
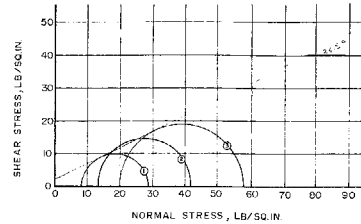
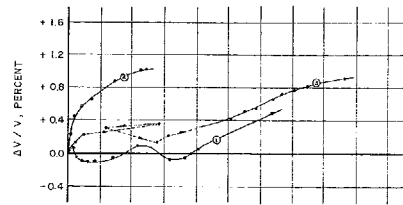
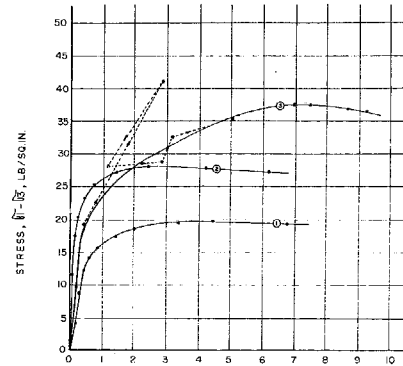
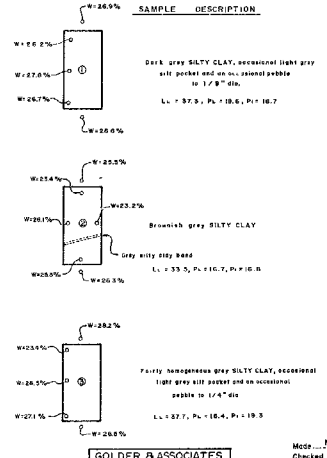
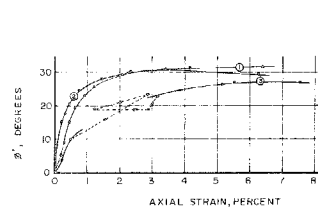
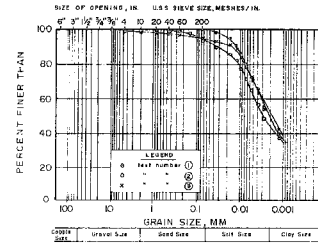


TABLE									
TEST NO.	HOLE	SAMPLE	ELEVATION	T. 100	TIME TO FAILURE	W. T. WT	UNIT WEIGHT		
①	30	B	284.2	116 min.	15 days	26.7% (25.9%)	126 lb/cu ft		
②	"	"	284.7	"	9 days	25.9% (24.6%)	128 lb/cu ft		
③	"	"	285.2	397 min.	8 days	28.3% (26.6%)	125 lb/cu ft		

NOTE

1. Filter strips 1/4" wide were placed 1/4" apart vertically around sample in cell drainage.
2. The sudden deviation (shown dotted) of test no. ③ was caused by a mechanical defect of the shut-off valve.

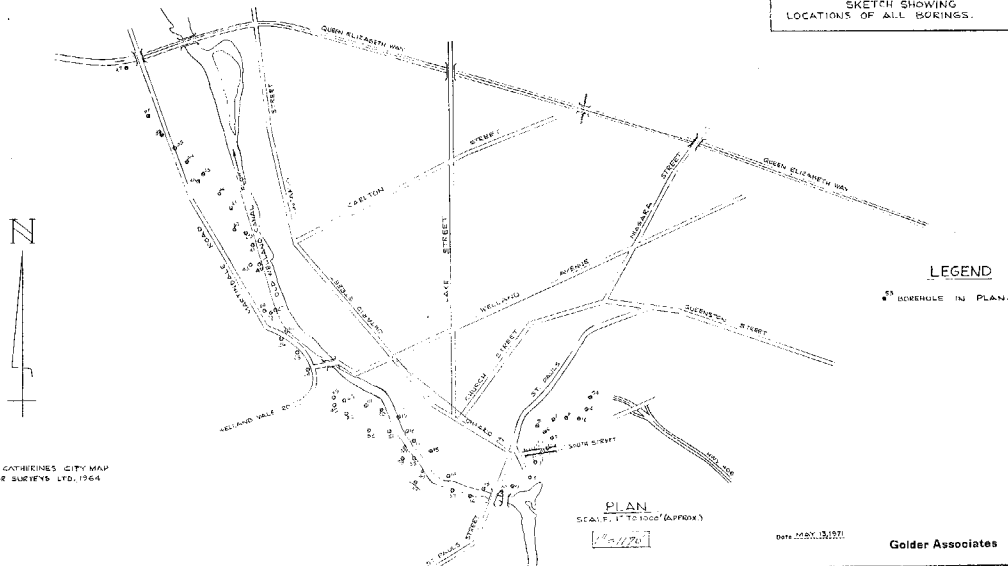


GOLDER & ASSOCIATES

Mode M.W.
Checked

SKETCH SHOWING
LOCATIONS OF ALL BORINGS.

FIGURE 1



REFERENCE: ST. CATHERINES CITY MAP
PATHFINDERS AIR SURVEYS LTD. 1964

PLAN
SCALE, 1" TO 1000' (APPROX.)

Date MAY 13, 1971

Golder Associates

Grown $\frac{100}{100}$
Chld. $\frac{100}{100}$
Appd. $\frac{100}{100}$