

PHASE I GEOTECHNICAL DATA REPORT
GREEN POINT ROAD OVER INTERSTATE 395
BRIDGE NO. 1563, MAINEDOT WIN 029484.00
BREWER, MAINE

by
Haley & Aldrich, Inc.
Portland, Maine

for
Maine Department of Transportation
Augusta, Maine

File No. 0210037-000
May 2026





HALEY & ALDRICH, INC.
75 Washington Avenue
Suite 1A
Portland, ME 04101
207.482.4600

May 15, 2026
File No. 0210037-000

Maine Department of Transportation
16 State House Station
Augusta, Maine 04333-0016

Attention: Laura Krusinski, P.E.
Senior Geotechnical Engineer

Subject: Phase I Geotechnical Data Report
Green Point Road over Interstate 395
Bridge No. 1563, MaineDOT WIN 029484.00
Brewer, Maine

Ladies and Gentlemen:

This Phase I Geotechnical Data Report presents the compilation of subsurface data and results of the historical geotechnical field investigations completed for construction of the existing Green Point Road bridge (existing bridge) in Brewer, Maine (see Figures 1 and 2). This report is intended to provide Maine Department of Transportation (MaineDOT) and their bridge subconsultant (HNTB Corporation; HNTB) with initial geotechnical information for the proposed bridge replacement. This work has been completed in accordance with our proposal dated March 5, 2024, which was authorized on March 18, 2024. This report supersedes our April 29, 2025 report.

A site-specific field investigation has been conducted to support development of the design build (DB) request for proposals (RFP) document and is summarized in the Phase II Geotechnical Data Report dated May 15, 2026.

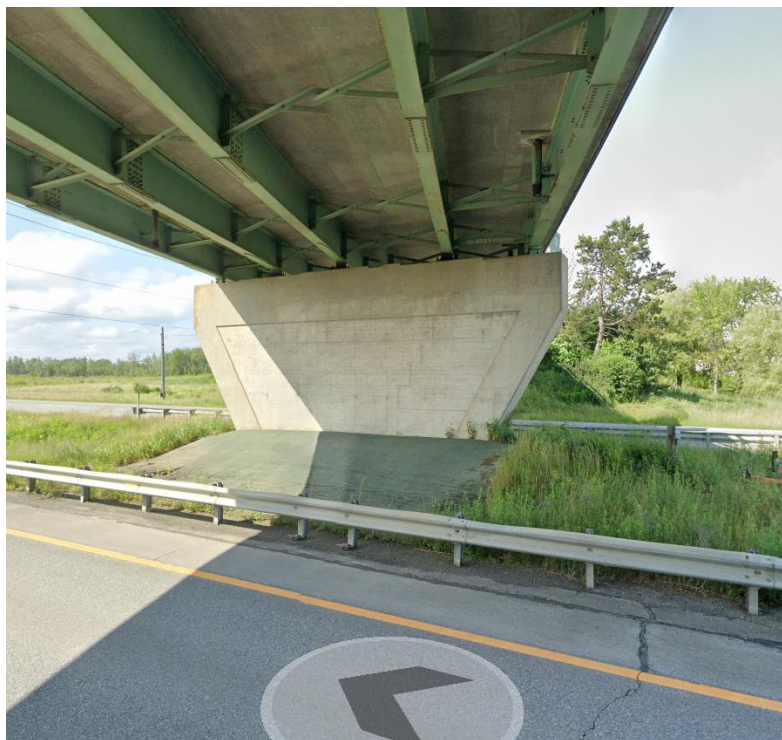
Project Background

EXISTING BRIDGE STRUCTURE

The existing 200-foot (ft)-long, two-span bridge carries the Green Point Road roadway over Interstate 395 (I-395; see Figure 2). Based on our review of the historical bridge drawings (dated December 1983) the existing cast-in-place concrete abutments, wingwalls, and pier are supported on vertical and battered steel, end-bearing, H-piles (see historical bridge drawings, Sheet Nos. 2 through 7). Abutment Nos. 1 and 2 are supported on 30- to 32-ft-long, steel HP 12x53 piles (maximum pile load of 71 tons). The pier is supported on 30-ft-long, steel HP 14x73 piles (maximum pile load of 75 tons).



Photograph 1 – Abutment No. 1 (south side of existing bridge) supported on steel HP 12x53 piles.



Photograph 2 – Pier supported on steel HP 14x73 piles.



Photograph 3 – Abutment No. 2 (north side of existing bridge) supported on steel HP 12x53 piles.

PROPOSED BRIDGE STRUCTURE

Based on discussions with HNTB, the project scope will be a full bridge replacement.

Geologic Setting

According to Maine Geological Survey's Veazie Surficial Geology Quadrangle, Maine (2008), the surficial geologic unit mapped within the site vicinity is the Presumpscot Formation which consists of silt, clay, and sand. According to Maine Geological Survey's Veazie Bedrock Geology Quadrangle, Maine (2011), bedrock at the site vicinity is mapped as the Brewer Formation of the Vassalboro Group which consists of Silurian Age fine-grained to very fine-grained siltstone and claystone slate.

Historical Geotechnical Field Investigations

Three phases of geotechnical field investigations (investigations) were conducted at the subject site by MainesDOT in 1978, 1980, and 1982. The results of these investigations are summarized in the following Soils Reports (reports) that were provided by MainesDOT:

- “Soils Report 81-102, Brewer – Penobscot County, Project I-395-8(79), Over-Under Study for Greenpoint Road, January 1981”.
- “Soils Report 82-30, Brewer – Penobscot County, Interstate 395, Sta. 235+00 – 300+50, & Green Point Road, Project 395-8(79), August 1982”.
- “Soils Report 82-34, Brewer – Penobscot County, Project I-395-8(79), Green Point Road Over I-395, September 1982”.

The above reports are included for reference in Appendix A. Please note that a reference elevation datum was not indicated in the Soils Report. Based on Sheet Nos. 8 and 9 in the Soils Report 82-34, the investigations consisted of conducting seven wash borings (borings) to support design and construction of the existing bridge. Additionally, two borings were conducted near the existing bridge pier, which is summarized in Soils Report 81-102. Refer to Figure 2 for approximate locations of historical borings.

Generalized Subsurface Conditions

The subsurface conditions encountered in the investigations generally consisted of the following geologic units presented in order of increasing depth below ground surface (BGS) along the existing bridge alignment: in-situ fill, marine deposit (“upper” and “lower” layers), glacial till, and bedrock. The Soils Reports did not provide a geologic unit classification for the marine deposits.

A general description of each geologic and bedrock unit encountered in the available historical borings is provided separately below.

GEOLOGIC UNIT DESCRIPTIONS

Geologic Unit	Approximate Range in Encountered Thickness (ft)	Generalized Description
In-situ Fill	2 to 4	Medium dense ¹ , brown, GRAVEL.
“Upper” Marine Deposit ²	8 to 13	Stiff, brown, mottled, “weathered,” silty CLAY.
“Lower” Marine Deposit ²	3 to 7	Medium stiff, grey, silty CLAY.
Glacial Till	4 to 14	Medium dense, grey, silty, “pebbly,” silty fine SAND.

Notes:

1. Please note that field blow counts per foot (i.e., uncorrected N-values) and corresponding densities in the table below were based on a Sprague & Henwood soil sampler.
2. Based on the descriptions of this stratum on the boring logs, we have classified these strata as a marine deposit.

BEDROCK CONDITIONS

Bedrock was cored in eight of the historical borings. In these borings, the top of the bedrock surface ranged from 24.3 ft to 30.8 ft BGS (El. 106.8 to El. 99.4). The cored bedrock was generally described as calcareous metasiltstone, with calcite veins and high angles of foliation. In one historical boring (i.e., GP-21-82), the bedrock was described as fractured and weathered metasiltstone (with high angle foliation).

GROUNDWATER ELEVATIONS

Historical groundwater levels were not recorded. An indication of soil sample saturation was not indicated on the historical boring logs. However, per Sheet Nos. 2 and 3 of the Soils Report 82-34, the groundwater level was assumed to be at the interface between the “upper” and “lower” marine deposit layers (i.e., approximately at El. 116.5).

HISTORICAL IN-SITU FIELD VANE SHEAR STRENGTH TESTING

The historical in-situ field vane shear strength testing results are summarized in the table below, and details can be found in the Soils Report included in Appendix A.

Existing Substructure	Historical Borings	Geologic Unit	Approximate Range of Field Vane ¹ Shear Strengths (pounds per square foot [psf])
Abutment No. 1	GP-24-82, GP-25-82	“Upper” Marine Deposit	Not Conducted (NC)
		“Lower” Marine Deposit	
		Glacial Till	
Pier	GP-20-82, GP-23-82, GP-59-78(B-25), and GP-50-80	“Upper” Marine Deposit	NC
		“Lower” Marine Deposit	600 to 700
		Glacial Till	NC
Abutment No. 2	GP-21-82, GP-22-82	“Upper” Marine Deposit	2,200
		“Lower” Marine Deposit	680 to 800
		Glacial Till	NC

Note:

- Per the MaineDOT, the “homemade” tapered field vane was 7 in. by 3 in. (including the tapered end).

HISTORICAL GEOTECHNICAL LABORATORY TESTING

The historical geotechnical laboratory testing results are summarized in the tables below, and details can be found in the Soils Report included in Appendix A.

Atterberg Limits

Existing Substructure	Historical Boring	Geologic Unit	“Average” Plastic Limit (%)	“Average” Liquid Limit (%)
Abutment No. 1	GP-25-82	“Upper”/“Lower” Marine Deposit	21	32
Abutment No. 2	GP-21-82	“Upper”/“Lower” Marine Deposit	>31	>31
	GP-22-82	“Upper”/“Lower” Marine Deposit	--	~31

Strength Testing Results

Existing Substructure	Historical Borings	Geologic Unit	Approximate Range of Laboratory Vane Shear Strengths (psf)
Abutment No. 1	GP-24-82, GP-25-82	"Upper" Marine Deposit	1,640
		"Lower" Marine Deposit	480 to 1,320
		Glacial Till	NC
Pier	GP-20-82, GP-23-82, GP-59-78(B-25)	"Upper" Marine Deposit	1,160 to 2,160
		"Lower" Marine Deposit	1,280 to 1,680
		Glacial Till	NC
Abutment No. 2	GP-21-82, GP-22-82	"Upper" Marine Deposit	680 to 920
		"Lower" Marine Deposit	460 to 800
		Glacial Till	NC

Consolidation Results

Existing Substructure	Historical Boring	Sample No.	Approximate Sample Elevation (ft)	Geologic Unit	Range in Water Content, WC (%)	Preconsolidation Pressure, P_p (psf)	Virgin Compression Index, C_c (unitless)
Abutment No. 1	GP-25-82	1U	118	"Upper" / "Lower" Marine Deposit	29 to 35	5,400	0.32
Pier	GP-50-80	3U	127	"Upper" / "Lower" Marine Deposit	28 to 33	1,860	--
Abutment No. 2	GP-21-82	2U	116	"Lower" Marine Deposit	26 to 33	3,440	0.3
	GP-22-82	2U	116	"Lower" Marine Deposit	27 to 34	3,200	0.28

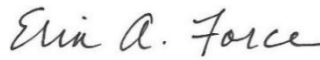
Closure

We appreciate the opportunity to provide engineering services on this project. Please do not hesitate to contact us if you have any questions or comments.

Sincerely yours,
HALEY & ALDRICH, INC.



Nathan A. Sherwood, P.E.
Senior Project Manager



Erin A. Force, P.E.
Senior Associate



Enclosures:

- Figure 1 – Project Locus
- Figure 2 – Historical Boring Location Plan
- Appendix A – Historical Soils Report

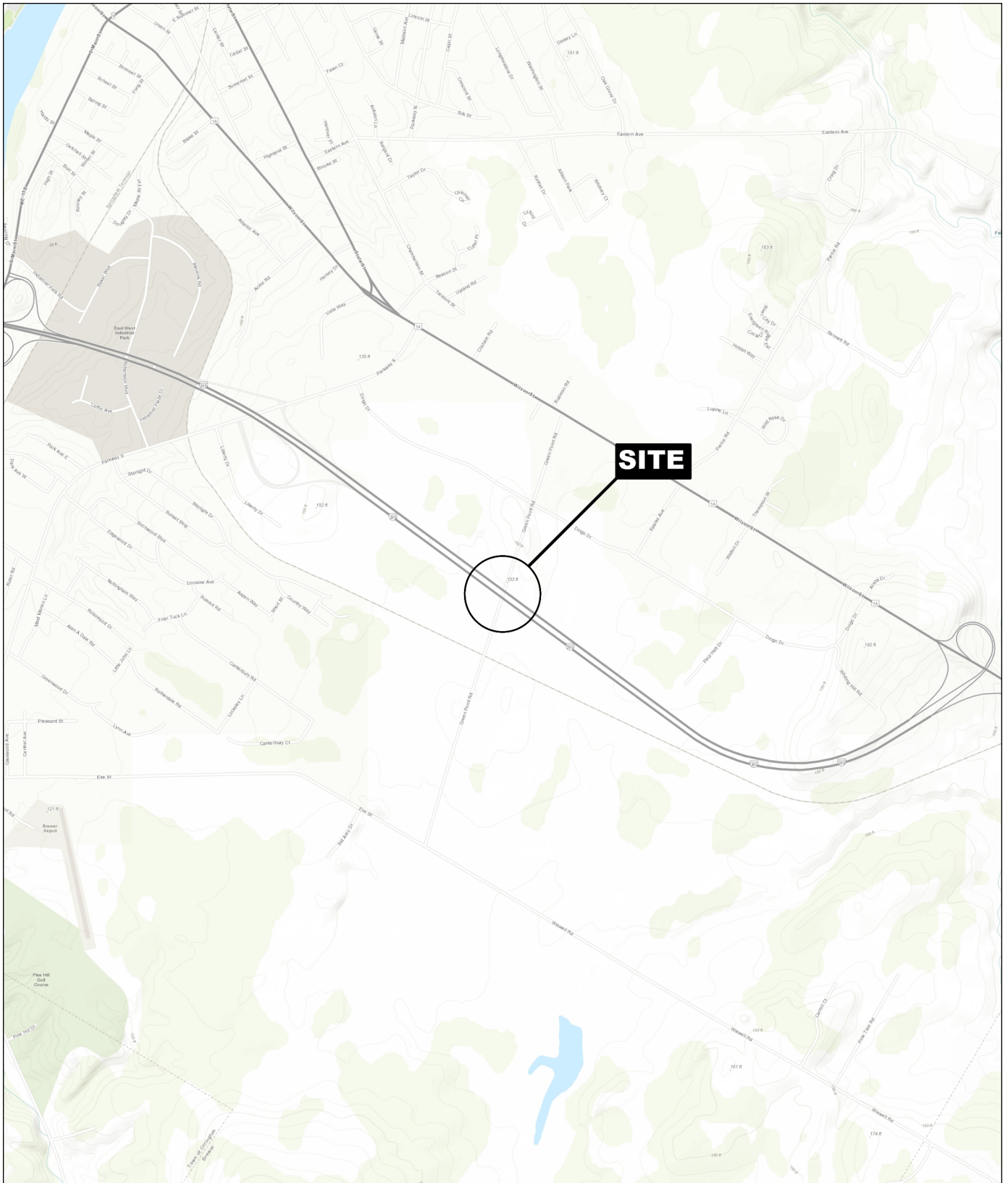
<https://haleyaldrich.sharepoint.com/sites/MaineDepartmentofTransportation2/Shared Documents/0210037.MaineDOT-Brewer I-395 Design Build/Deliverables/Phase 1 - Historic Geotech Data Reports/Green Point Road Bridge No. 1563/2026-0515-HAI-I395-Green Point Rd Bridge-Phase I GR-F.docx>

References

1. Hildreth, Carol T., *Surficial Geology of the Veazie 7.5-Minute Quadrangle, Penobscot County, Maine*, Maine Geological Survey, Department of Conservation, Augusta, Maine, Open File Report No. 08-56, 2008.
2. Pollock, Stephen G., *Bedrock Geology of the Veazie Quadrangle, Maine*, Maine Geological Survey, Department of Conservation, Augusta, Maine, Open File Report No. 11-58, 2011.

<https://haleyaldrich.sharepoint.com/sites/MaineDepartmentofTransportation2/Shared Documents/0210037.MaineDOT-Brewer I-395 Design Build/Deliverables/Phase 1 - Historic Geotech Data Reports/Green Point Road Bridge No. 1563/2026-0515-HAI-I395-Green Point Rd Bridge-Phase I GR-F.docx>

FIGURES



0210037.001 LOCUS HALEYALDRICHUBOIS



SITE COORDINATES: 44°46'26"N, 68°44'45"W



MAP SOURCE: USGS

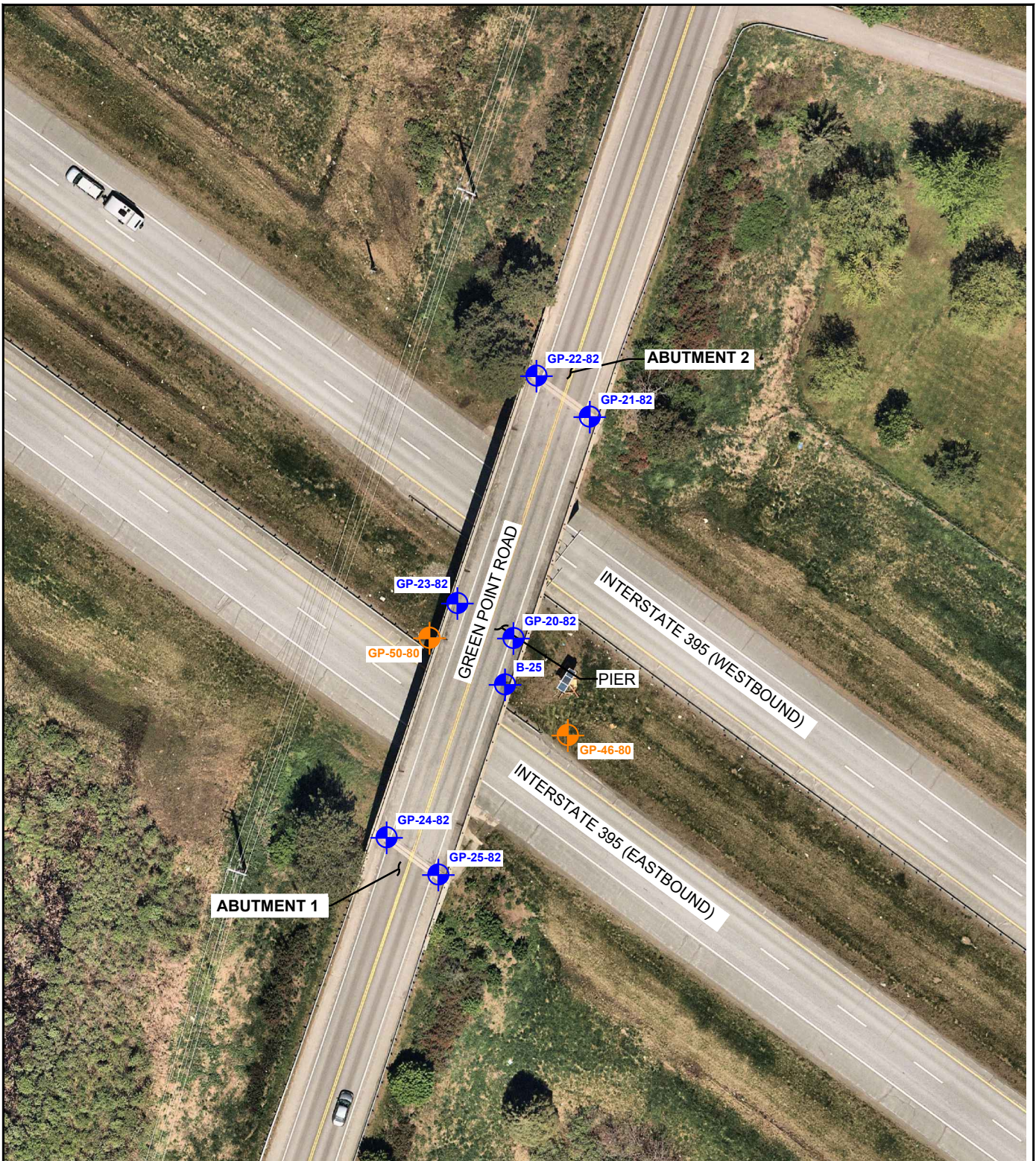
**HALEY
ALDRICH**

GREEN POINT ROAD OVER INTERSTATE 395
BRIDGE NO. 1563, MAINEDOT WIN 029484.00
BREWER, MAINE

PROJECT LOCUS

APPROXIMATE SCALE: 1 INCH = 2,000 FEET
MAY 2026

FIGURE 1



LEGEND



GP-50-80 APPROXIMATE LOCATION OF HISTORICAL TEST BORING
 BASED ON JANUARY 1981 SOILS REPORT



GP-25-82 APPROXIMATE LOCATION OF HISTORICAL TEST BORING
 BASED ON SEPTEMBER 1982 SOILS REPORT

NOTES

1. AERIAL IMAGE SHOWN IS DATED MAY 22, 2023 AND WAS DOWNLOADED FROM THE NEARMAP ONLINE DATABASE.



0 30 60
 SCALE IN FEET

**HALEY
 ALDRICH**

GREEN POINT ROAD OVER INTERSTATE 395
 BRIDGE NO. 1563, MAINEDOT WIN 029484.00
 BREWER, MAINE

HISTORICAL BORING LOCATION PLAN

SCALE: AS SHOWN
 MAY 2026

FIGURE 2

APPENDIX A

Historical Soils Report

395 8 79 BREWER

Soils Report 82-34
Brewer - Penobscot County
Project I-395-8(79)
Green Point Road Over I-395
September 1982

02 34

Maine Department of Transportation
Materials and Research Division
Soils Section

SUBSURFACE INVESTIGATION FOR THE PROPOSED CONSTRUCTION OF
A STRUCTURE TO CARRY GREEN POINT ROAD OVER I-395
IN THE CITY OF BREWER

Penobscot County

Project I-395-8(79)
September 1982

Soils Report 82-34

BANGOR

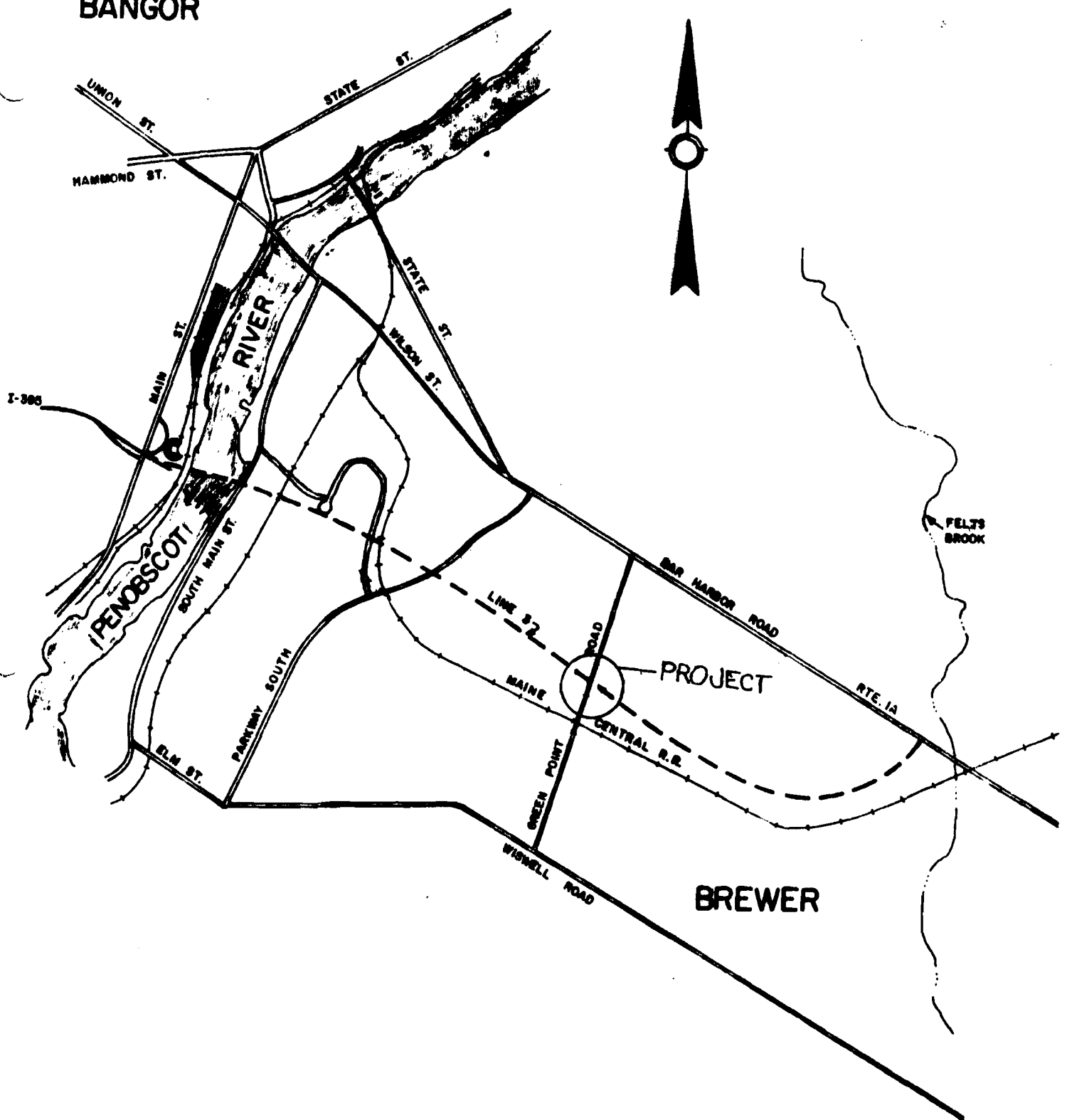


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INTRODUCTION

A subsurface soils investigation has been completed for a 2-span bridge structure to carry the Green Point Road over the proposed I-395 lanes in Brewer. This investigation consisted of a preliminary washboring done in 1978 and six additional washborings done in 1982 by a crew under the supervision of Mr. Gary Paine. The locations and details of these explorations are shown on Sheets 8 and 9 along with plan, profile, and transverse sections. All soil and bedrock samples were forwarded to the Central Laboratory in Bangor for testing and analysis.

In late 1980, an over-under study for this intersection was completed and additional soils information was obtained along the I-395 route to the left and right of Green Point Road. This information was presented in Soils Report 81-102 submitted in January, 1981.

In August, 1982, Soils Report 82-30 was written for the proposed construction of the I-395 roadway through this area and the proposed reconstruction of a portion of Green Point Road.

GENERAL CONDITIONS

The existing Green Point Road runs generally in a north-south direction and the surrounding terrain is relatively flat open meadows. To the west of Green Point Road, the topography is slightly lower and tends to be wet throughout the year. The seven washborings done near the proposed substructures indicate the upper 2/3 of overburden to be of marine origin. The surficial 8 feet to 13 feet is a stiff brown weathered and mottled silty clay and this changes to medium consistency gray silty clay ranging in thickness from 3+ feet to 7+ feet. Below this clay lies 3 1/2+ feet to 14+ feet of medium density gray pebbly silty till and silty fine sand. Bedrock was core drilled in 6 of the washborings and described as metamorphosed siltstone with calcite veins and a high angle of foliation.

SUBSTRUCTURE DETAILS

Two abutments and one pier in the median will support the superstructure and at least two washborings were made at each substructure location. Each span will be 100 feet in length.

Abutment No. 1:

The centerline of bearing of this abutment intersects the centerline of construction of Green Point Road at Station 27+29.44 and is skewed ahead 18°03' on the left. The approach fill behind this abutment will reach a maximum height of 25 \pm feet.

Washboring GP-24-82 (Elevation 129.89) was made at Station 27+32, 13 feet left of construction centerline. Three feet of brown gravel used as roadway base material was found over 8 1/2 feet of stiff brown weathered and mottled silty clay with sand lines. Between depths 11 1/2 feet and 18 feet, there exists dense brown silty pebbly sand and this is underlain by 6 1/2 \pm feet of medium density gray pebbly silty fine sand. The ledge surface was encountered at Elevation 105.4 and core drilled 5 feet and described as calcareous metasiltstone.

Washboring GP-25-82 (Elevation 129.62) was made at Station 27+23, 13 feet right of centerline. Three feet of brown gravel base material lies over 8 feet of stiff brown mottled and weathered silty clay. From the depth of 11 feet to 15 feet 9 inches, there exists medium consistency gray silty clay. Two samples of this clay exhibited natural water contents of 32 \pm percent and 27 \pm percent. Plastic limits averaged 21 \pm percent and liquid limits averaged 32 \pm percent. Underlying this clay is 9 1/2 \pm feet of medium density gray pebbly silty fine sand. Ledge was encountered at Elevation 104.3 and core drilled for 5 feet with a 95 percent recovery. This ledge was described as calcareous metasiltstone.

Washboring details are shown on Sheet 9 and a transverse section depicting the soils stratification at this abutment is shown on Sheet 8.

It is recommended to support this abutment on end bearing H-piles driven to the ledge surface or practical refusal. The ledge surface at this location is relatively flat and decreases from Elevation 105.4 to Elevation 104.3 from left to right. It is anticipated that all piles will penetrate to ledge.

Pier

The centerline of bearing is coincidental with the I-395 main line centerline and the intersection occurs at Station 28+29.44 on the Green Point Road and Station 256+32.36 on the I-395 centerline.

Washboring GP-20-82 (Elevation 130.62) was made at the edge of pavement at Station 28+24, 11 feet right of the Green Point Road centerline. Beneath 1 1/2 feet of brown gravel fill is 10 1/2 feet of stiff brown mottled silty clay. One field vane shear test resulted in a shear strength that exceeded the capacity of the test equipment. Corresponding lab vane tests exhibited shear strengths ranging from 0.58 TSF to 1.08 TSF. Natural water contents averaged 29+ percent. Underlying this weathered clay layer is 3 1/2 feet of compressible gray silty clay and then 14 feet of medium density gray pebbly clay-silt till. Ledge was encountered at Elevation 101.0 and core drilled 5 feet and described as metasiltstone with calcite veins and a high angle of foliation.

Washboring GP-23-82 (Elevation 130.75) is located at Station 28+35, 14 feet left of the Green Point Road centerline. There exists 2 feet of brown gravel fill over 11 feet of stiff brown mottled and weathered silty clay with sand and silt lenses. From 13 feet to 17 1/2 feet, medium consistency gray silty clay exists and this overlies 6 feet 9 inches of medium density gray pebbly clay-silt till. One field vane test in the gray silty clay indicated shear strength of 0.34 TSF. Below Elevation 106.5, ledge was core drilled for 5 feet and described as metasiltstone with calcite veins and a high angle of foliation.

In 1978 during preliminary route alignment studies, a washboring was made near this proposed pier location. Washboring GP-59-78 (B-25) was performed at Station 28+08, 15 feet right of the Green Point Road centerline. Ground elevation at this boring location is 130.08. One foot of topsoil overlies 8 feet of stiff gray-brown weathered silty clay with sandy silt lenses. One unconfined compression test on this stiff material indicated a shear strength of 0.88 TSF and natural water contents averaged 26 percent. At the depth of 9 feet, the soils changed to a stiff to medium consistency gray-brown partially weathered and laminated silty clay with silt layers. Samples of this clay had water contents that averaged 31 percent and vane shear strengths decrease with depth from 0.84 TSF to 0.34 TSF. From 14 feet to 27 feet 3 inches, medium density gray pebbly sandy clay-silt till was drilled. Two samples of this till were tested and grain size distribution curves are shown on Sheet 1. Refusal was encountered at Elevation 102.8 and this appears to be on the ledge surface.

Washboring details of these three borings are shown on Sheets 8 and 9 and a stratified transverse section at this pier is shown on Sheet 8.

It is recommended to support this pier on end-bearing steel H-piles driven to the ledge surface or practical refusal. The ledge surface slopes from left to right from Elevation 106.5 to Elevation 101.0. It is anticipated that virtually all piles will reach ledge. *all the way*

Abutment No. 2:

The centerline of bearing of this abutment intersects the centerline of construction of the Green Point Road at Station 29+29.44 and is skewed ahead 18° 03' on the left. The approach fill to this abutment reaches a maximum height of 26+ feet. Two washborings were made at the proposed abutment location.

Washboring GP-21-82 (Elevation 131.98) was made at Station 29+26, 12 feet right of the Green Point Road centerline. Under the surficial 4 feet of brown gravel fill,

there is 12 feet of mottled and weathered stiff brown silty clay with silt lenses. One field vane test in this clay exhibited a shear strength greater than 1.1₊ TSF and a corresponding lab vane test resulted in a shear strength of 1.0₊ TSF. From 16 feet to 23 feet, there exists a compressible stratum of medium consistency gray silty clay with a few sand or silt lines. Two field vane tests averaged 0.36 TSF and the lab vanes ranged from 0.22 TSF to 0.46 TSF. Natural water contents averaged 31 percent which is above the plastic and liquid limits of this clay. Underlying this clay is 5 feet 3 inches ₊ of medium density gray silty pebbly till. Ledge was encountered at Elevation 103.7 and core drilled 4.5 feet with 75 percent recovery. This rock is identified as weathered and fractured metasiltstone with a high angle of foliation.

Washboring GP-22-82 (Elevation 132.09) was made at Station 29+35, 13 feet left of the Green Point Road centerline. Two feet of brown gravel overlies 13 feet of stiff brown and gray weathered and mottled silty clay with silt lenses. At the depth of 15 feet, this clay changes to soft to medium consistency gray silty with a few sand lines for a depth of 6 1/2 feet. A field vane test showed a 0.38 TSF shear strength and lab vane strengths ranged from 0.21 to 0.43 TSF. Natural water contents averaged 31 percent which is approximately equal to the liquid limit of this clay. Underlying this clay is 3 feet 9 inches of gray silty pebbly till. Ledge was encountered at Elevation 106.8 and core drilled 5 feet and described as metasiltstone with calcite veins and a high angle of foliation.

The details of these two washborings are shown on Sheet 9 and a transverse section depicting the subsurface stratification at this abutment is shown on Sheet 8.

It is recommended to support this support on end-bearing steel H-piles driven to the ledge surface or practical refusal. The ledge surface slopes downward from left to right from Elevation 106.8 to Elevation 103.7. Virtually all piles should penetrate to the ledge surface.

DESIGN CONSIDERATIONS

Stability:

The proposed embankments that approach the two abutments reach a maximum height of 26+ feet and have 2:1 side slopes. Because there is a substratum of potentially unstable gray silty clay, there exists a possibility of a rotational shear failure; thus, an analysis was completed to investigate this possibility.

A longitudinal stability analysis was completed for the approach embankment to Abutment No. 2 and a diagram that shows the soil characteristics is shown on Sheet 2. With the existing soil conditions and proposed fill geometrics, the minimum safety factor against shear failure is 1.86. A second analysis was completed in which the ground water table was raised to the ground surface and the resultant safety factor remained the same. Thus, it appears that longitudinal stability along the Green Point Road construction centerline is satisfactory and no problems are anticipated.

A lateral stability analysis was also conducted for a 26 foot fill and 2:1 side slopes. Using the subsurface soil characteristics indicated on the diagram shown on Sheet 3, and with the ground water table at the top of the gray silty clay layer, the calculated minimum safety factor is 1.95. When the ground water table is at the surface, the safety factor is slightly less. Therefore, a shear failure under the proposed design conditions appears unlikely.

Settlement:

Approach fills to each abutment reach a maximum height of 26 feet above the existing road and this loading will result in consolidation of the clay strata. Settlement estimates indicate 4.2+ inches and an average of 95 percent of this settlement should occur within one year. Laboratory consolidation tests were made on four samples and the resultant pressure-void ratio curves used to calculate settlement are shown on Sheets 4 through 7.

SUMMARY

A soils investigation has been completed for a proposed new structure to carry the Green Point Road over the proposed I-395 lanes in Brewer. Seven washborings were made at the proposed substructure locations and the data was analyzed and is summarized on Sheets 8 and 9. Also shown on these sheets are the plan and profile and three transverse sections depicting the interpreted soils stratification at this site.

Below the 2 feet to 3 feet of brown gravel used as roadway material, there exists a layer of stiff brown mottled and weathered silty clay. The thickness of this clay is $13\pm$ feet near the proposed Abutment No. 2 location and appears to decrease to $8\pm$ feet near the Abutment No. 1 location. The shear strength of this stiff clay exceeds 1.0 TSF when tested with the field vane shear device. Underlying this clay is $3\frac{1}{2}\pm$ feet to $7\pm$ feet of more compressible medium consistency gray silty clay. In one washboring at Abutment No. 1, this gray clay was not encountered. Instead, six feet of dense brown silty pebbly sand was penetrated. Below the clay is glacial till described as medium density gray pebbly clay-silt found in thickness ranging from $3\frac{1}{2}\pm$ feet to $14\pm$ feet. At Abutment No. 1, this till was not encountered but medium density gray pebbly silt fine sand directly overlies ledge. Ledge was core drilled in six of the washborings and the samples were described by the Materials Geologist as metasiltstone with calcite veins and a high angle of foliation. The ledge surface elevations range from 106.8 to 101.0.

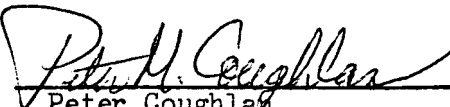
It is recommended to support the two abutments and pier on end-bearing steel H-piles driven to the ledge surface or practical refusal. At Abutment No. 1, the ledge surface is relatively flat across the proposed footing area dropping from Elevation 105.4 on the left side to Elevation 104.3 on the right side. At the pier location, the ledge surface on the left side was encountered at Station 106.5

and this decreases to Elevation 101.0 on the right side of the construction centerline. At Abutment No. 2, the probable ledge surface also slopes from left to right from Elevation 106.8 to Elevation 103.7. It is anticipated that virtually all piles will penetrate to ledge.


Embankment stability analyses were conducted longitudinally and laterally to the Green Point Road construction centerline. Adequate safety factors against shear failure were computed with the proposed design geometrics. Longitudinally, the computed minimum safety factor is 1.86 and laterally, the minimum safety factor is 1.95. Variances of the subsurface soil characteristics resulted in minor changes in the safety factors. Thus, it appears from the theoretical calculations that embankment instability is not of serious concern.

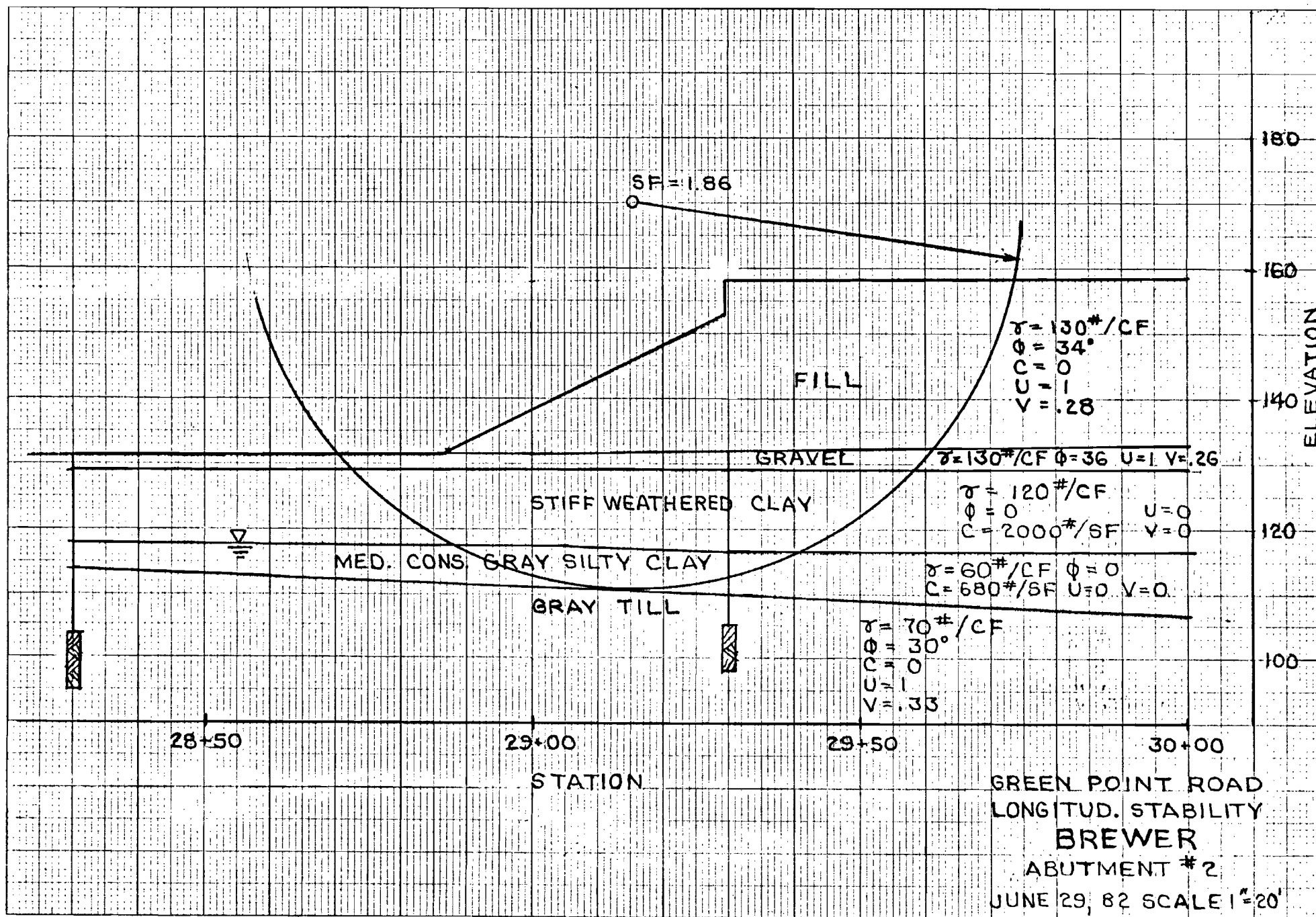
Settlement of the approach fills was determined and calculations indicate that 4.2 inches of settlement will occur due to consolidation of the clay strata. An average of 95 percent of this settlement is expected to take place within one year of fill construction.

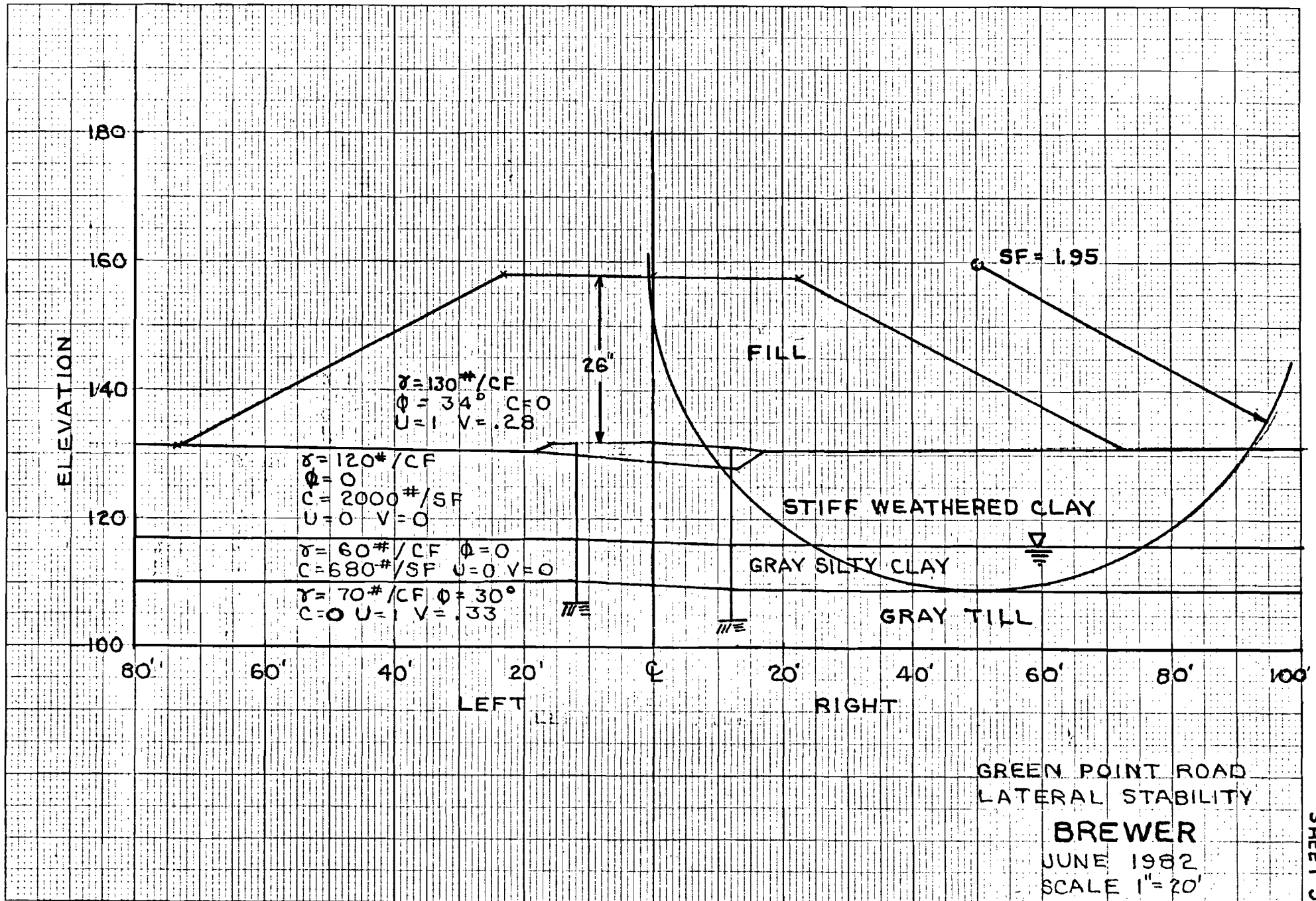
Prepared by:


Peter Coughlan
Civil Engineer I

Approved by:

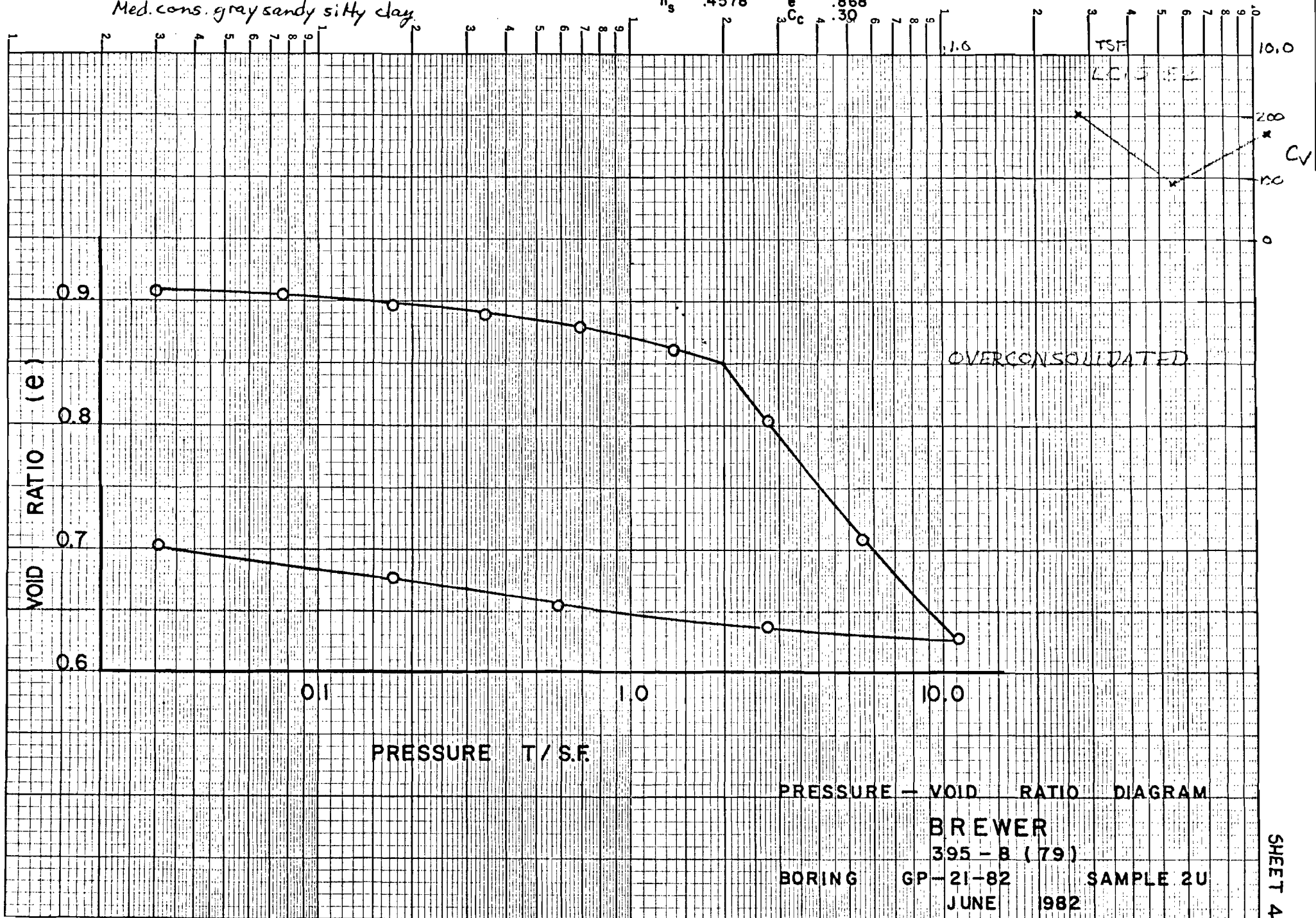

Guy L. Baker
Assistant Soils Engineer





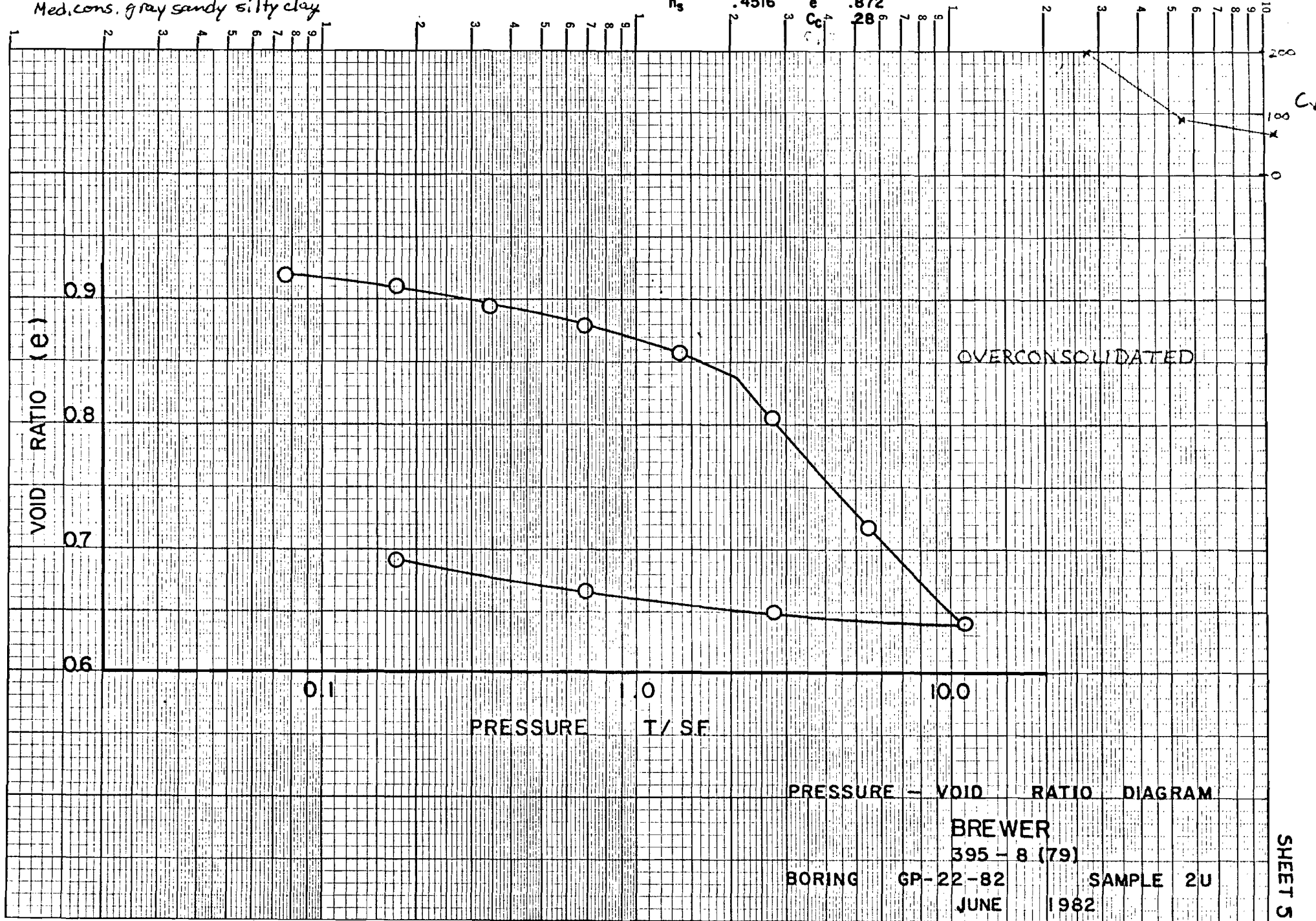
VANE .312 Pmin 1.5 Cv 20 # 204
WC's 33-26 Pmax 2.0 40 # 92
G 2.77 Pp 1.72 80 # 169
hs .4578 e .868
Cc .30

Med. cons. gray sandy silty clay



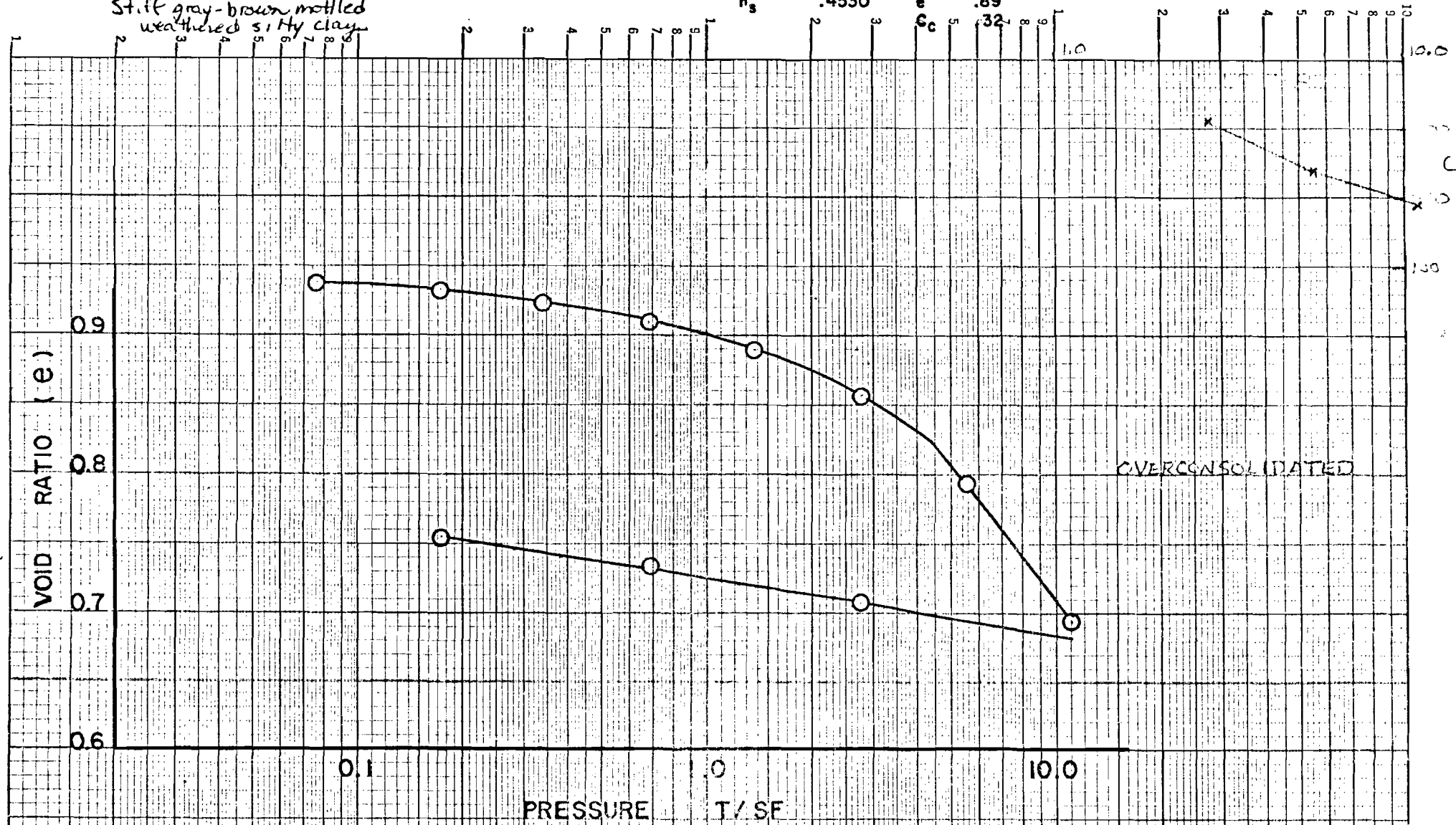
VANE .420 Pmin 1.2 Cv 20 # 198
WC's 34.27 Pmax 2.1 40 # 90
G 2.75 Pp 1.6 80 # 66
hs .4516 e .872
Cc 28

Med. cons. gray sandy silty clay



VANE γ_c 's
 γ .624
 h_s 35-29
 2.76
 .4530
 Pmin 2.05
 Pmax 4.4
 Pp 2.7
 e .89
 Cc .32
 C_v 20 # 307
 40 # 237
 80 # 191

Stiff gray-brown mottled
weathered silty clay



PRESSURE — VOID RATIO DIAGRAM

BREWER

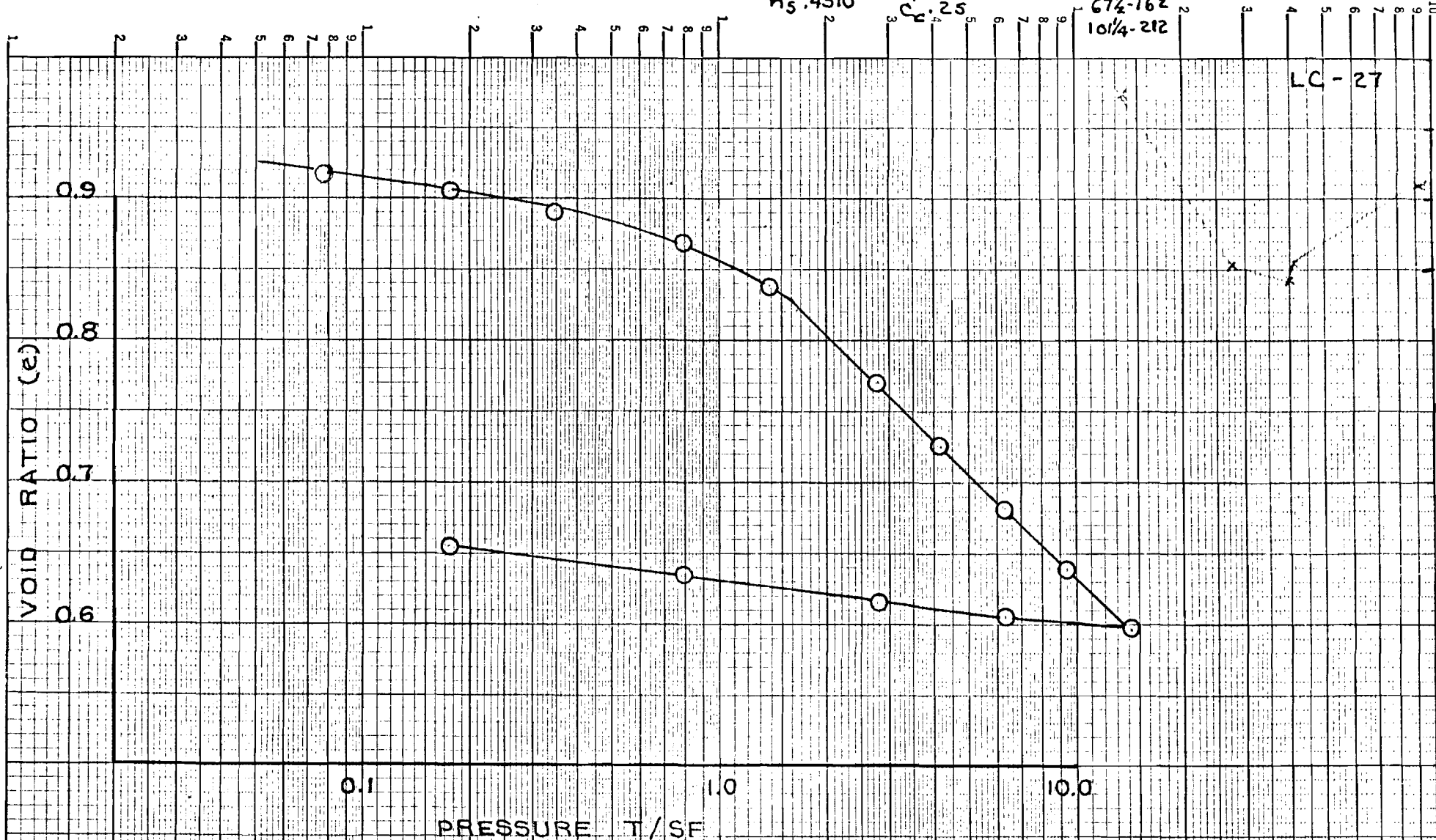
395 - 8 (79)

BORING GP 25 - 82 SAMPLE 1U
JUNE 1982

Vane .264
Wc's 35-25
G 2.74
h_s .4510

P_{min} .91
P_{max} 1.6
P_p .93
e .885
C_v .25

C_v 10¹⁴-227
20-103
30-92
45-105
67 1/2-162
101 1/4-212



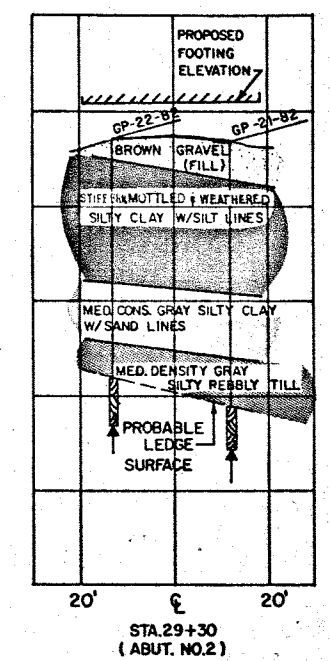
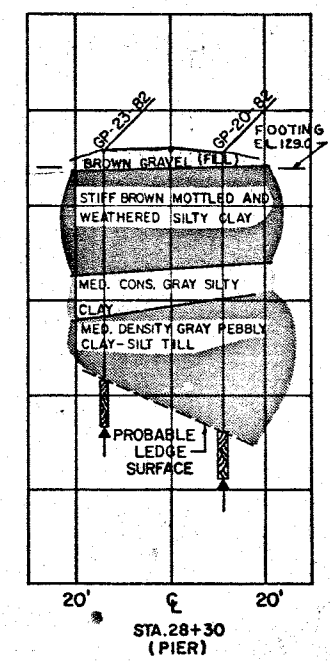
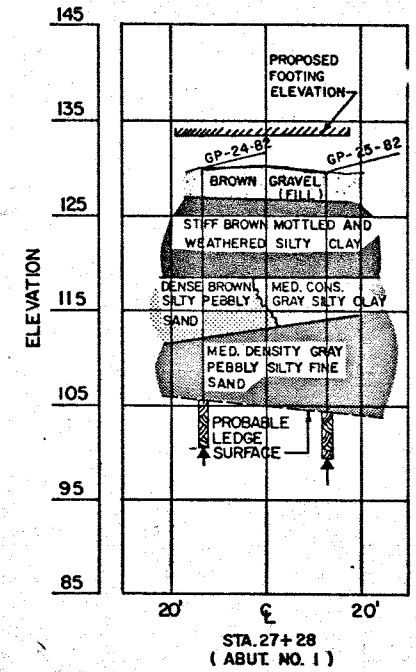
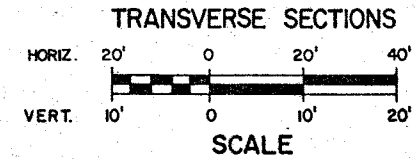
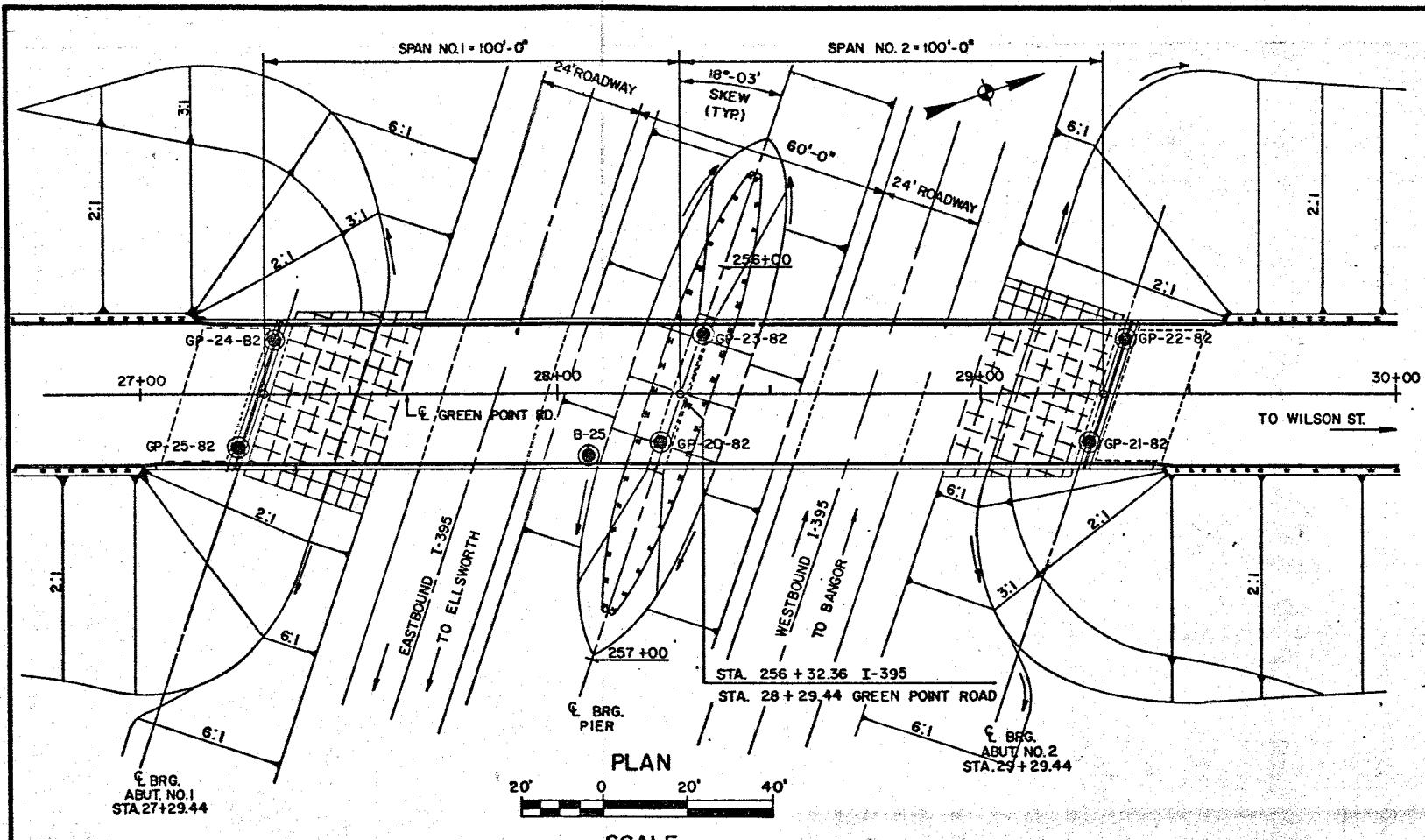
PRESSURE-VOID RATIO DIAGRAM

BREWER

395 - 8 (79)

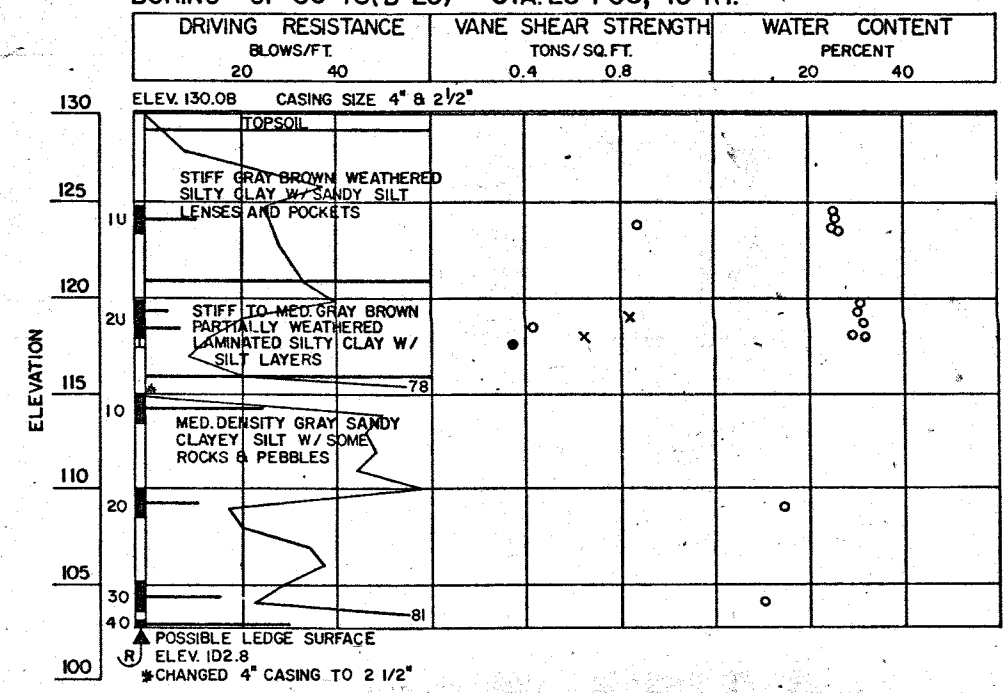
BORING GP-50-80 SAMPLE 3U

NOVEMBER 1980



BORING DETAILS

BORING GP-59-78(B-25) STA. 28+08, 15' RT.



BORING NOTES

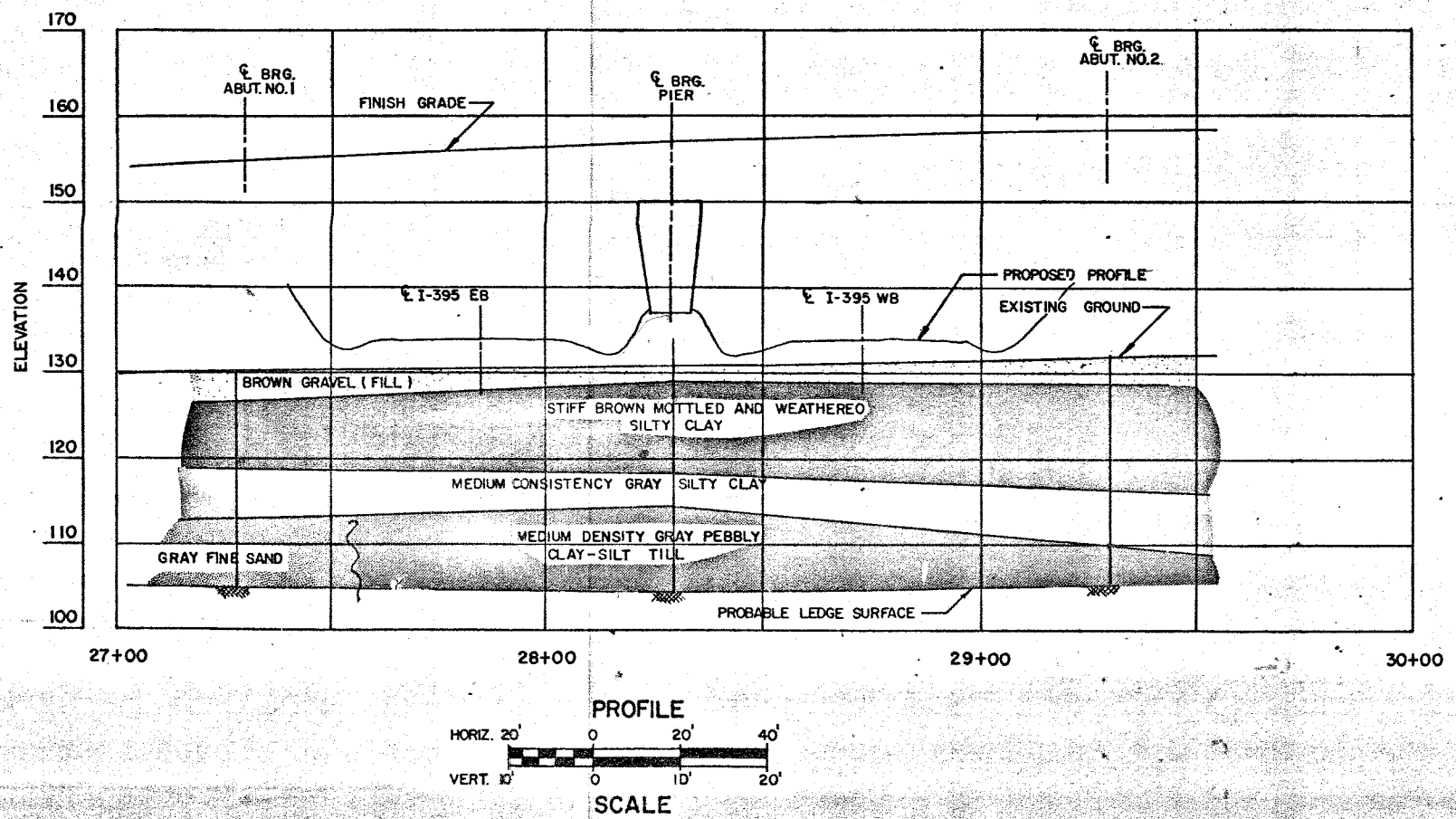
All samples and vane are made ahead of casing
 Number of blows required to drive extra heavy casing one foot with 400 ft. lbs. of energy per blow
 Location of sample or sample attempt
 Number and type of dry sample
 S.B.H. Sampler #1290's
 3/2" O.D. 16 ga. seamless tubing
 Unsuccessful sample attempt and type of sampler
 Number of blows required to drive spoon or tubing one foot with 350 ft. lbs. of energy per blow
 Field vane test
 Refusal of drill rods or casing (may not be ledge)

SHEAR NOTES

Field vane shear strengths
 Laboratory vane shear strengths
 Shear strengths in excess of capacity of equipment
 One half unconfined compressive strengths

WATER CONTENT NOTES

Natural water contents, given as percent of dry weight

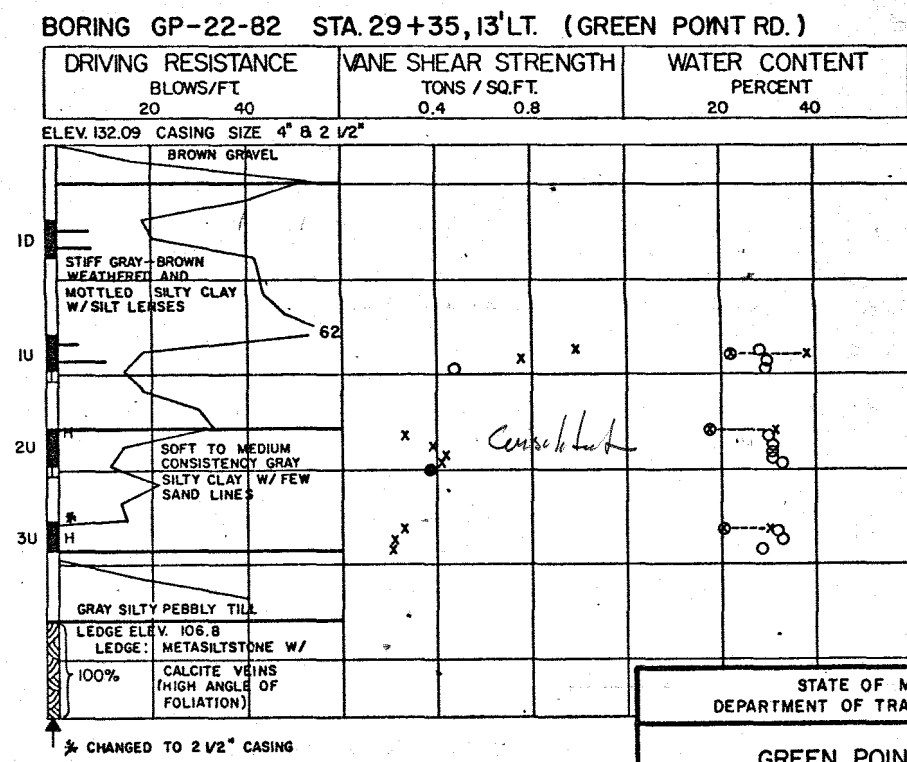
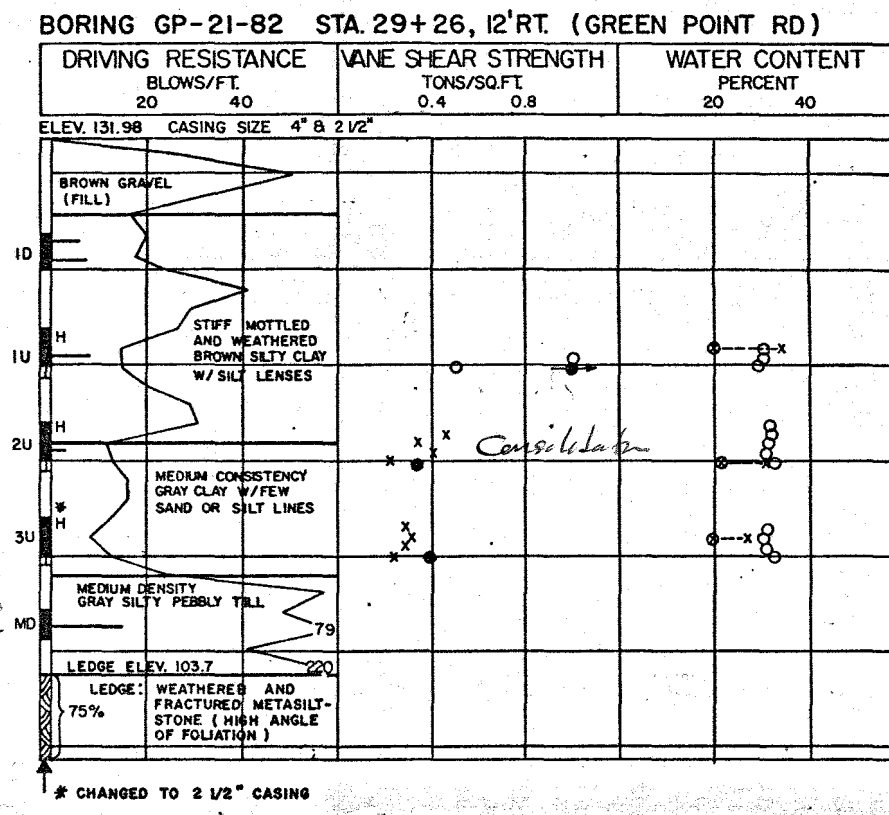
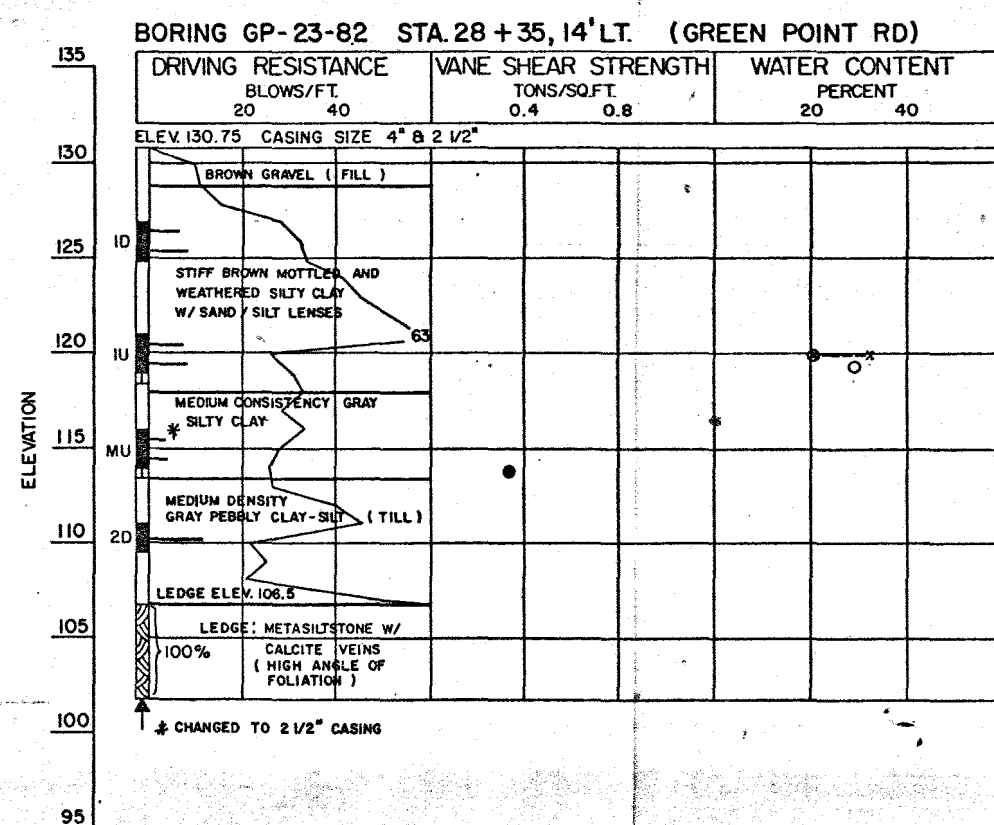
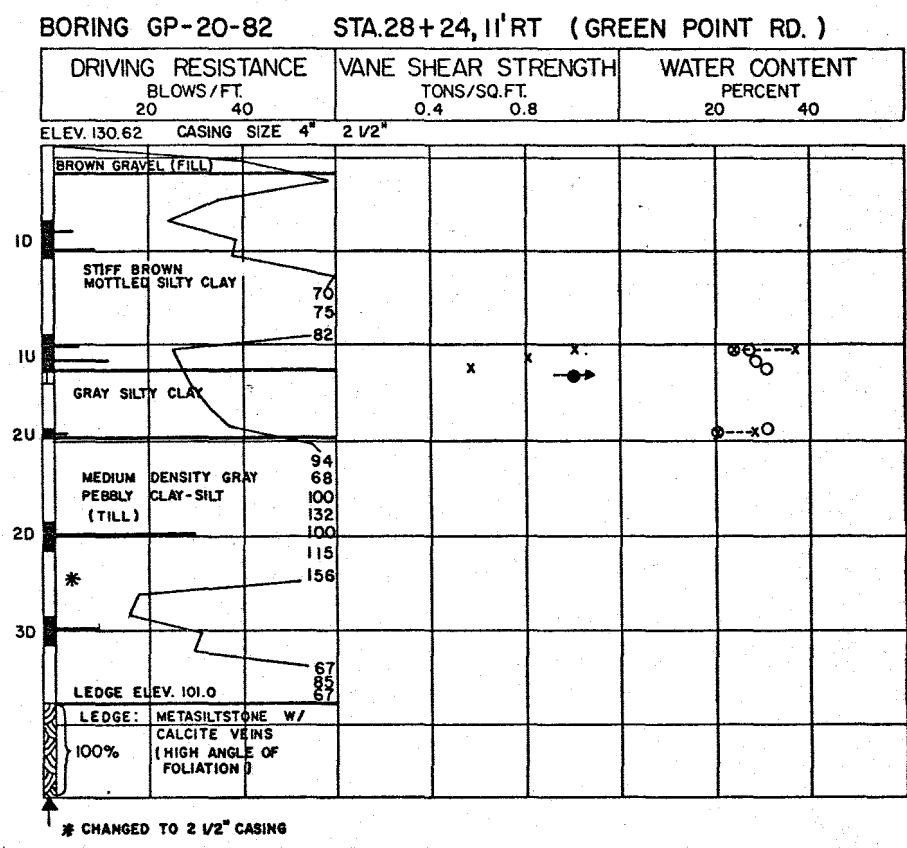
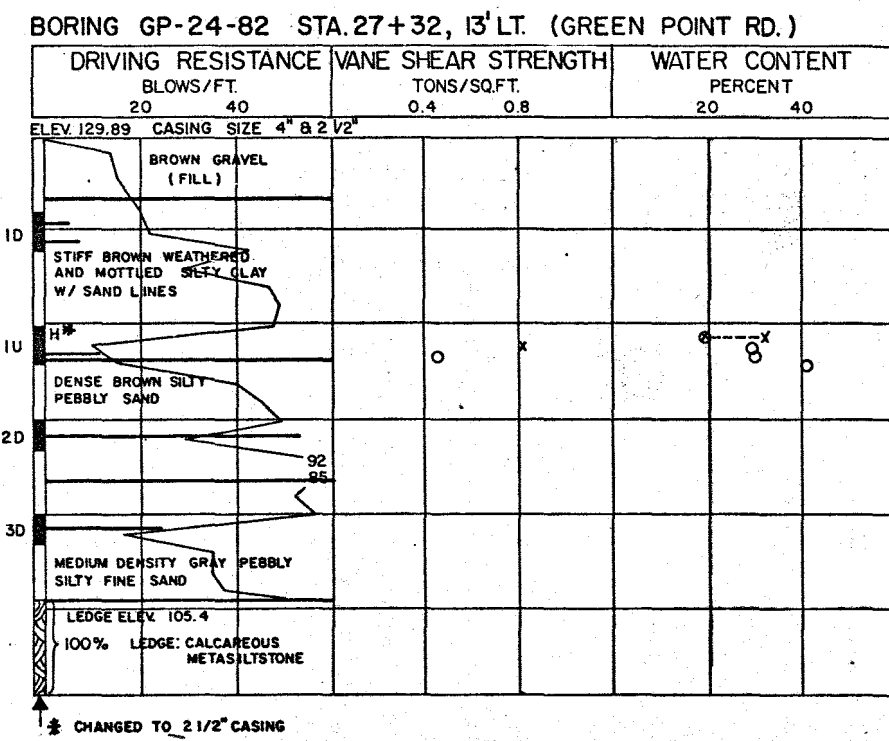
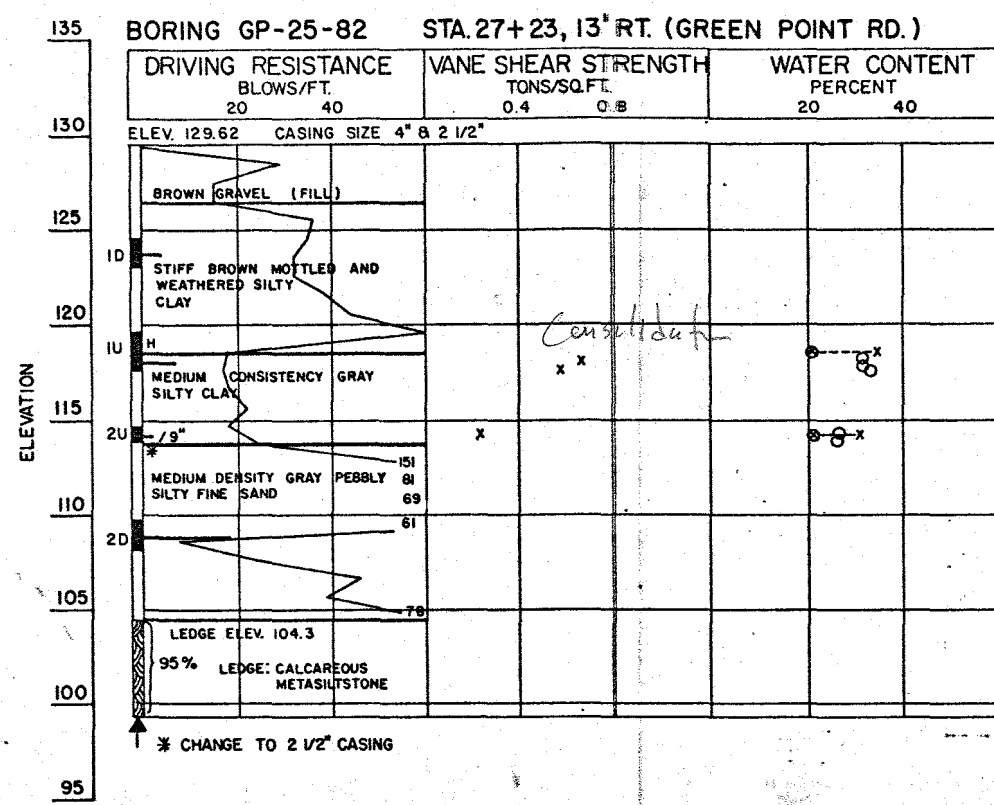


PROJECT DESIGN ENGINEER	BY	DATE
DESIGN - DETAILED		
CHECKED		
REVISIONS		
FIELD CHANGES		

STATE OF MAINE
 DEPARTMENT OF TRANSPORTATION

**GREEN POINT ROAD
 OVER
 I-395
 IN THE TOWN OF
 BREWER
 PENOBSCOT COUNTY
 FOUNDATION SURVEY**

SHEET OF AUGUSTA, MAINE



PROJECT DESIGN ENGINEER
DESIGN - DETAILED
CHECKED
REVISIONS
FIELD CHANGES
PLANS

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION
GREEN POINT ROAD
OVER
1-395
IN THE TOWN OF
BREWER
PENOBSCOT COUNTY
BORING DETAILS
SHEET OF AUGUSTA, MAINE

BORING 44-132-43710

Soils Report 81-102
Brewer - Penobscot County
395-8(79)
Over-Under Study for Greenpoint Road
January 1981

Maine Department of Transportation

Materials and Research Division

Soils Section

OVER-UNDER STUDY FOR THE INTERSECTION OF THE PROPOSED I-395 ROADWAY
AND GREENPOINT ROAD IN BREWER

BANGOR

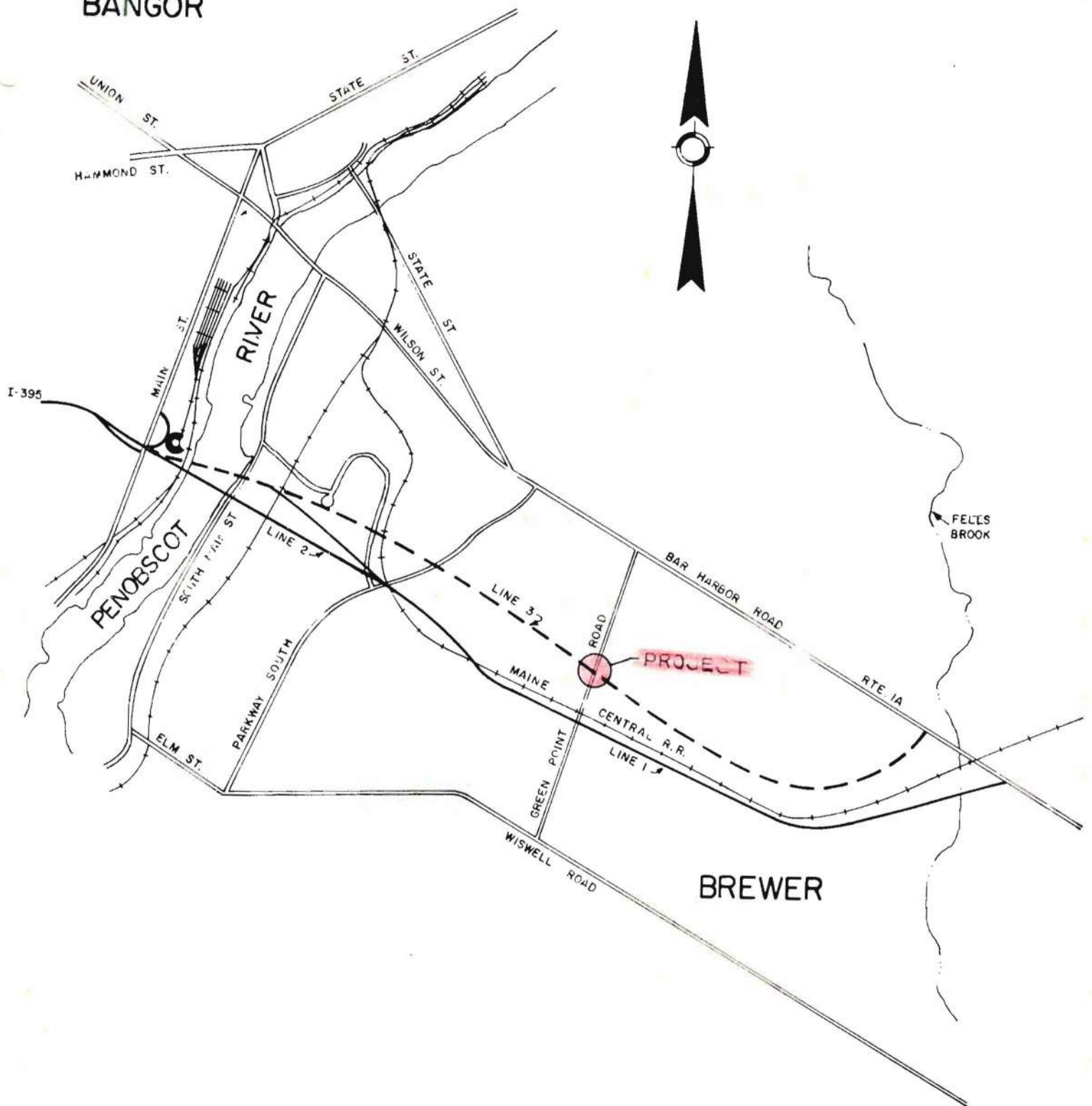


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INTRODUCTION

A soils investigation has been completed to study the possibility of altering the original design of this overpass by allowing the proposed I-395 roadway to carry traffic OVER Greenpoint Road instead of UNDER it. Under the original design, approach embankments would be constructed along the Greenpoint Road and thus would involve the infringement on residential property and dwellings along the road. Fills up to twenty-three feet in height would be necessary to carry Greenpoint Road over the I-395 roadway. In order to avoid the right-of-way problems caused by the fill embankments, it was suggested to construct approach fills for I-395 to carry traffic over the existing Greenpoint Road. The existing topography of low, flat meadows along the proposed I-395 route would present no major right-of-way considerations and the existing Greenpoint Road would remain untouched. However, one washboring done in 1978 showed evidence of soft, compressible materials along the proposed I-395 route. Thus, additional investigations were made in 1980. Two washborings and several rod soundings were done in the area and the details of these investigations are shown on Sheets 3 through 8. Also, plan and profile sketches are shown on Sheet 9.

SUBSURFACE SOIL CONDITIONS

Along the I-395 route to the east of Greenpoint Road, two washborings were made.

In 1978, washboring B-25 (Elevation 130.08) was made in the ditch parallel to Greenpoint Road at approximately Station ²⁵⁶~~257~~+70, ten feet right of the I-395 centerline. Under a foot of topsoil is eight feet of stiff gray-brown weathered

silty clay with sandy silt lenses and pockets. This is underlain by five feet of similar material except that its consistency is more plastic and the silty clay is laminated with sand layers. From a depth of fourteen feet to twenty-seven feet three inches is medium density gray sandy clay silt with some rocks and pebbles (till). Refusal occurred at the depth of twenty-seven feet three inches (Elevation 102.8).

Shear strengths, water contents, and related details are shown on Sheet 3.

In 1980, washboring GP-46-80 was made at Station ~~2~~59+50 on the proposed centerline (Elevation 130.18). The surficial eight feet of material is stiff brown and gray mottled and weathered silty clay and this is underlain by twenty feet of medium to dense brown pebbly clayey fine sand and silt. From the depth of twenty-eight to thirty feet nine inches, dense gray till is found. Ledge was encountered at the depth of thirty feet nine inches (Elevation 99.43), and core drilled five feet. Boring details are shown on Sheet 4.

Thus, it can be assumed that on this easterly side of the Greenpoint Road soft soils do not appear to exist in significant stratum thicknesses. If approach embankments were constructed in this area, settlement and/or stability problems do not appear to be of much concern.

To the west of the Greenpoint Road along I-395, one washboring was made in a depression in this lowlying flat meadow along with several rod soundings.

Washboring GP-50-80 (Elevation 127.19) was made at Station 253+55.4. Underlying nine feet of surficial stiff gray and brown mottled and weathered silty clay with sand lenses is fourteen+ feet of medium consistency gray silty clay with black specks and then three+ feet of dense gray till. From depth twenty-five feet nine inches to thirty-three feet six inches, rock was core drilled and described as phyllite with calcite and quartzite intrusions grading to calcareous metasiltstone with a high angle of foliation.

Several rod soundings within a 200 foot radius of this boring also showed evidence of soft soils. By analyzing the blow counts and depths of penetration, an approximate soil profile was developed and this is shown on the I-395 profile on Sheet 9. Details of the rod soundings are shown on Sheets 7 and 8.

STABILITY AND SETTLEMENT ANALYSIS

Using the sounding information to the left and right of boring GP-50-80, a transverse soils stratification was developed and is shown on Sheet 2. A design fill height of thirty feet and a unit weight of 125 lb./cu.ft. produced a safety factor against shearing of 1.36. When the unit weight was increased to 130 lb./cu.ft., the safety factor decreased to 1.31. Thus, it is believed that adequate embankment stability will exist in the field if actual subsurface conditions closely approximate the analyzed conditions.

Using the embankment geometry shown on Sheet No. 2, it is estimated that approximately nine inches of total settlement is likely in this approach embankment. This estimate is based on the assumption that the gray clay is overconsolidated. (Seven inches of this total settlement is anticipated in the first year.) The pressure-void ratio diagram for a sample of the gray clay is shown on Sheet 1.

SUMMARY

A subsurface investigation has been conducted to study the possibility of routing the proposed I-395 roadway OVER the Greenpoint Road instead of under it. Data from several rod soundings and three washborings provided adequate information for a stability analysis to be conducted.

4.

It appears that there is not significant depths of soft soil to the east of Greenpoint Road. Thus an embankment could be constructed without settlement or stability problems. To the west of Greenpoint Road, a layer of compressible gray silty clay is present below a surficial stiff, weathered silty clay stratum. A stability analysis performed at the location of the highest fill height resulted in safety factors above the desired minimum of 1.25. Therefore, a stable embankment is anticipated. However, a significant amount of settlement (approximately nine inches) of this approach embankment is possible. Ninety-five percent of total settlement is anticipated to occur in less than 2 1/2 years.

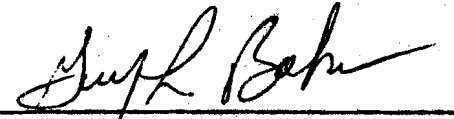
From a soils engineering viewpoint, this proposal to carry I-395 over the Greenpoint Road appears to be a viable alternative to the original design.

Prepared by



Peter M. Coughlan
Assistant Engineer - Soils

Approved by

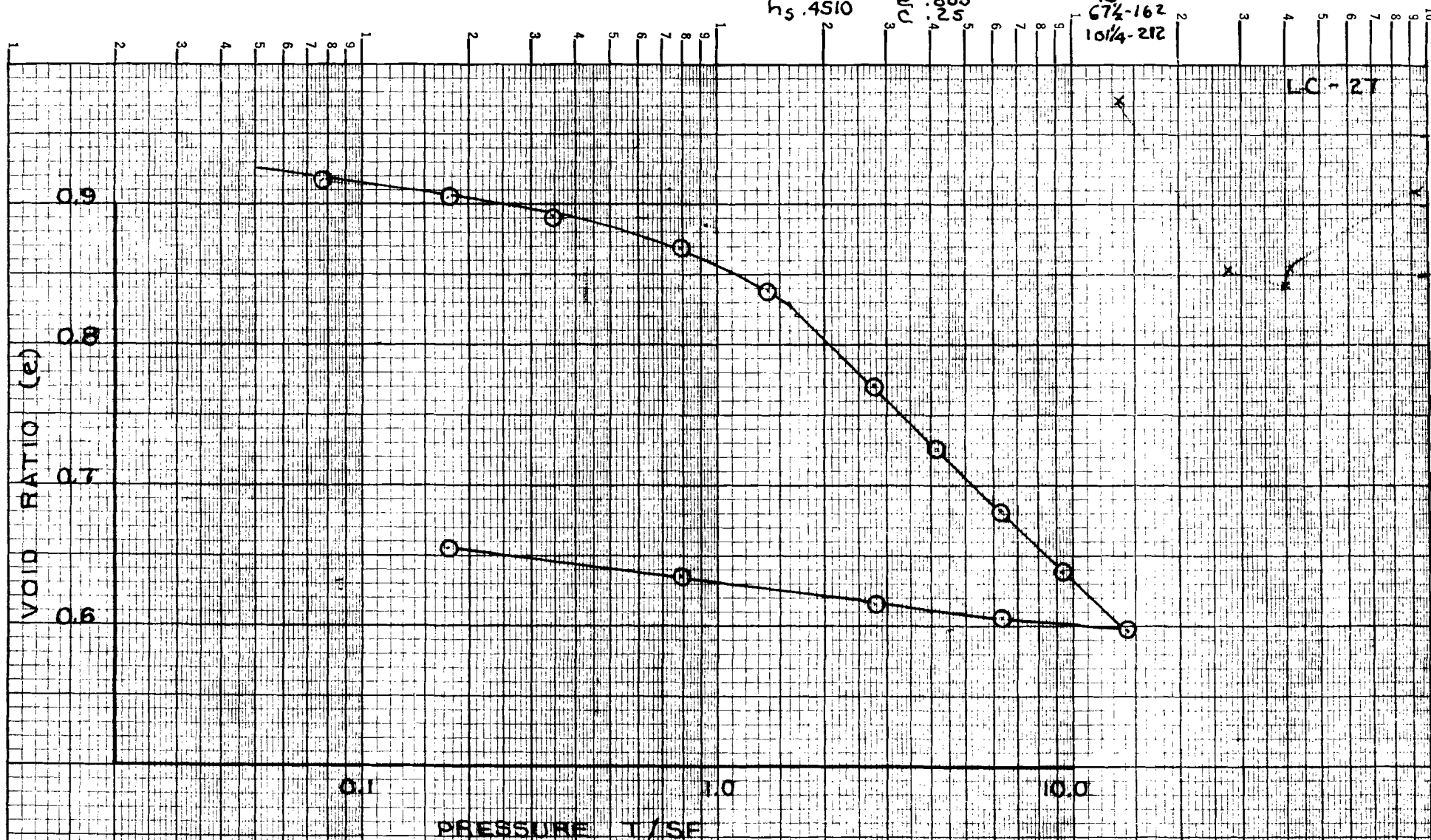


Guy L. Baker
Assistant Soils Engineer

Vane .264
We's 35-25
G 2.74
h_s .4510

r_{min} .91
P_{max} 1.6
P_p .93
e .885
c .25

LV 10^{-2.22}
20-103
30-92
45-105
67.4-162
101/4-212



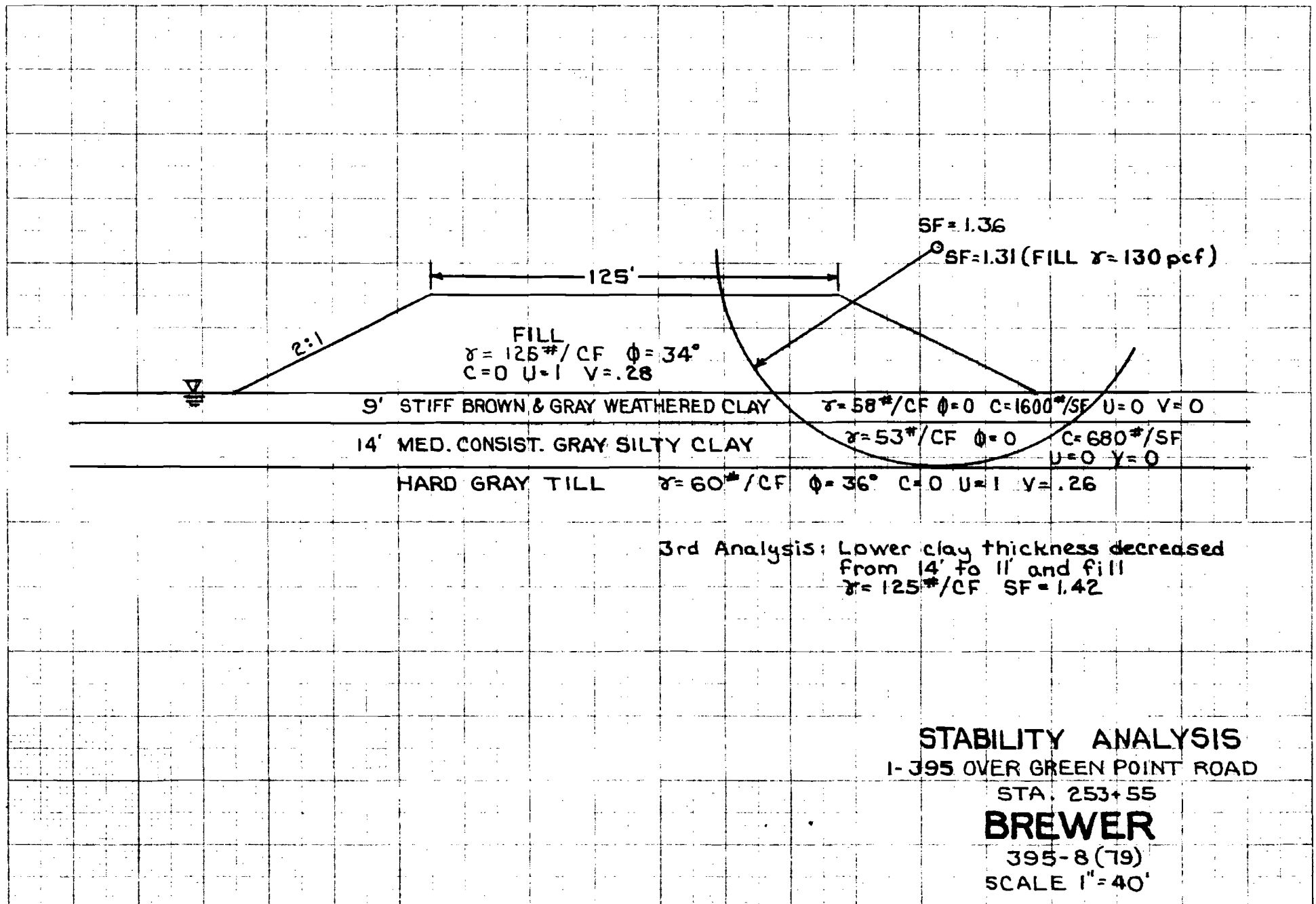
LC - 2T

PRESSURE-VOID RATIO DIAGRAM

BREWER

395 - 8 (79)

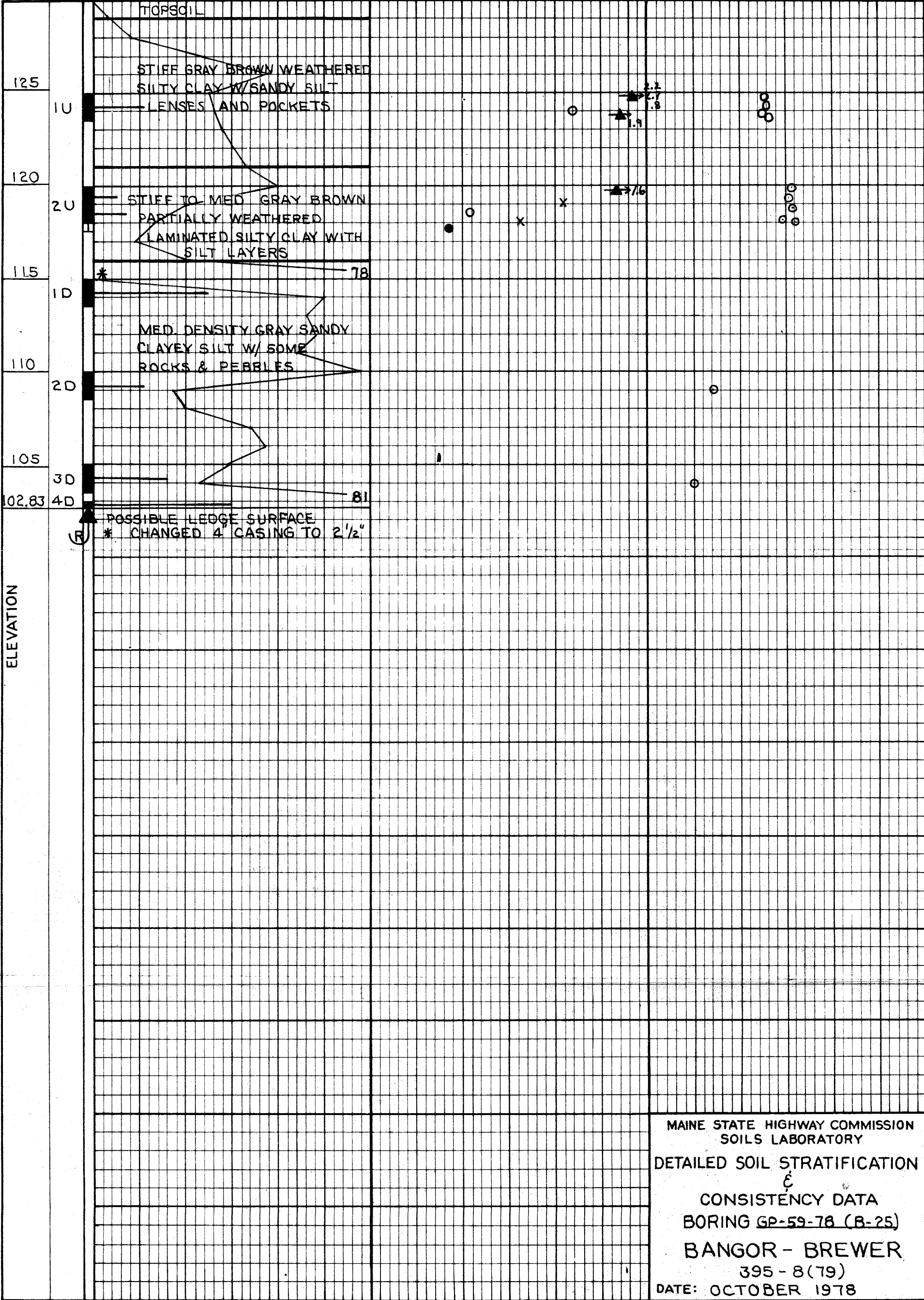
BORING GP-50-80 SAMPLE 3U
NOVEMBER 1980



BORING GP-59-78 (B-25) STATION

CASING SIZE	DRIVING RESISTANCE Blows/Ft.	VANE SHEAR STRENGTH Tons/Sq. Ft.	WATER CONTENT Percent
4" ± 2 1/2"	20 40	0.4 0.8	20 40

ELEV. 130.08



BORING GP-46-80 STATION 259+50 ♀

GREEN POINT ROAD

CASING
SIZE

4" & 2 1/2"

DRIVING RESISTANCE

Blows/Ft.

20

40

60

80

100

ELEV. 130.18

ELEVATION

10

10

20

30

40

50

STIFF BROWN & GRAY MOTTLED & WEATHERED
SILTY CLAY W/A FEW FLAT STONES

1/6"

*

115.32.5%
PL 19.8%

150

MEDIUM DENSITY BROWN PEBBLY CLAYEY FINE SAND & SILT

DENSE GRAY PEBBLY CLAYEY FINE SAND & SILT

161

266

185

139

160

176

203

DENSE GRAY TILL

1/9"

163

316

LEDGE ELEV=99.43

EDGE: CALCAREOUS
METASILTSTONE WITH
HIGH ANGLE OF FOLIATION

* CHANGED TO 2 1/2" CASING

MAINE DEPARTMENT OF TRANSPORTATION
MATERIALS & RESEARCH DIVISION

DETAILED SOIL STRATIFICATION

CONSISTENCY DATA
BORING GP-46-80

BREWER
395-8(79)

DATE:

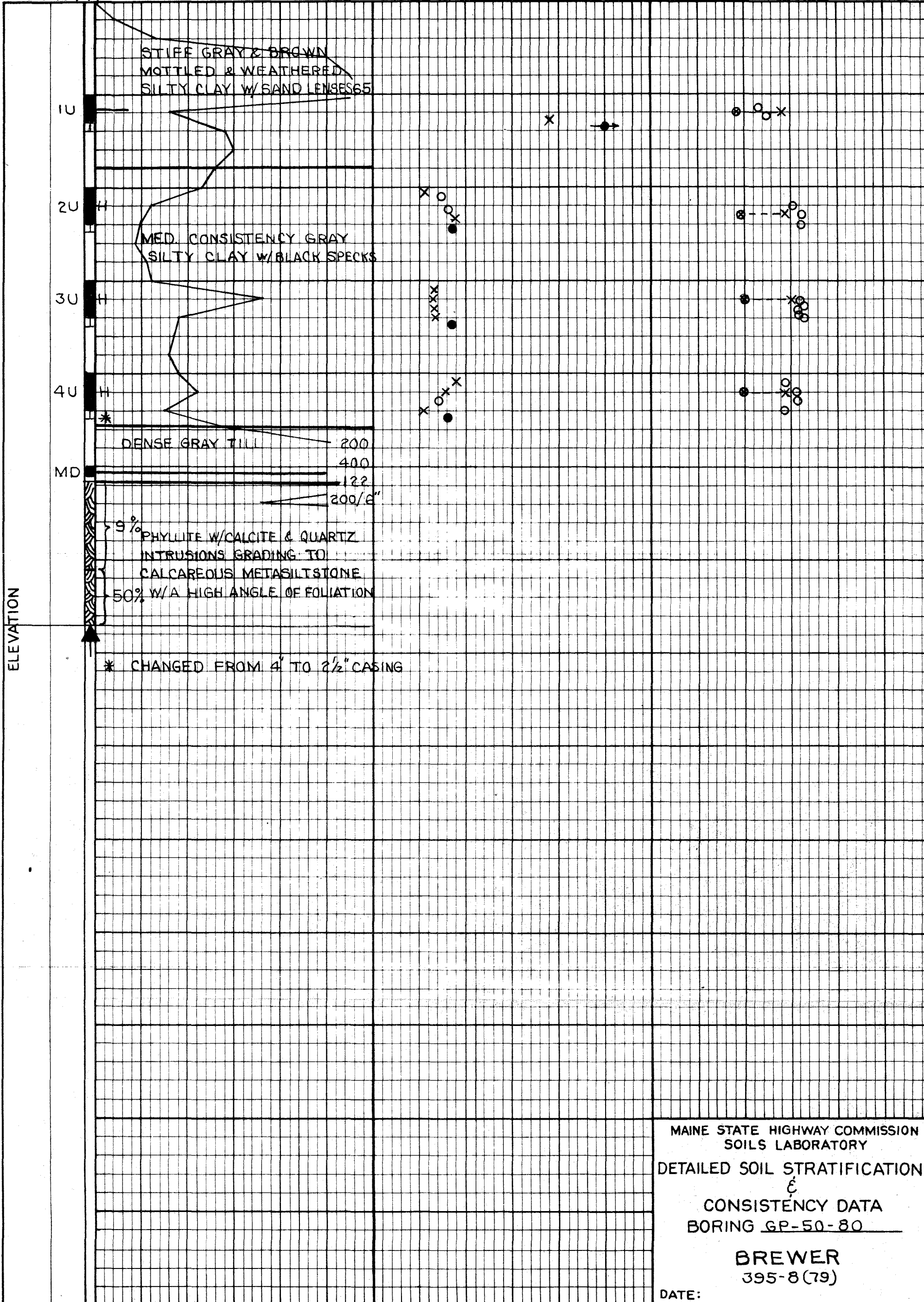
SML-202(8-72)

BORING GP-50-80

STATION 253+55 C

CASING SIZE	DRIVING RESISTANCE Blows/Ft.	VANE SHEAR STRENGTH Tons/Sq. Ft.	WATER CONTENT Percent
4" & 2 1/2"	20 40	0.4 0.8	20 40

ELEV. 127.19



LEGEND

PLAN SYMBOLS

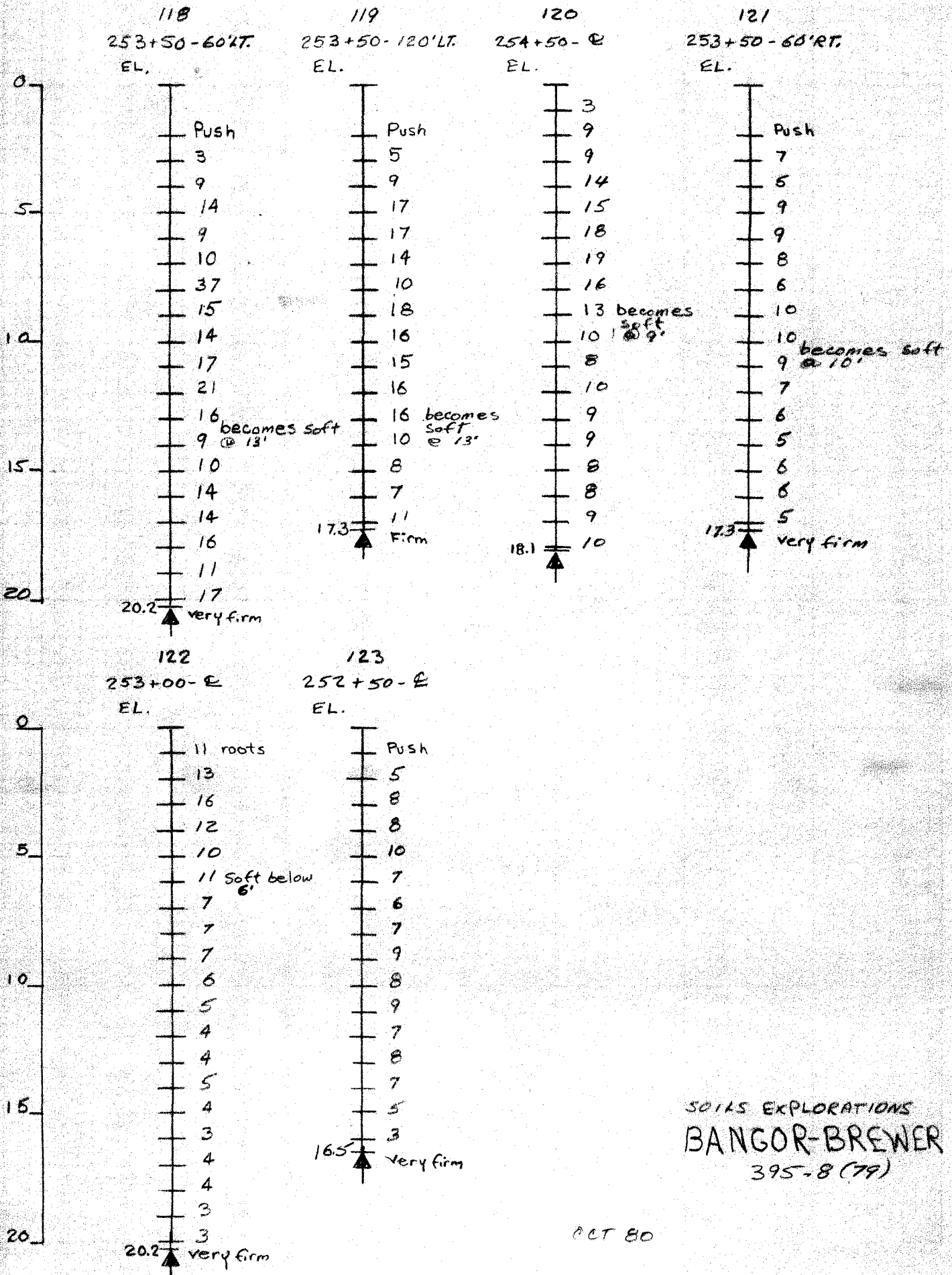
- _____ ROD SOUNDING
- ⊗ _____ AUGER BORING
- ⊗ _____ BORING & SOUNDING
- ⬡ _____ POWER AUGER
- ⊙ _____ WASH BORING
- ◇ _____ SEISMIC: SHOT LOCATION
- ◆ _____ RESISTIVITY: TEST LOCATION
- ⊠ _____ TEST PIT
- ////// _____ LEDGE ON SURFACE

EXPLORATION NOTES

- ⌵ _____ WATER LEVEL
- ⌵₁₀₁₀ _____ BLOWS PER FOOT - ROD SOUNDINGS
- ⌵_{CLAY}_{B-160} _____ MATERIAL & SAMPLE NO. - AUGER BORING
- ⌵₂₁ _____ DEPTH OF MATERIAL CHANGE (IN FEET)
- ⌵ _____ BOTTOM OF EXPLORATION
- ⌵_⊗ _____ REFUSAL
- ⌵_{//////} _____ LEDGE

SHEET NO. 7
EXPLORATIONS 118-123
SOUNDINGS

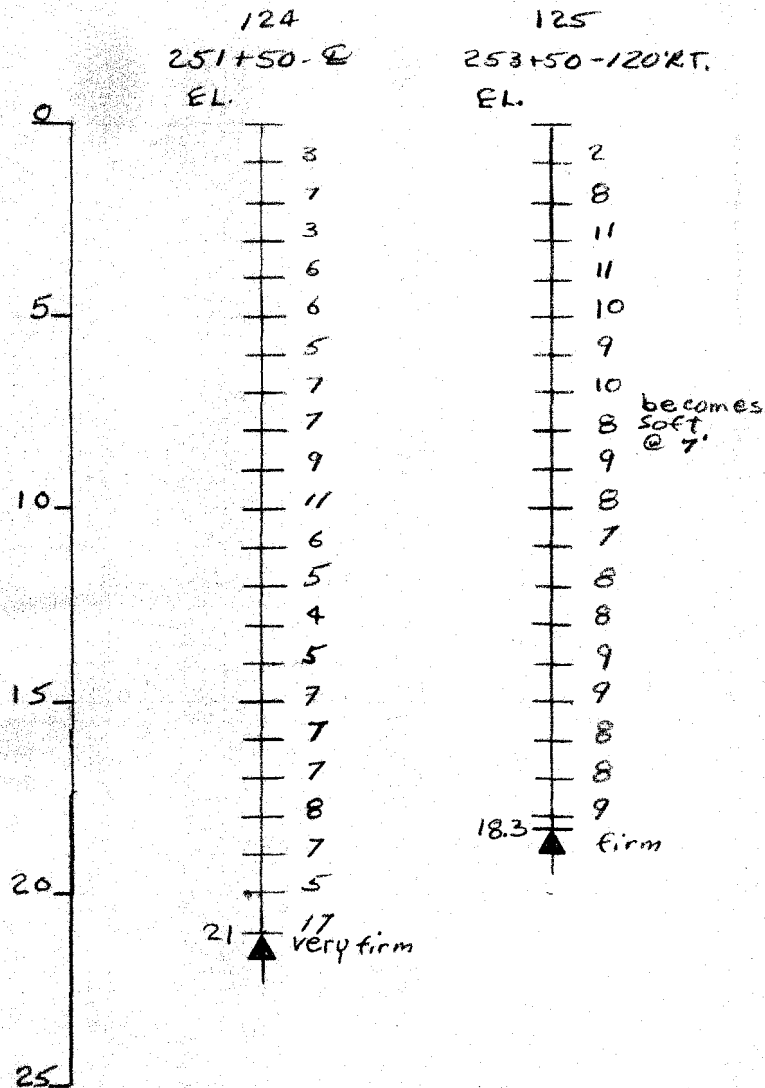
DEPTH (FEET)



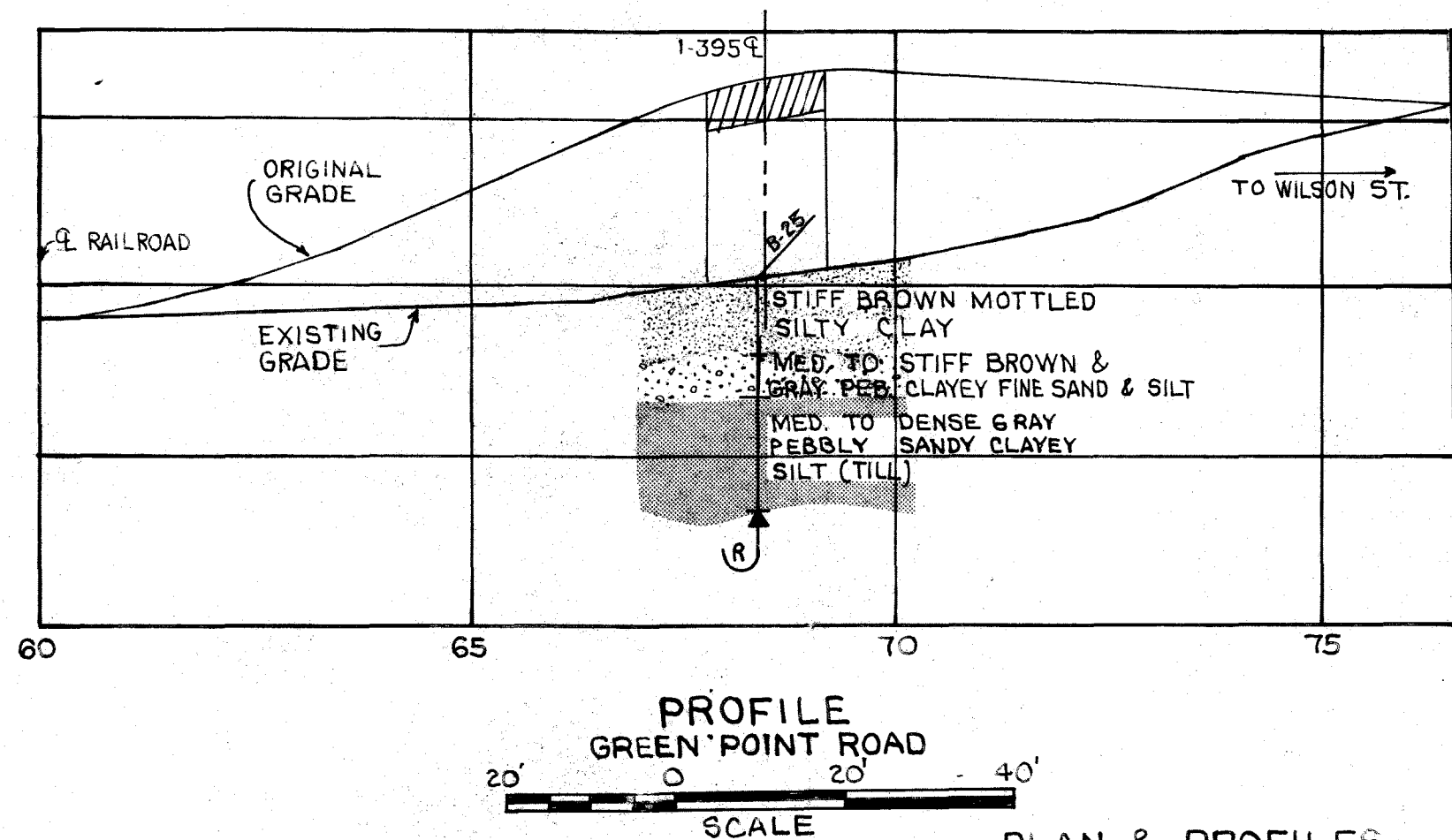
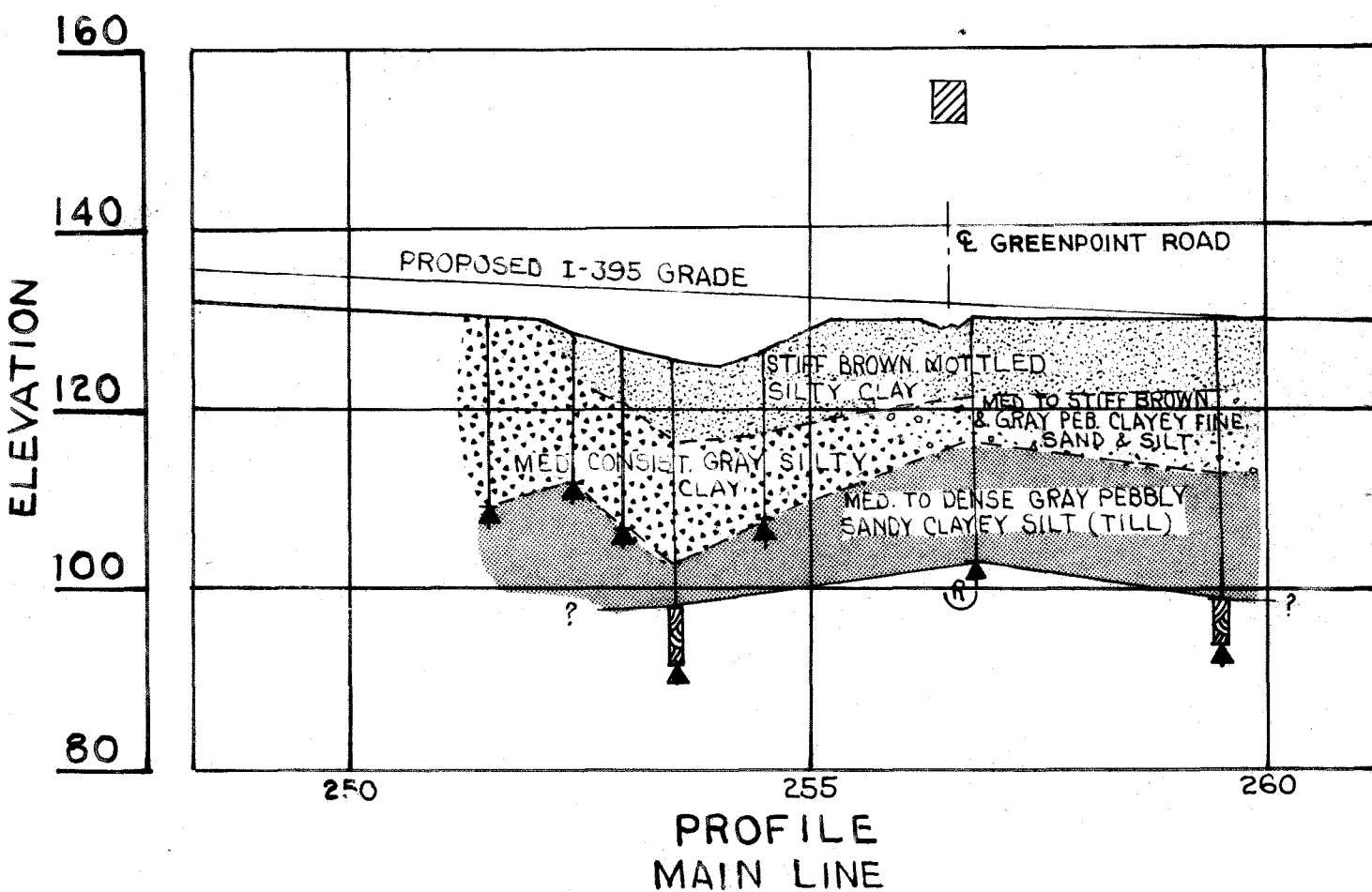
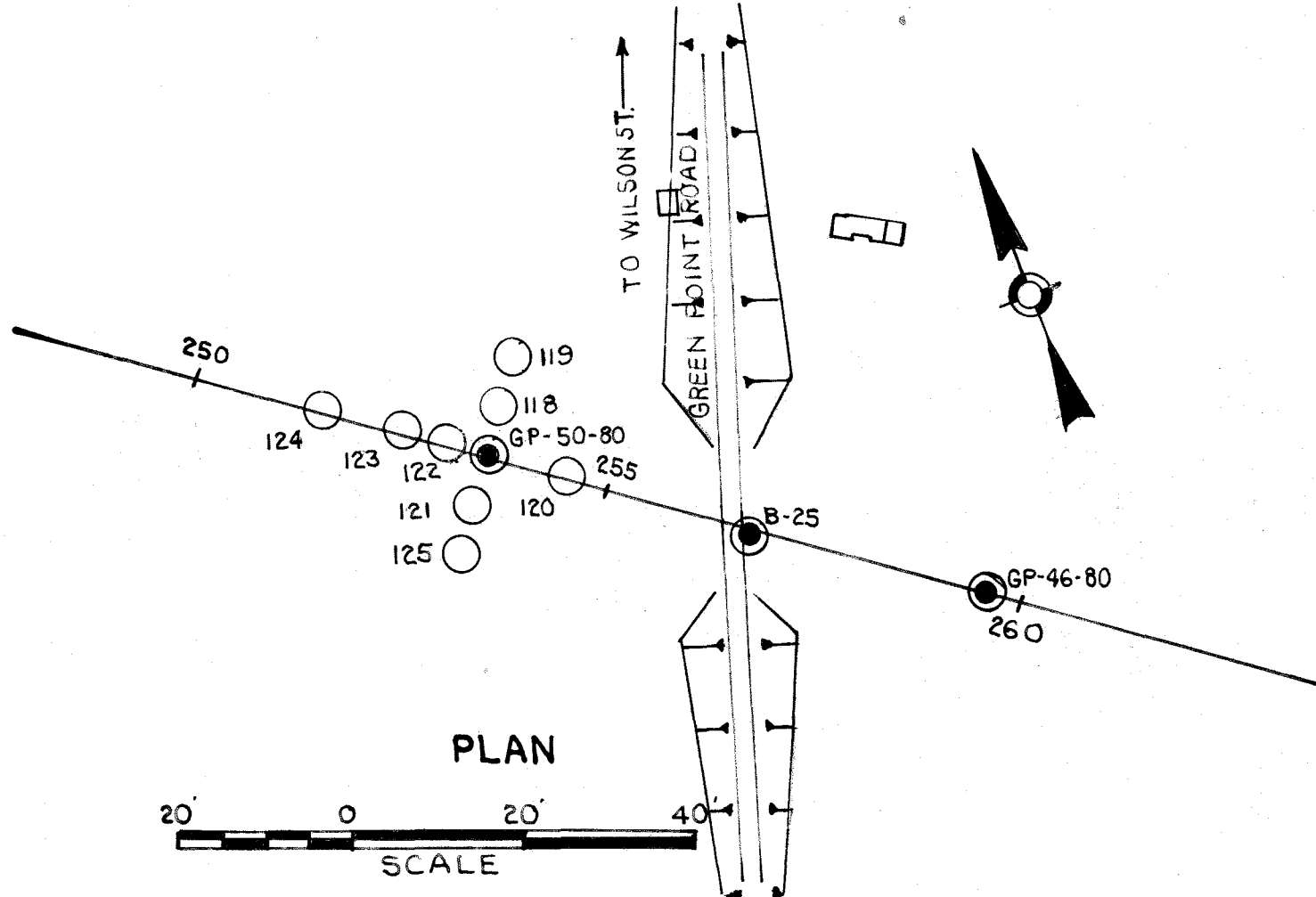
SOILS EXPLORATIONS
BANGOR-BREWER
395-8 (79)

OCT 80

SHEET NO. 8
EXPLORATIONS 124-125
SOUNDINGS



SOILS EXPLORATIONS
BANGOR-BREWER



Soils Report 82-30
Brewer - Penobscot County
Interstate 395, Sta. 235+00 -
300+50, & Green Point Road
Project 395-8(79)
August 1982

Maine Department of Transportation

Materials & Research Division

Soils Section

SUBSURFACE INVESTIGATION FOR THE PROPOSED
CONSTRUCTION OF A PORTION OF INTERSTATE
395 (STA. 235+00 to 300+50) AND THE RECONSTRUCTION
OF A PORTION OF THE GREEN POINT ROAD
IN THE CITY OF BREWER

Prepared By

Alan R. King
Engineering Technician

Approved By

Guy Baker
Assistant Soils Engineer

BANGOR

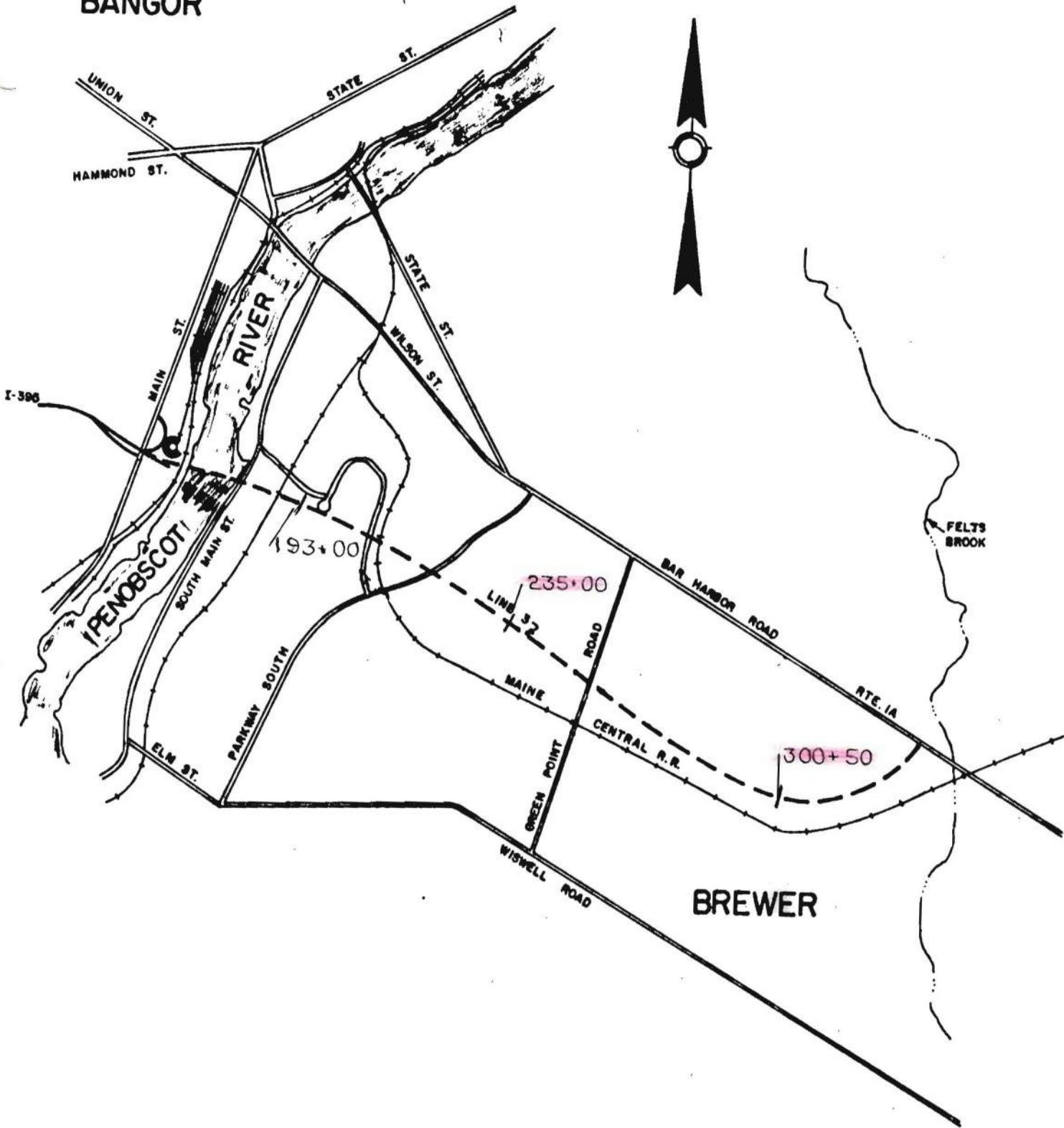


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1. INTRODUCTION

1.1 This report covers the subsurface investigation for a 1.24 mile section of the proposed 3+ miles of Interstate 395 highway in Brewer which will form the eastern approach to the proposed third bridge over the Penobscot River between Bangor and Brewer. This section of the proposed roadway begins at Station 235+00, approximately midway between Parkway South and the Green Point Road, and extends easterly to Station 300+50. Also included in this report is the subsurface investigation for the reconstruction of approximately 2000 feet of the Green Point Road where it will cross the Interstate.

1.2 The soils investigation was carried out under the general supervision of Regional Geologist, Albert Eggleston and included backhoe test pits, washborings, power auger borings, hand auger borings and rod soundings. The locations of these explorations are shown on a plan and profile on Sheets 25 through 29 of the Illustrations following the text of this report. Details of the explorations are also shown in the Illustrations. A total of 17 soil samples were collected from the explorations and forwarded to the Central Laboratory in Bangor for testing and classification. The results of these tests and classifications are included in a tabulation of the samples on page 14.

1.3 In addition to this report, the explorations have been plotted on a set of plans and cross sections which will be forwarded to the Engineer of Design.

1.4 An over-under study for the intersection of the proposed I-395 roadway and Green Point Road, prepared by Peter M. Coughlan, Assistant Soils Engineer, was submitted in January of 1981 (Soils Report 81-102). A soils report for a proposed structure to carry the Green Point Road over I-395 will be submitted at a later date.

1.5 A preliminary drainage study for the proposed I-395 roadway, prepared by Wilbur Tidd, Soils Research Scientist, was submitted in a letter to Larry Childs of the Design Division dated March 5, 1982. A materials inventory for the entire I-395 project in Bangor and Brewer is currently being prepared by the Materials Geologist, Charles Norburg and will be submitted at a later date under separate cover. A final drainage study prepared by Wilbur Tidd, Soils Research Scientist, is included as Appendix B.

2. RECOMMENDATIONS

2.1 Approximately 75 percent of the subgrade for this section of the I-395 roadway will be new fill embankment. Subgrade soils for the remaining 25 percent will be the native stiff gray brown clay silt. A soils support (s) value of 3.0 is recommended where this clay silt soil occurs at subgrade.

2.2 Underdrain is recommended at the following locations in the cut area on the Green Point Road where a box section is proposed:

Sta. 35+50 to Sta. 38+00 right
Sta. 38+25 to Sta. 39+50 left

This underdrain can probably best be outletted into the existing ditch ahead (Sta. 41+50+).

2.3 A small marshy area exists along the right of the Green Point Road from about Station 25+50 to Station 26+25. Rod soundings and borings found 4 to 5 feet of soft brown organic clay silt overlying gray clay at this location. It is recommended that an initial thick layer (3' minimum) of clean granular material be placed across this area:

3. CONCLUSIONS

3.1 Earth Excavation

3.1.1 The proposed grade for this section of the I-395 roadway will require earth excavation in two areas. On the westbound lane shallow cuts to subgrade and for ditches will be required between Stations 255+00 and 263+50 and between Stations 269+00 and 280+00. On the eastbound lane shallow cuts will be necessary between Stations 256+00 and 264+50 and between Stations 273+00 and 279+00. This excavation will consist almost entirely of firm clay silt soils similar to samples A-1, A-7, A-8 and BW-10. These samples were all classified as A-6 soils. Where the alignment crosses the Green Point Road, excavation will also include some pavement and base materials from the existing roadway.

3.1.2 On the Green Point Road, excavation for the proposed cut between Stations 36+00 and 39+50, will consist of pavement and base of the existing roadway, topsoil and dense stony sandy clay silt similar to sample AK-6 classified A-4, III. This soil also contains some larger stone not reflected in the grain size curve and is probably glacial till.

3.1.3 Moisture density relationship (proctor) tests were completed on three samples, A-1, A-3, and A-7, representative of the stiff gray brown mottled clay silt soils. A CBR test was also performed on Sample A-3. Details of the moisture density relationship tests are shown on Sheets 2, 3 and 4. The results of these tests are summarized as follows:

<u>Sample</u>	<u>Maximum Density (lbs./cu.ft.)</u>	<u>Optimum Water Content (percent)</u>	<u>CBR Value</u>
A-1	117	14	
A-3	118	14	4.4
A-7	116	15	

3.1.4 Most of the earth excavation from this section of the proposed I-395 system should be suitable for use in embankment construction although the clay silt soils could provide some difficulties during a particularly wet construction season.

3.2 Rock Excavation

3.2.1 No rock excavation is anticipated for this section of I-395 or for the proposed reconstruction on the Green Point Road.

3.3 Organic Soils

3.3.1 No soft soils of any significance were noted on this section of the proposed I-395 highway. At locations where seasonal runs cross the alignment or where slight depressions in the ground surface allow water to collect, the top 1 to 2 feet of the stiff clay layer is somewhat soft.

3.3.2 On the right side of the Green Point Road between Stations 25+50 and 26+25, is a small marshy area. Rod soundings and hand auger borings found soft soils consisting of brown organic clay silt to a depth of 4 to 5 feet. The soft soils are confined to a small area and no problems are anticipated with regards to embankment construction.

3.4 Embankment Foundation

3.4.1 Embankment fills for this section of the I-395 roadway are moderate with a maximum height of about 16 feet in the vicinity of Station 298+00. The underlying clay silt soils are firm and should provide adequate support and no stability problems are foreseen.

3.4.2 Embankment fills of up to 26 feet are proposed for the approaches to the proposed Green Point Road bridge over the interstate roadway. A stability and settlement analysis for these fills was completed in conjunction with the proposed foundation design for the bridge. The analysis indicates that the embankments should be stable as designed. Some settlement is anticipated; however, this should be limited to about 6 inches or less.

3.5 Subgrade Considerations

3.5.1 Approximately three quarters of the subgrade for this portion of the I-395 roadway will be new embankment fill. The remaining one quarter will be the native clay silt soils. Approximately 64 percent of the subgrade for the Green Point Road will be new fill with clay silt, the existing roadway fill and stony sandy clay silt till making up the remainder. A summary of the anticipated subgrade materials is as follows:

Stations

I-395 Eastbound

235+00 - 256+00	New embankment
256+00 - 264+00	Clay silt (A-1, A-7)

264+00 - 270+50	New embankment
270+50 - 273+00	Clay silt (A-8) and new embankment
273+00 - 278+00	Clay silt (BW-10)
278+00 - 300+50	New embankment

I-395 Westbound

235+00 - 255+50	New embankment
255+50 - 263+50	Clay silt (A-1)
263+50 - 269+00	New embankment
269+00 - 280+00	Clay silt (BW-10)
280+00 - 300+50	New embankment

Green Point Road

20+00 - 21+50	Clay silt, existing pavement & base
21+50 - 27+28	New embankment
27+28 - 29+30	Bridge
29+30 - 35+50	New embankment
35+50 - 39+50	Stony sandy clay silt till (AK-6)

3.5.2 The relative amounts of the various soils at subgrade are as follows:

<u>Subgrade Material</u>	<u>AASHTO Classification</u>	<u>Frost Rating</u>	<u>Percentage</u>
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I-395

New embankment	--	--	74%
Clay Silt	A-6	III, IV	26%

Green Point Road

New embankment	--	--	68%
Stony sandy clay silt till	A-4	III	23%
Clay silt	A-6	III, IV	5%
Existing base	--	--	4%

3.5.3 Freezing Index and Frost Penetration estimates are as follows:

<u>Freezing Index</u>	<u>Total Frost Penetration</u>		<u>Frost Penetration into Subgrade</u>	
	<u>Nongranular Subgrade</u>	<u>Granular Subgrade</u>	<u>Nongranular Subgrade</u>	<u>Granular Subgrade</u>

I-395 (52 inches of base and pavement)

Mean 1200	57"	64"	5"	12"
Design 1700	65"	85"	13"	33"

Green Point Road (30 inches of base and pavement)

Mean 1200	44"	64"	14"	34"
Design 1700	52"	85"	22"	55"

3.6 Drainage

3.6.1 No major waterways cross this section of the proposed I-395 and drainage is limited to a few intermittent or seasonal runs all of which drain in a southerly direction. The relatively flat terrain and underlying clay silt soils allow water to collect at the surface resulting in many wet areas along the alignment. At locations where the subgrade is below the existing ground surface, the proposed ditches should provide sufficient drainage.

3.6.2 On the Green Point Road, the area from the railroad embankment, Station 20+00+ ahead to Station 27+00+ is low and poorly drained. Much of the area on the west side of the road between these stations is flooded during the spring of the year. Low wet marshy areas also occur on the right between Stations 23+00 and 24+00 and from Station 25+00 to Station 26+00. Beyond Station 27+00 as the ground rises, the soils are generally well drained.

3.7 Soil Erosion

3.7.1 The clay silt soils are susceptible to erosion once disturbed by construction activities. Some temporary erosion control measures may be necessary where these materials are used in embankment fills.

4. GENERAL CONDITIONS

4.1 The proposed I-395 roadway in Brewer will form the east approach to a proposed new bridge over the Penobscot River connecting with the existing I-395 spur off the I-95 interstate system in Bangor. The proposed roadway will be on new location beginning at South Main Street on the east bank of the river and extending easterly approximately three miles connecting with U.S. Route 1A near the foot of so called Whittings Hill near the Brewer-Holden townline. This report covers approximately the middle third of the project beginning at Station 235+00, 2000 feet east of Parkway South, and extending easterly to Station 300+50 a distance of about one and one-quarter miles.

4.2 The proposed alignment within these stations crosses a relatively flat and poorly drained terrain underlain by marine clays which were deposited at a time when the sea was more than 100 feet above its present level. Washborings made where the center-line crosses the Green Point Road and soundings elsewhere along the project show the maximum depth of these marine soils to be about 20 feet. Samples of the clay taken from the washborings and test pits, show the upper two-thirds to be stiff gray brown and mottled with the lower portion gray in color and of medium consistency. Below the clay soils and overlying the bedrock surface, which was reached at depths of 24 to 29 feet at the Green Point Road crossing, is a layer of glacial till consisting of medium density gray pebbly silty sand and clay silt. Rock cores show the bedrock to be a calcareous metasiltstone with a high angle of foliation and typical of the bedrock in this area.

4.3 Similar soil conditions underly the Green Point Road from Station 20+00 to about Station 31+00. From Station 31+00 however, the roadway rises over a low knoll composed of dense gray brown stony sandy silty glacial till. Initial hand rod soundings made for a proposed cut through this knoll encountered refusals in a rocky layer in the till at depths of 4 to 5 feet which were believed to be on bedrock. Power auger borings made later penetrated this layer to depths of 8 to 9 feet without encountering refusal.

4.4 Drainage is limited to a few seasonal or intermittent runs all of which drain in a southerly direction. The flat terrain and underlying clay soils allow surface water to collect resulting in a number of wet areas along the alignment. A large area on the west side of the Green Point Road and small areas on the east side is generally flooded each spring.

5. DETAILED CONDITIONS

I-395 Median Centerline

5.1 Station 235+00 to Station 256+00

5.1.1 Station 235+00 is located approximately 2000 feet east of Parkway South. From this point the proposed alignment continues east on a tangent to Station 256+00 just west of the Green Point Road. The terrain in this area is generally flat and poorly drained, with the first 300 feet wooded and the remainder of the section old fields overgrown with alders and gray birch. A marshy area lies between Stations 238+25 and 239+50 and a seasonal or intermittent run crosses the centerline at about Station 253+25. The proposed grade will require embankment fills for the entire length of this section with a maximum height of about $8\frac{1}{2}$ feet.

5.1.2 Explorations within this section consisted of backhoe test pits, hand rod soundings and one washboring, GP-50-80 located on centerline at Station 253+55. The testpits, numbered TP-666 through TP-669, and located between Stations 235+00 and 250+00 penetrated to depths of 8 and 9 feet and found similar conditions consisting of 1 foot of topsoil, roots and humus at the surface underlain by mottled gray brown silty clay. The clay is represented by samples A-1 through A-4 which were classified A-6 or A-4 with a Class III or Class IV frost rating. Boring GP-50-80 also encountered this stiff gray brown silty clay to a depth of 9 feet at Station 253+55. Below 9 feet the boring found 14 feet of medium consistency gray silty clay with black specks and 3 feet of dense gray till overlying bedrock. The silty clay soils are quite firm and should adequately support the proposed embankments.

5.2 Station 256+00 to Station 263+50

5.2.1 From Station 256+00 the proposed alignment continues on a tangent to the east crossing the Green Point Road between Stations 256+20 and 256+45 and a large field east of the Green Point Road. A sloping proposed finished grade combined with a slight rise in the ground surface will require shallow cuts to subgrade and for ditches. On the westbound lane these cuts will amount to a maximum of 3 feet to subgrade and $4\frac{1}{2}$ feet at the ditch line. On the eastbound lane maximum cuts of 2 feet to subgrade and 3 feet at the ditch line will be required.

5.2.2 Explorations within this section consisted of two test pits, a number of hand rod soundings and one washboring GP-46-80 located on centerline at Station 259+50. In addition, seven washborings were made for a proposed structure to carry the Green Point Road over the interstate roadway. A separate soils report for this structure will be submitted at a later date. An over-under study for this location was submitted in January, 1981 (Soils Report 81-102).

5.2.3 Borings (GP-20-82, GP-23-82, GP-59-78) at the Green Point Road found the existing roadway fill to consist of 1½ to 2 feet of gravel. Below this the borings encountered 10 to 11 feet of stiff gray brown weathered silty clay, 4 to 5 feet of medium consistency gray silty clay and then medium density pebbly sandy clay silt till. Bedrock was encountered at elevation 101 on the east side of the road and 106.5 on the west side of the road. A similar soil stratification was encountered by boring GP-46-80 at Station 259+00. Test pit number 778 at Station 261+00 found topsoil and stiff clay to 4 feet and then a layer of rock fragments from 4 feet to 6 feet which at first was thought to be bedrock. This test pit was latter redug and the backhoe penetrated the rock layer to a depth of 9 feet without encountering bedrock. Hand soundings made in this area penetrated to depths of up to 12 feet at some locations without refusals while at other locations, refusals were met at depths ranging from 7.9 feet to 11.9 feet.

5.2.4 Excavation for this section of the I-395 roadway will consist almost entirely of stiff gray brown mottled silty clay. Sample A-7, classified A-6, Class IV, is representative of this material. This clay silt soil will also make up the subgrade for most of this section. Other excavation will include topsoil and the pavement and base of the Green Point Road. No rock excavation is anticipated.

5.3 Station 263+50 to Station 270+00

5.3.1 The proposed alignment between these stations continues on a tangent in an easterly direction crossing open fields. The ground surface slopes downward slightly to a seasonal or intermittent drainageway, which crosses the centerline at about 266+80, and then rises again slightly east of this drainage way. The proposed finished grade will require embankment fills with a maximum height of about 10 feet between Stations 266+00 and 267+00.

5.3.2 The only exploration in this area was one back-hoe test pit (TP-672) located 4 feet right of Station 266+00. This test pit found 1 foot of sod or topsoil at the surface underlain by mottled gray brown clay silt, represented by sample A-7, to a depth of 9 feet where the test pit was terminated. Similar soils were found in a test pit at Station 271+00. The clay silt is firm and should provide adequate support for the proposed embankment. No soft soil of any significance was noted in the drainage way at Station 266+80.

5.4 Station 270+00 to Station 279+00

5.4.1 The proposed alignment between these stations continues on a tangent through open field to Station 271+50 and then woods. The ground surface slopes upward slightly from Station 270+00 to Station 275+50 and then is relatively level. The proposed finish grade is above existing grade, but shallow cuts will be required both for subgrade and for ditches. On the westbound lane, maximum cuts of $1\frac{1}{2}$ feet will be required for subgrade and 3 feet for ditches. On the eastbound lane, maximum cuts of 2 feet to subgrade and $3\frac{1}{2}$ feet for ditching are proposed.

5.4.2 Explorations within these stations consisted of two test pits, TP-673 at Station 271+00 and TP-711 at Station 276+00. Both test pits found mottled gray brown clay silt to a depth of 8 to 9 feet. Samples A-8 and BW-10, Classified A-6, Class III and Class IV, were collected from these test pits and are representative of this clay silt soil. At Station 271+00 the gray brown mottled clay silt soil will make up most of the excavation for this section and will also form the subgrade.

5.5 Station 279+00 to Station 300+50

5.5.1 The proposed finished grade will require embankment fills throughout this section with a maximum height of about 16 feet in the vicinity of Station 298+00 eastbound lane. The alignment continues on a tangent to Station 287+05.21 and then begins a long gradual curve to the left for the remainder of the section. The area is generally wooded or old grown up fields. The centerline crosses a transmission line between Stations 291+00 and 293+00 and intermittent or seasonal drainage ways are noted at Station 285+00 and 299+85. The terrain is generally quite flat and poorly drained.

5.5.2 Explorations between these stations consisted of one test pit, TP-712, at Station 281+00 and a number of hand

auger borings. All of these explorations found firm gray brown mottled clay silt soils to depths of 8+ feet. Samples AK-3, AK-4 and AK-5, classified A-4 and A-6, Class IV are representative of this material. The clay silt soils are firm and should provide adequate support for the proposed embankments. At some locations where slight depressions in the terrain have allowed water to collect and form wet areas, the top 6 inches to 1 foot of the clay has become soft. Other than this, no soft soils were noted along the alignment.

Green Point Road Centerline

5.6 Station 20+00 to Station 21+00

5.6.1 Beginning at Station 20+00 near the Maine Central Railroad tracks, the centerline extends northerly closely aligned with the center of the existing roadway. Shallow cuts and fills are proposed for this first 100+ foot section as the new grade matches into the existing roadway. A maximum cut of 2½ feet will be required while fills of 1 to 1½ feet are necessary to widen the roadway beyond the existing shallow fill.

5.6.2 Excavation for this section will consist essentially of the existing pavement and base. Subgrade will be the native clay silt soils or a thin layer of the existing base overlying clay silt.

5.7 Station 21+00 to Station 27+25

5.7.1 From Station 21+00 the proposed grade rises steeply to form the south approach of the proposed structure over the I-395 roadway. A maximum fill height of about 25 feet is proposed.

5.7.2 Explorations between these stations consisted of hand rod soundings and auger borings and two washborings (GP-24-82, GP-25-82) which were made at the approximate location of the south abutment of the proposed bridge. Details of these borings are shown on Sheet 24 and a profile and cross sections showing the underlying soils stratification on Sheet 25. These sheets were prepared for the soils report for the proposed structure which will be forwarded at a later date.

5.7.3 The washborings found 3 feet of brown gravel (existing roadway fill) underlain by 8 to 9 feet of stiff brown mottled silty clay. Below this on the right, boring GP-25-82 encountered 5 feet of medium consistency gray silty clay and 8 feet of medium density gray pebbly silty fine sand overlying

bedrock. On the left, below the stiff clay, boring GP-24-82 found dense brown silty pebbly sand and medium density gray pebbly silty fine sand overlying ledge. Hand explorations at other locations within this section also found the underlying soils to consist of clay silts or silty clay which are generally firm except for the top 1 to 2 feet which is softer due to seasonal flooding over much of the area adjacent to both sides of the road. These clay silt soils should adequately support the proposed fills although some settlement is anticipated where the gray clay layer underlies the fill. (See Section on Embankment Foundation).

5.7.4 At the right between Stations 25+50 and 26+25 is a small marshy area. Borings and soundings at this location found up to 5 feet of soft brown organic silt at the surface underlain by gray clay.

5.8 Station 27+25 to Station 29+30

5.8.1 A two span bridge is proposed between these stations to carry the Green Point Road over the I-395 roadway. A separate soils report for this structure will be forwarded at a later date.

5.9 Station 29+30 to Station 35+00

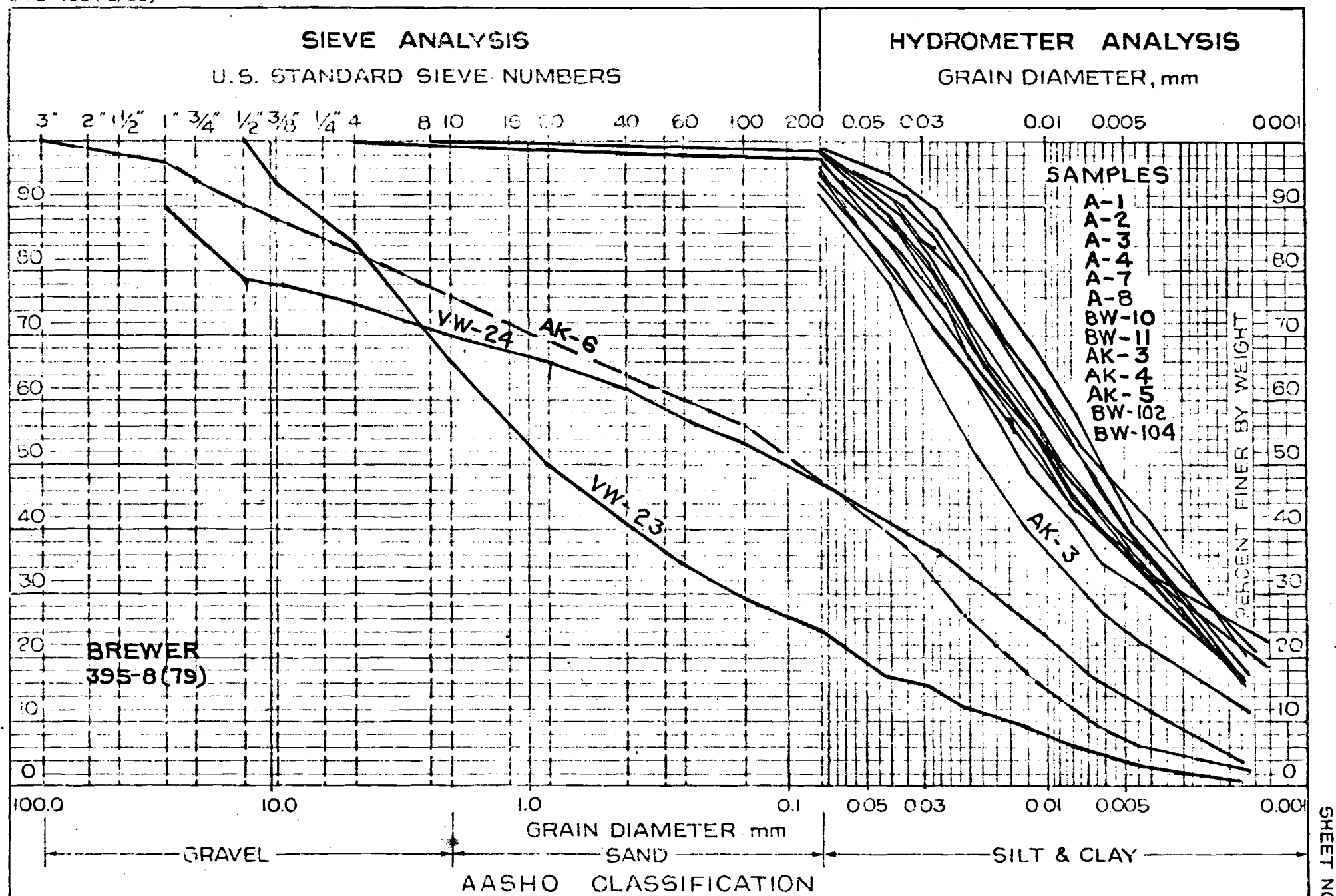
5.9.1 Embankment fills are proposed between these stations for the north approach to the I-395 overpass. The proposed fill will reach a maximum height of 26 feet between Stations 29+30 and 30+00. Beyond Station 30+00 the fill height diminishes rapidly as the ground rises over a small knoll and the proposed new grade descends.

5.9.2 Two washborings, GP-21-82 and GP22-82, made at the location of the north abutment of the proposed bridge, indicate the underlying soil stratification in the vicinity of Station 29+30 consists of 2 to 4 feet of brown gravel fill of the existing roadway, 12 to 13 feet of stiff gray brown mottled silty clay, 6 to 7 feet of medium consistency gray silty clay, and 4 to 5 feet of gray silty pebbly till overlying ledge (See Sheet 24). Ahead of Station 31+00, the ground surface slopes upward over a small knoll composed of dense glacial till described as gray brown stony sandy clay silt. The stiff clay and glacial till soils should provide adequate support for the proposed fills.

5.10 Station 35+00 to Station 39+50

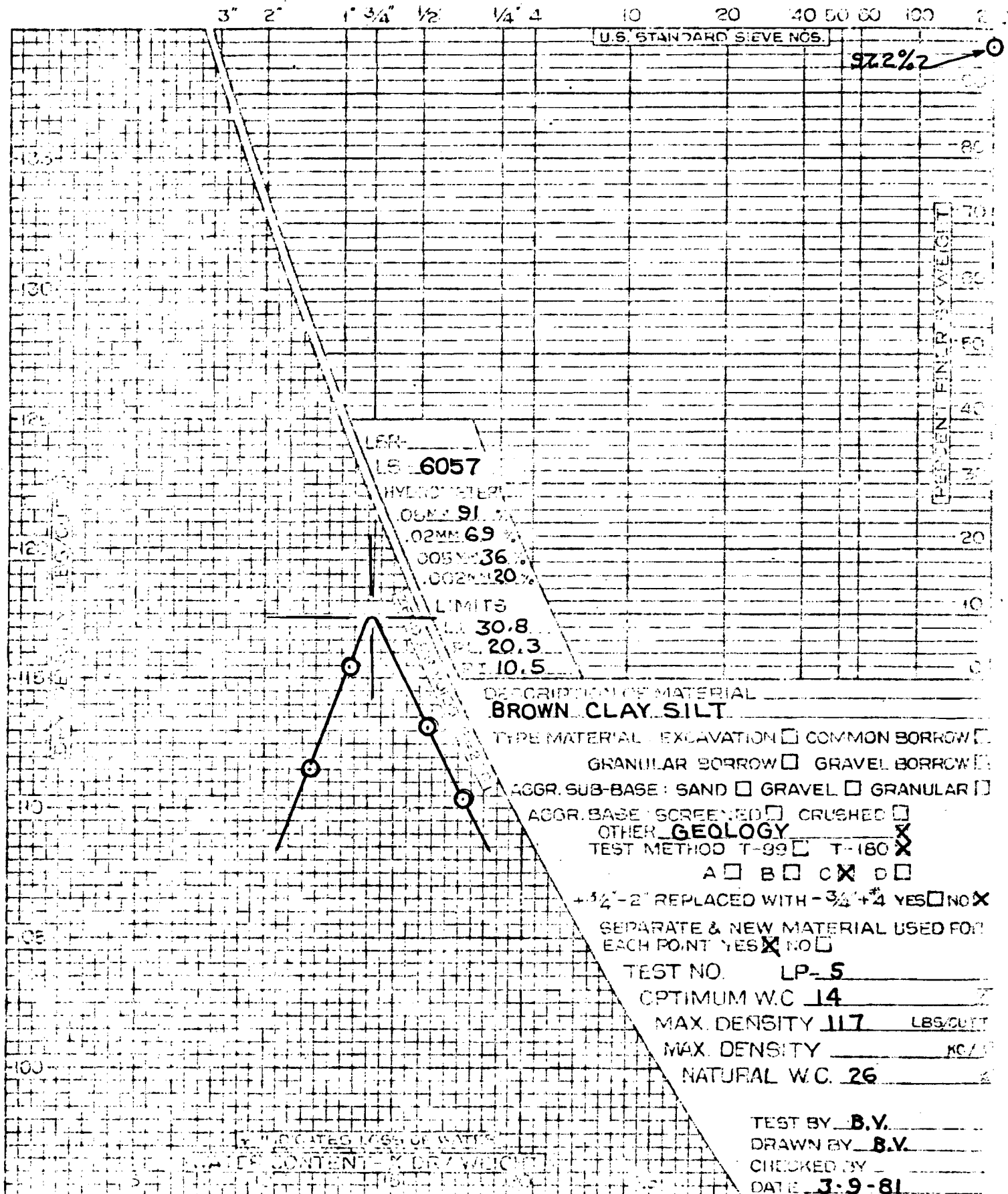
5.10.1 Between these stations the proposed grade passes through a low knoll matching into the existing roadway at Station 39+50. Maximum cuts of 6 feet to subgrade at centerline and 9 feet for the left ditch line will be required at Station 37+00. The design calls for a box section along the right from Station 34+75 to Station 38+00, and along the left from Station 38+25 to the end of the project.

5.10.2 Initial rod soundings and two test pits in this cut encountered a layer of rock, which appeared to be rotten ledge, at a depth of 4 to 5 feet. Subsequent power auger borings penetrated to a depth of 9.5 feet, well below the limits of excavation at most locations, without encountering ledge. No ledge excavation is therefore anticipated in this cut. The test pits show the soils to consist of dense glacial till, brown mottled stony sandy clay silt, similar to samples AK-6 and VW-24 both classified A-4, III. This glacial till soil along with the existing roadway pavement and base, should make up most of the excavation for this cut. The till soils, which are highly frost susceptible, will also comprise the subgrade for this section.



STATE OF MAINE
DEPARTMENT OF TRANSPORTATIONBUREAU OF HIGHWAYS
MATERIALS & RESEARCH DIVISION

MOISTURE DENSITY RELATIONSHIP

PROJ. NO. 395-8 (79) SAMPLE NO. A-1 SAMPLE FROM: PIT ☐ CUT ☐ ROADWAY ☐
TOWN BANGOR-BREWER DATE SAMPLED _____ PIT NAME OR STATION 250+00-10' LT.

STATE OF MAINE
DEPARTMENT OF TRANSPORTATIONBUREAU OF HIGHWAYS
MATERIALS & RESEARCH DIVISION

MOISTURE DENSITY RELATIONSHIP

 PROJ. NO. 395-8 (79) SAMPLE NO. A-3 SAMPLE FROM: ☐ PIT ☐ CUT ☐ ROADWAY ☐
 TOWN BANGOR-BREWER DATE SAMPLED _____ PILE NAME OR STATION 240+00 7LT

3" 2" 1 3/4" 1 1/2" 1 1/4" 1" 3/4" 3/4" 1/2" 1/4" 1/8" 1/16" 1/32" 1/64" 1/128" 1/256" 1/512" 1/1024" 1/2048" 1/4096" 1/8192" 1/16384" 1/32768" 1/65536" 1/131072" 1/262144" 1/524288" 1/1048576" 1/2097152" 1/4194304" 1/8388608" 1/16777216" 1/33554432" 1/67108864" 1/134217728" 1/268435456" 1/536870912" 1/1073741824" 1/2147483648" 1/4294967296" 1/8589934592" 1/17179869184" 1/34359738368" 1/68719476736" 1/137438953472" 1/274877906944" 1/549755813888" 1/1099511627776" 1/2199023255552" 1/4398046511104" 1/8796093022208" 1/17592186044416" 1/35184372088832" 1/70368744177664" 1/140737488355328" 1/281474976710656" 1/562949953421312" 1/1125899906842624" 1/2251799813685248" 1/4503599627370496" 1/9007199254740992" 1/18014398509481984" 1/36028797018963968" 1/72057594037927936" 1/144115188075855872" 1/288230376151711744" 1/576460752303423488" 1/1152921504606846976" 1/2305843009213693952" 1/4611686018427387904" 1/9223372036854775808" 1/18446744073709551616" 1/36893488147419103232" 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STATE OF MAINE
DEPARTMENT OF TRANSPORTATIONBUREAU OF HIGHWAYS
MATERIALS & RESEARCH DIVISION

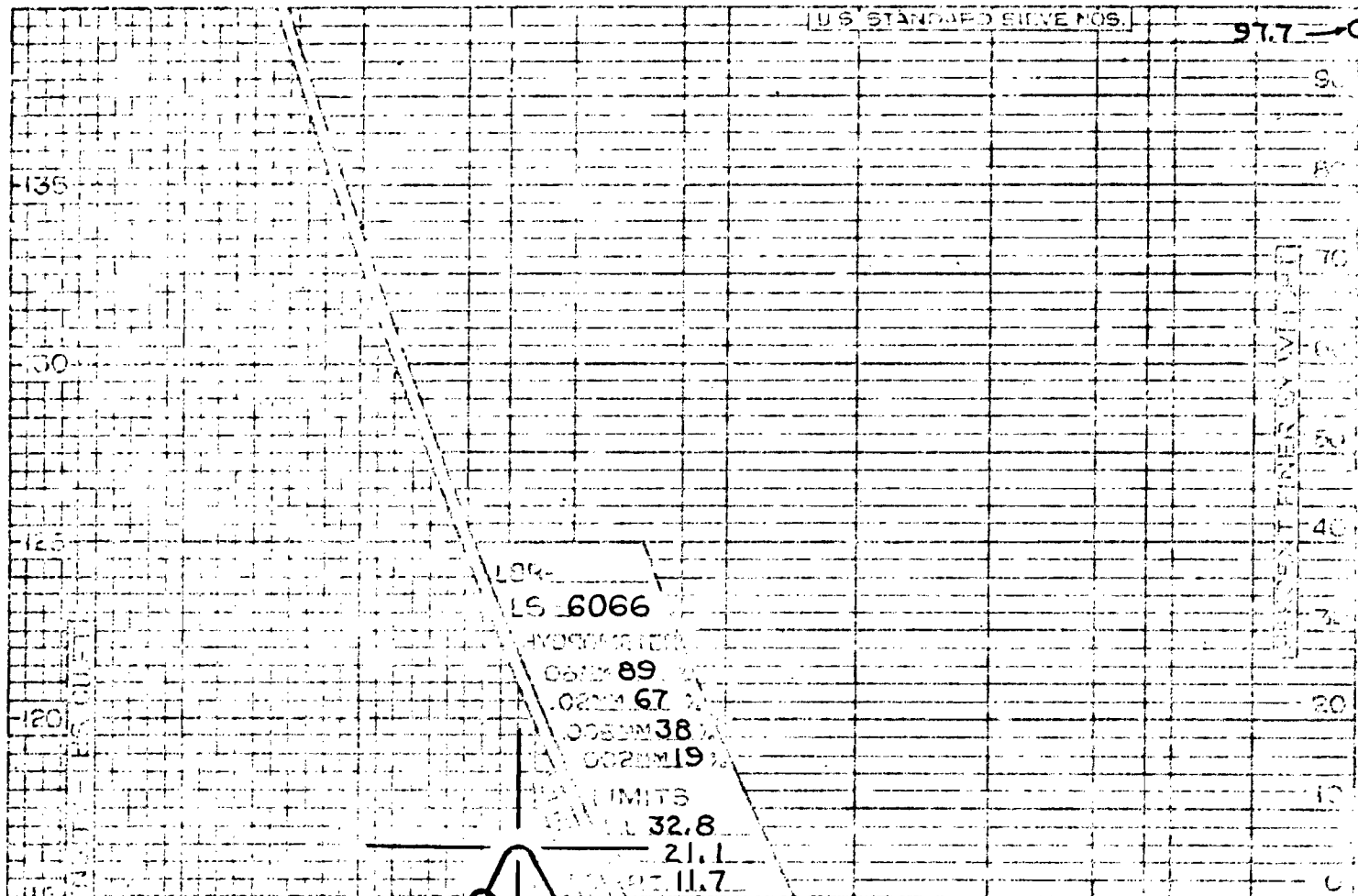
MOISTURE DENSITY RELATIONSHIP

PROJ. NO. 395-8 (79) SAMPLE NO. A-7 SAMPLE FROM ☐ PIT ☐ CUT ☐ ROADWAY ☐
TOWN BANGOR-BREWER DATE SAMPLED _____ PIT NAME OR STATION 271+00-4' RT.

3" 2" 1 3/4" 1 1/2" 1 1/4" 1" 3/4" 3/4" 1/2" 1/4" 0 20 40 50 60 100 200

U.S. STANDARD SIEVE NOS.

97.7-0



DESCRIPTION OF MATERIAL

CLAY SILT










TYPE MATERIAL: EXCAVATION ☐ COMMON BORROW ☐GRANULAR BORROW ☐ GRAVEL BORROW ☐AGGR. SUB-BASE: SAND ☐ GRAVEL ☐ GRANULAR ☐AGGR. BASE: SCREENED ☐ CRUSHED ☐OTHER GEOLOGY ☒TEST METHOD T-99 ☐ T-180 ☒A ☐ B ☐ C ☒ D ☐1/4"-2" REPLACED WITH - 3/4"+4 YES ☐ NO ☒SEPARATE & NEW MATERIAL USED FOR EACH POINT YES ☒ NO ☐TEST NO. LP-8OPTIMUM W.C. 15MAX DENSITY 116 LBS/CU FTMAX. DENSITY 1864.5 PCFNATURAL W.C. 22.1TEST BY B.V.DRAWN BY B.V.

CHECKED BY _____








DATE 3/2/82

LEGEND

PLAN SYMBOLS

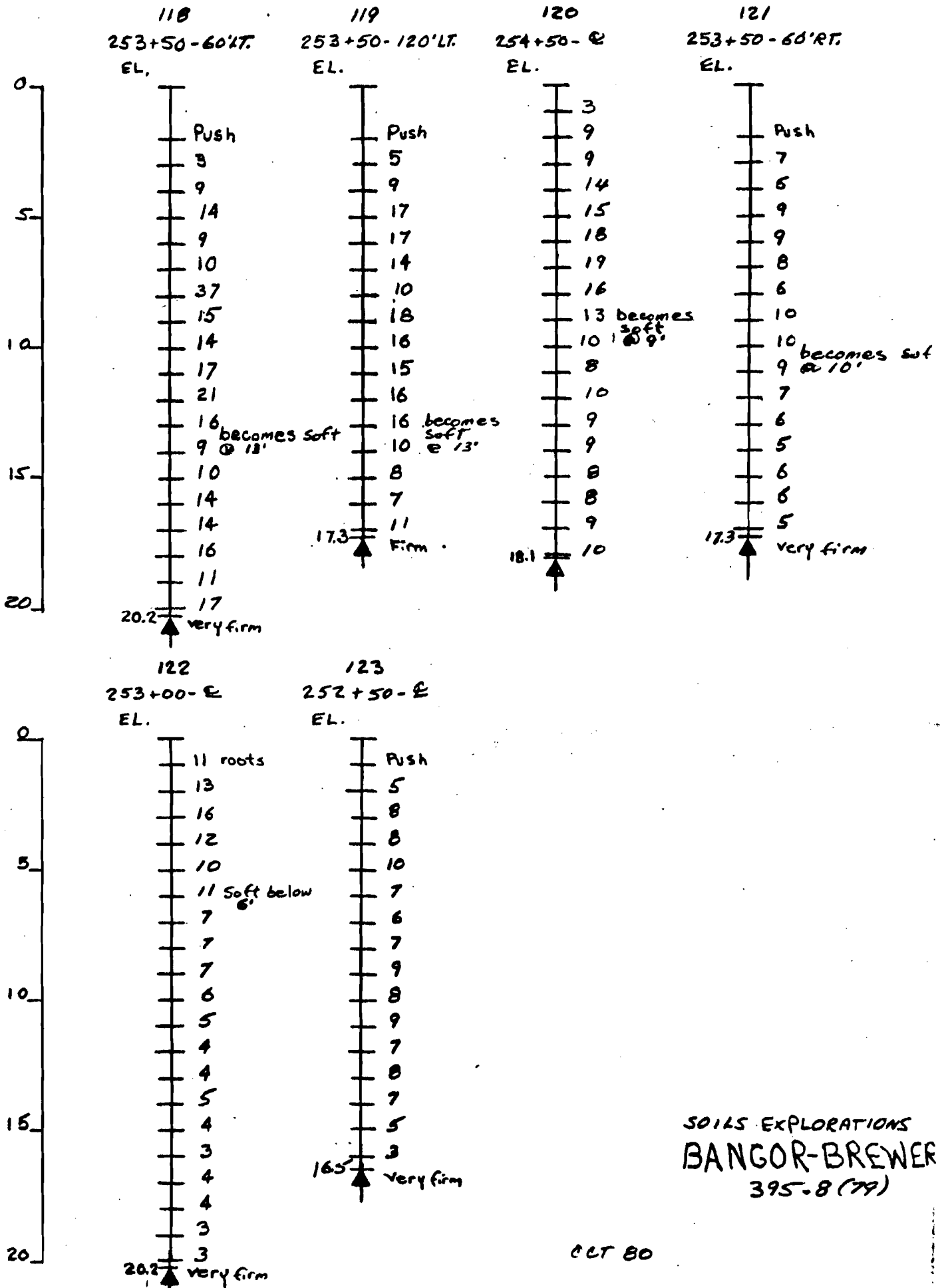
-  _____ ROD SOUNDING
 _____ AUGER BORING
 _____ BORING & SOUNDING
 _____ POWER AUGER
 _____ WASH BORING
 _____ SEISMIC: SHOT LOCATION
 _____ RESISTIVITY: TEST LOCATION
 _____ TEST PIT
 _____ LEDGE ON SURFACE

EXPLORATION NOTES

-  _____ WATER LEVEL
 _____ BLOWS PER FOOT - ROD SOUNDINGS
 _____ MATERIAL & SAMPLE NO. - AUGER BORING
 _____ DEPTH OF MATERIAL CHANGE (IN FEET)
 _____ BOTTOM OF EXPLORATION
 _____ REFUSAL
 _____ LEDGE

SHEET NO. 6
EXPLORATIONS 118-123
SOUNDINGS

DEPTH (FEET)

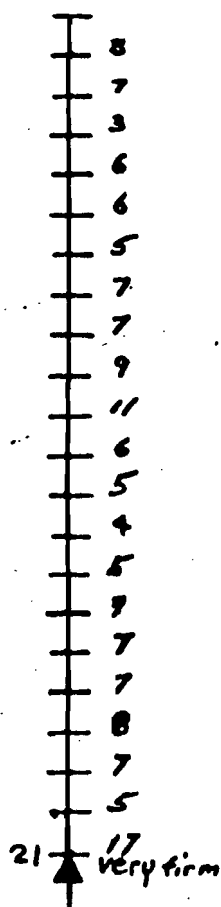


SOILS EXPLORATIONS
BANGOR-BREWER
395-8 (79)

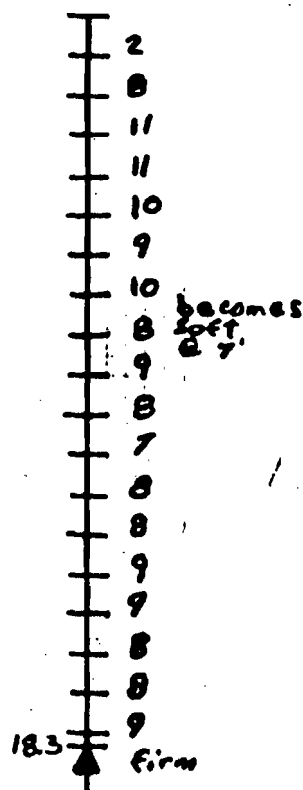
OCT 80

DEPTH (FEET)

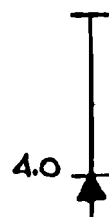
124
251+50-0
EL.



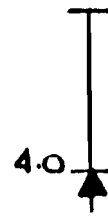
125
253+50-120 RT.
EL.



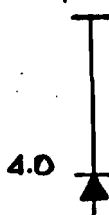
632
39+50 10' LT
EL 140.8



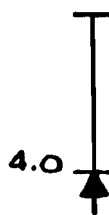
633
39+50 10' RT
EL 141.0



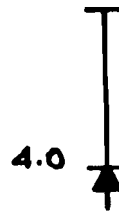
634
39+00 20' LT
EL 145.5



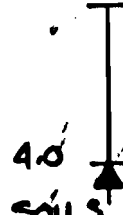
635
39+00 15' RT
EL 143.4



636
39+00 30' RT
EL 139.7



637
39+00 10' LT
EL 143.9



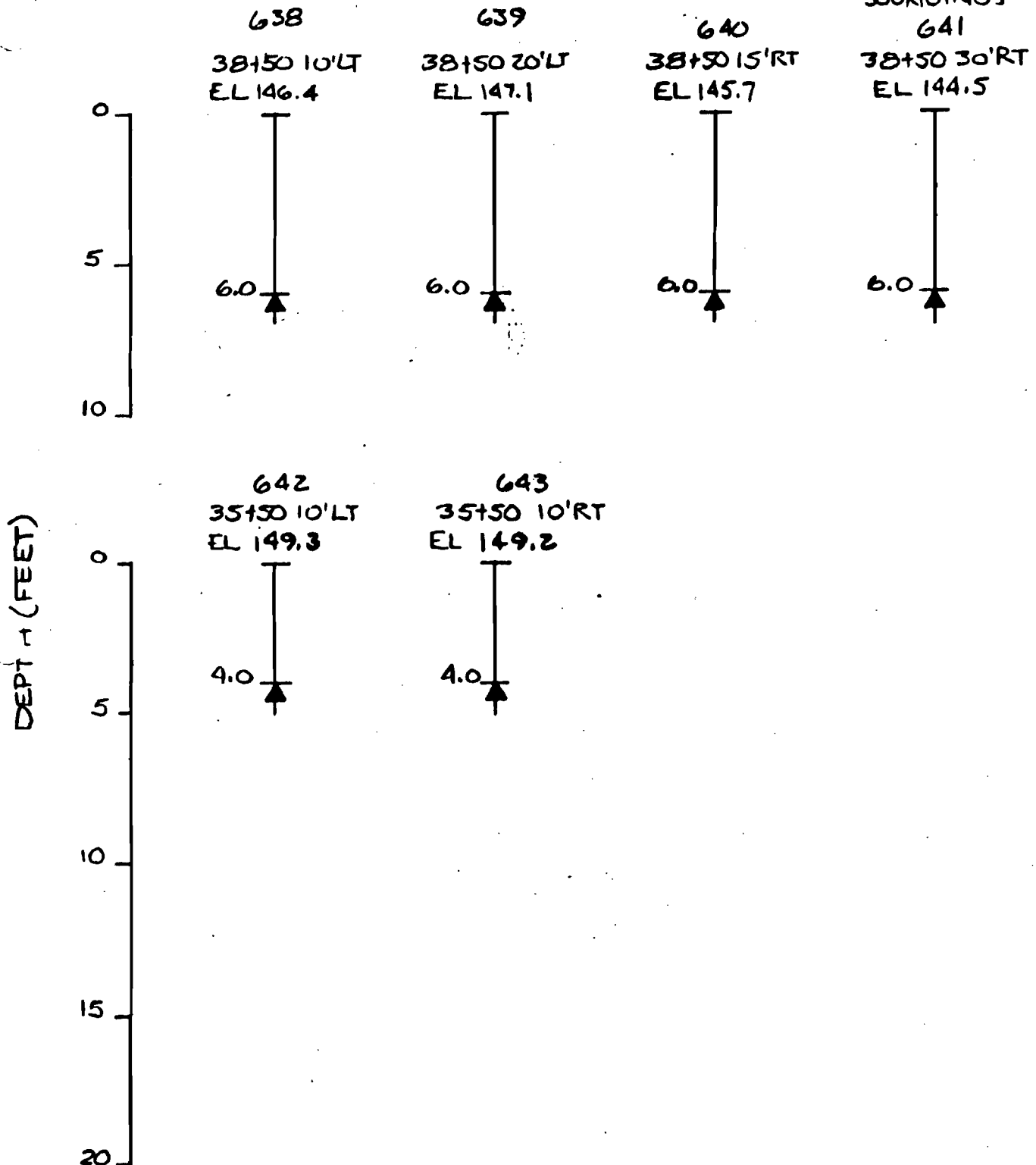
SOUNDINGS 632-637
TAKEN FROM GREEN
POINT RD.

BANGOR-BREWER

395-8(79)

OCT 80

EXPLORATIONS 638-643
SOUNDINGS



SOILS EXPLORATIONS

BANGOR-BREWER

395-B(79)

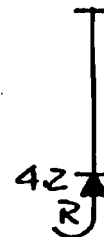
EXPLORATIONS 646-65

649

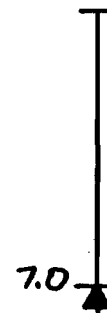
36+50 30'LT
EL 150.5



653
36+50 20'RT
EL 150.8



657
37+00 20'RT
EL 151.0

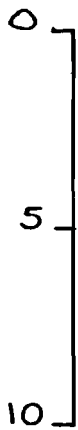


SOILS EXPLORATIONS

BANGOR-BREWER

395-B(79)

646
36+00 30'LT
EL 149.7



647
36+00 10'LT
EL 150.5



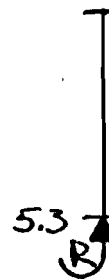
648
36+00 10'RT
EL 150.7



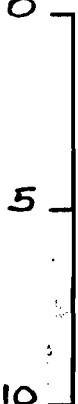
651
36+50 15'LT
EL 150.1



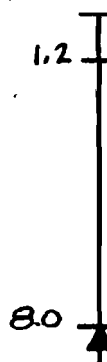
652
36+50 15'RT
EL 150.7



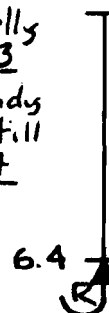
654
37+00 30'LT
EL 153.3



655
37+00 15'LT
EL 151.7



656
37+00 15'RT
EL 151.2

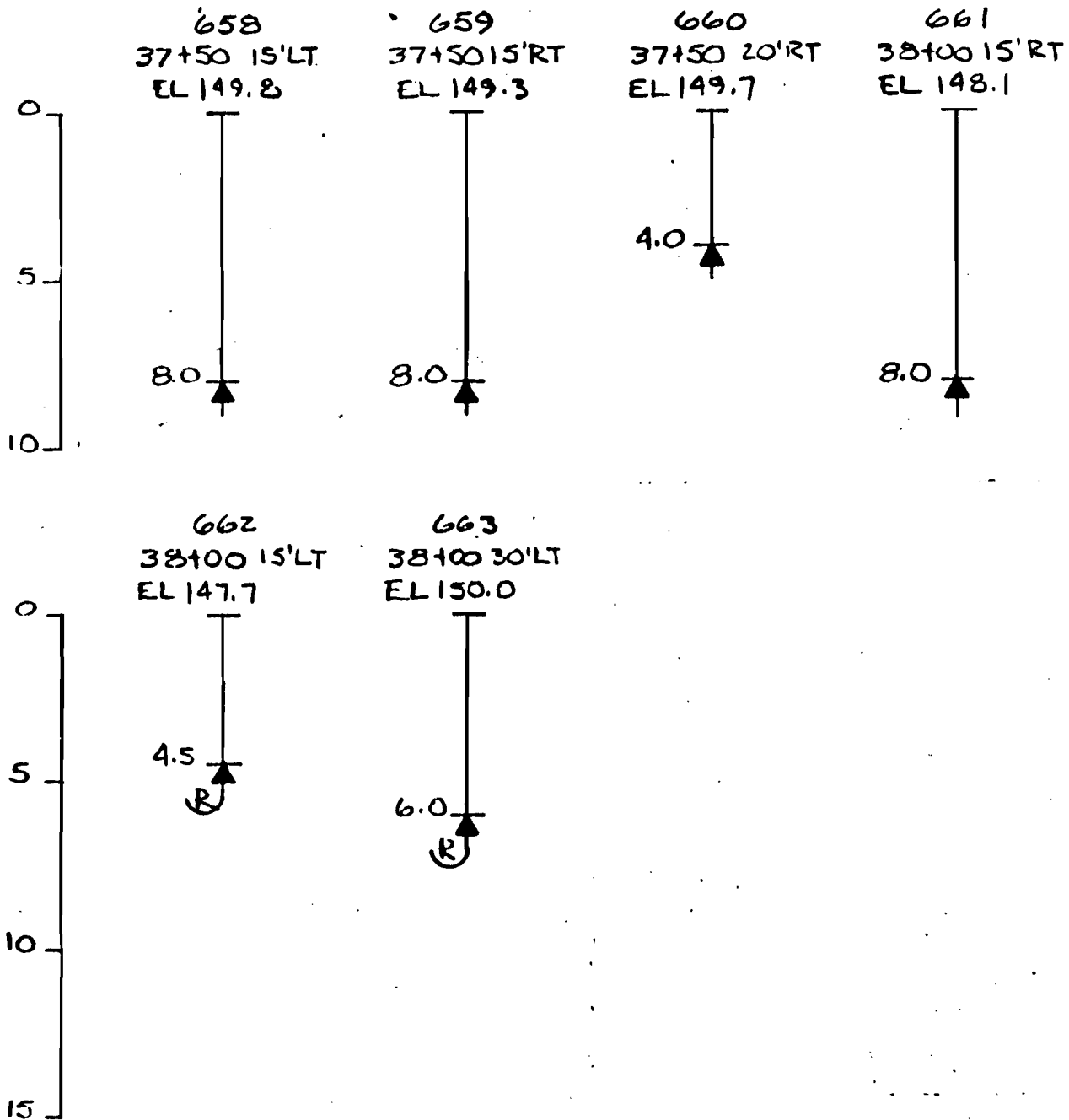


1.2
Silty gravelly
sand VW-23
Gravelly sandy
clay silt-till
VW-24

DE H (FEET)

FEB 82

EXPLORATIONS 658-663
SOUNDINGS



NOTE: SOUNDINGS 658 to 663 ARE MADE ALONG GREEN POINT ROAD

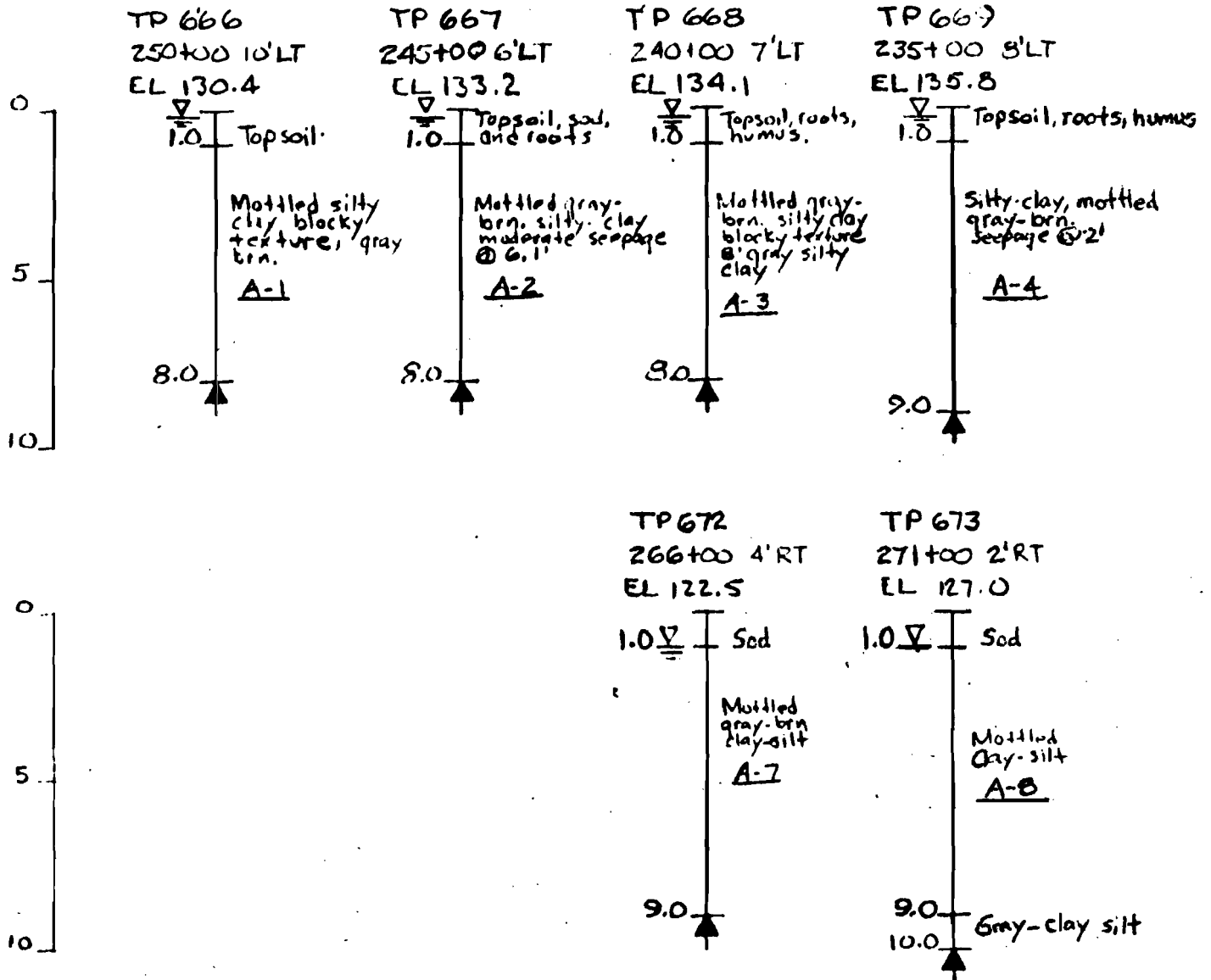
SOILS EXPLORATIONS

BANGOR-BREWER

395-8(79)

EXPLORATIONS 666-673

TEST PITS



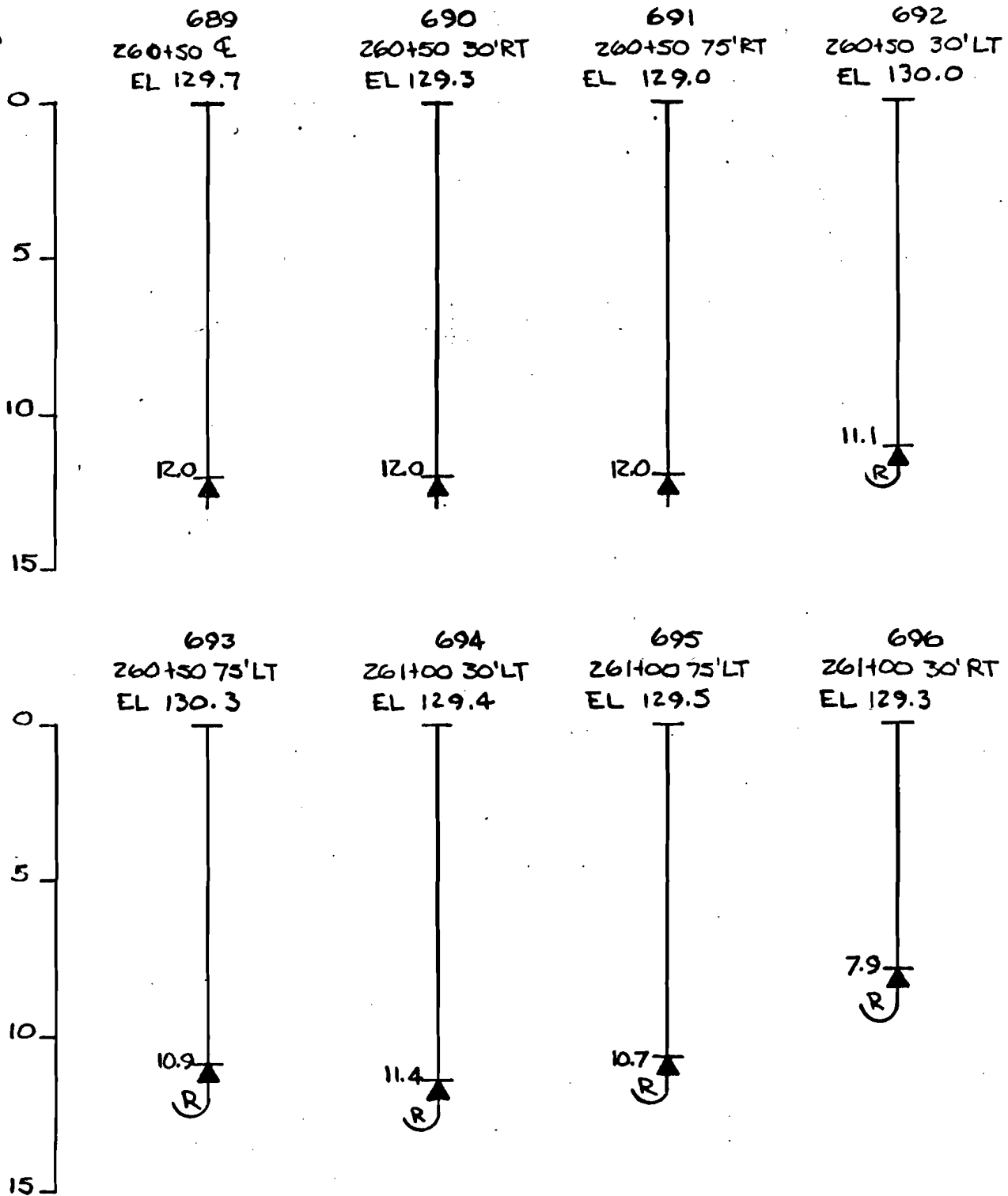
SOILS EXPLORATIONS

BANGOR-BREWER

395-8(79)

EXPLORATIONS 689-696
SOUNDINGS

DEPTH (FEET)



SOILS EXPLORATIONS

BANGOR-BREWER

395-8(79)

FEB 82

EXPLORATIONS 697-702
SOUNDINGS

697
261+00 75'RT
EL 128.8

698
264+50 E
EL 128.8

699
261+50 30'LT
EL 129.0

700
261+50 75'LT
EL 129.0

701
261+50 30'RT
EL 128.8

702
261+50 75'RT
EL 128.6

DEPTH (FEET)



10.7
(R)

12.0
(R)

11.6
(R)

11.9
(R)



8.1
(R)

8.4
(R)

SOILS EXPLORATIONS

BANGOR-BREWER

G.P.R.
TP774
36+50 20'LT
EL

TP775 G.P.R.
37+15 20'LT
EL

0
5
10

TP711
276+00 10'LT
EL 122.0

Brn. and gray
clay-silt

BW-10

8.0

TP712
281+00 10'LT
EL 129.0

Brn and gray
clay silt
w/ grnd. water

BW-11

8.0

0.4 Topsoil
Brown mottled stony
sandy clay-
silt
AK-6

4.0 Hard rock
layer, appears
to bottom
ledge

6.0

Dry brown
sandy-silt
w/ approx.
reddish ledge
at 4'

4.5

0
5
10

TP776
258+00 100'LT
EL

Brown & gray
mottled
clay-silt

3.0

Brown clay-
silt w/ lg.
rocks
(1'-2')

7.5

TP777
262+50 95'LT
EL

Brown & gray
mottled
clay-silt

7.2

TP778
261+00 10'LT
EL 129.3

Sod
Brown & gray
mottled
clay-silt

4.0 Rotten angular
ledge rock s.
+ rocks

6.0

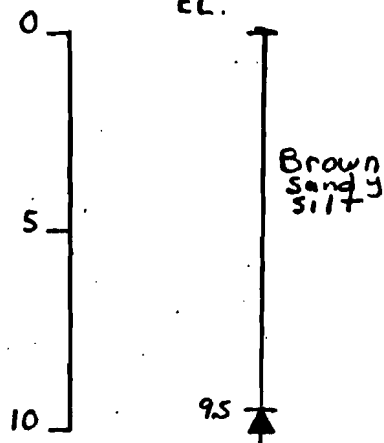
Sand + rocks
w/ water
seepage

9.0

TP779
258+00 E
EL

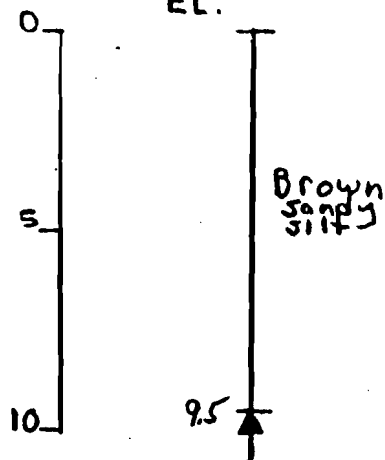
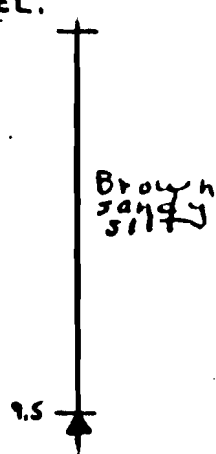
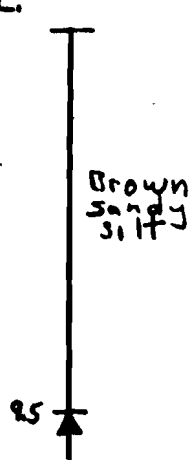
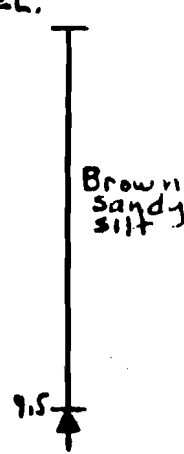
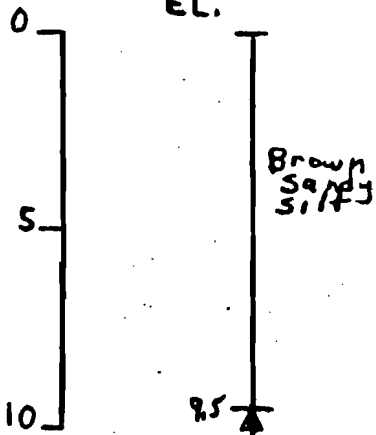
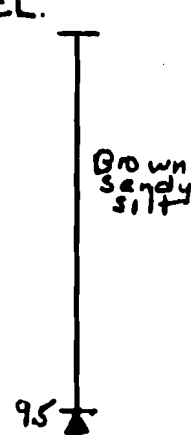
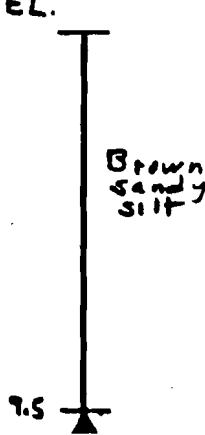
Brown & gray
mottled
clay-silt

6.0

EXPLORATIONS 788-794:807
POWER AUGERSGREEN POINT RD.
807 PA
35+00 12 RT.
EL.

GREEN POINT ROAD EXPL. 788-807

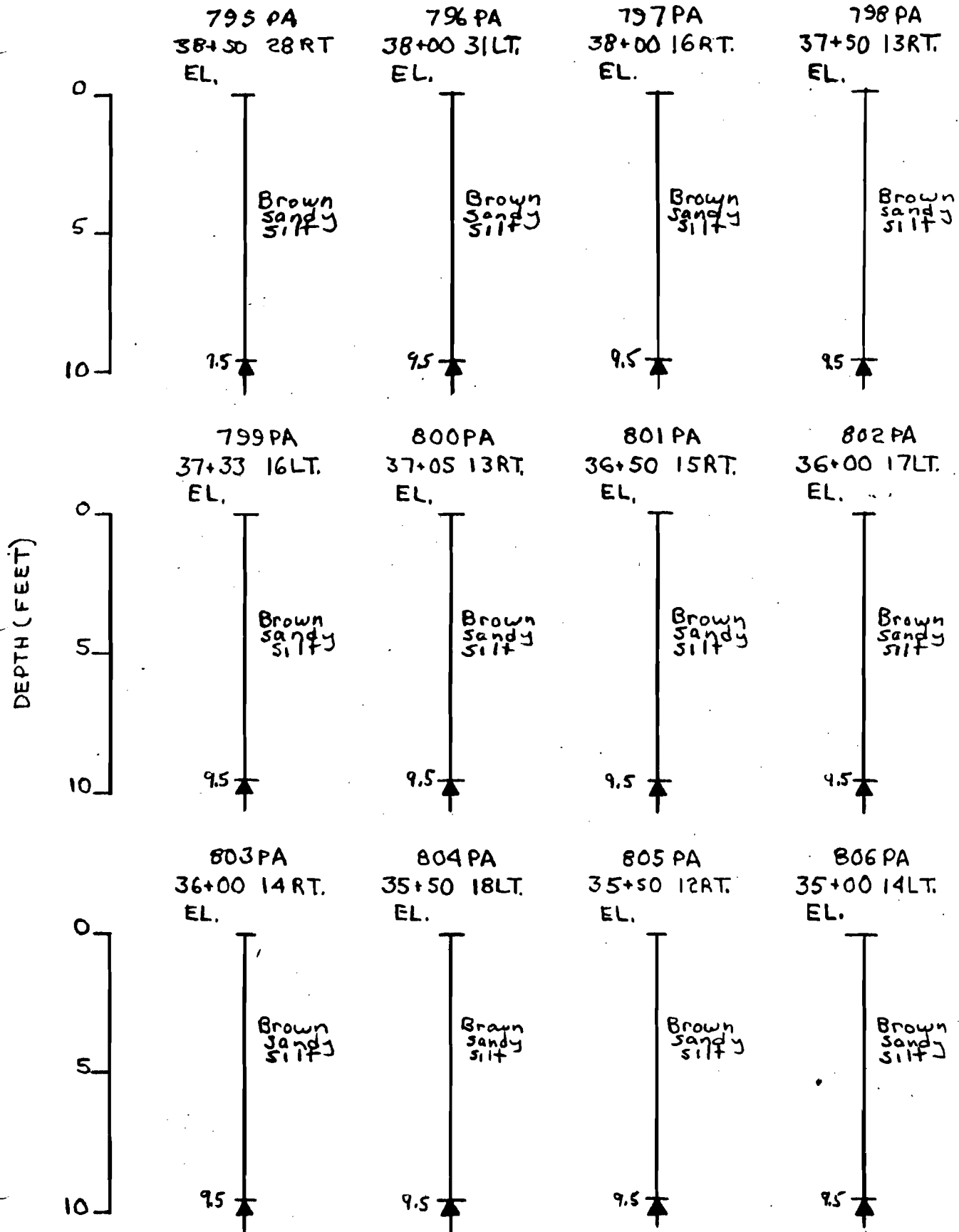
DEPTH (FEET)

788 PA
40+00 29 LT.
EL.789 PA
40+00 31 RT.
EL.790 PA
39+50 11 LT.
EL.791 PA
39+50 36 RT.
EL.792 PA
39+00 12 LT.
EL.793 PA
39+00 30 RT.
EL.794 PA
38+50 11 LT.
EL.SOILS EXPLORATIONS
BREWER
395-8 (79)

GREEN POINT ROAD

EXPLORATIONS 795-806

POWER AUGERS



SOILS EXPLORATIONS

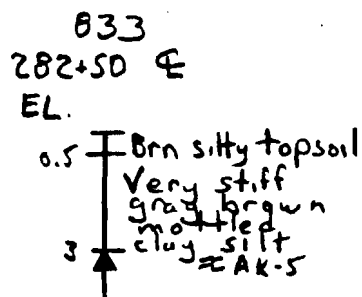
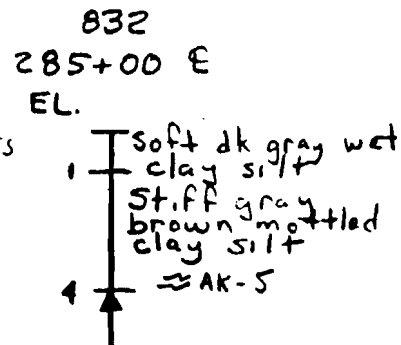
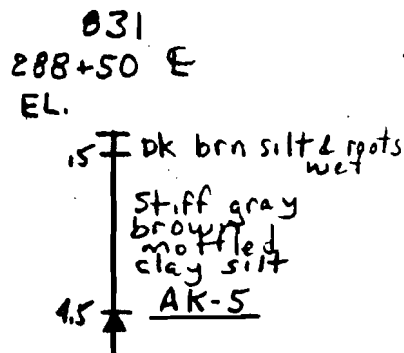
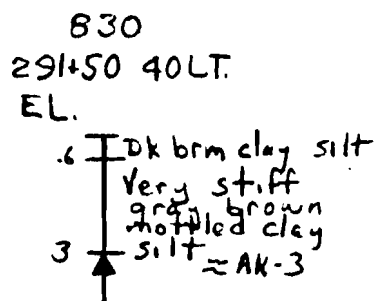
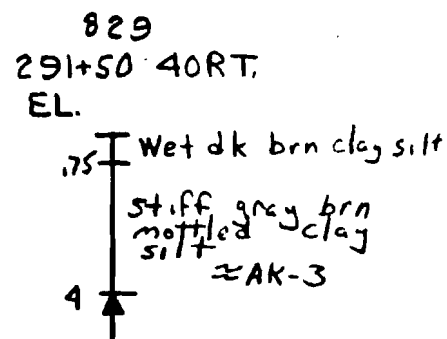
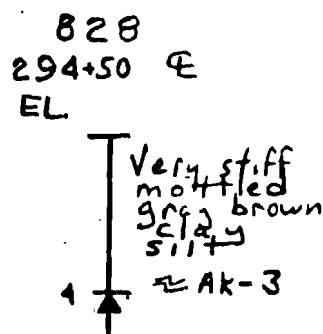
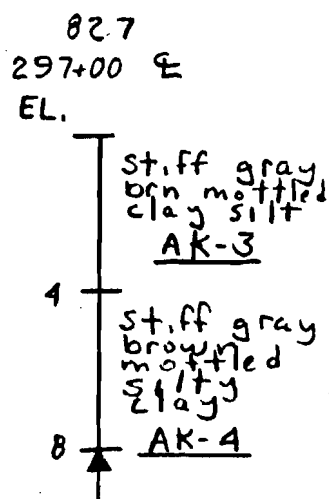
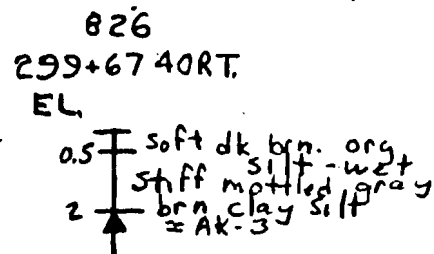
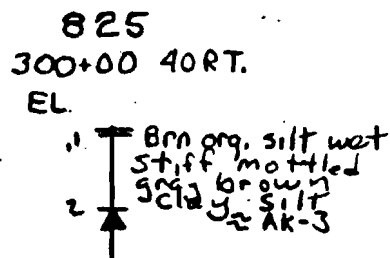
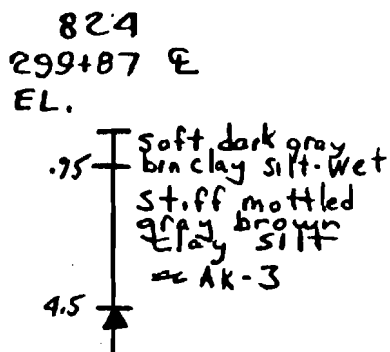
BREWER

395-8 (79)

JULY 1982

EXPLORATIONS 824-833
HAND AUGER BORINGS

DEPTH (FEET)

SOILS EXPLORATIONS
BREWER
395-B (79)

JULY 1982

G.P.R.B.L.

847

22+00 20' LT

EL 125.4

1' Brown silt and roots
1.5' Gray clay silt
Gray brown stiff clay silt

9'

G.P.R.B.L.

848

22+00 20' RT

EL 126.0

8.0'

G.P.R.B.L.

849

24+00 20' RT

EL 125.9

1
5
8
16
12
10
10
11
8.0'

G.P.R.B.L.

850

24+50 12' LT

EL 127.0

8.0'

G.P.R.B.L.

851

26+00 20' LT

EL 127.5

2
3
5
8
10
7
12
14
8.0'

G.P.R.B.L.

852

26+00 20' RT

EL 127.3

8
8
13
12
8
10
10
10
13
10
10
12
14
12'
12'

G.P.R.B.L.

853

31+00 20' RT

EL 133.6

20
16
40
46
38
90
146
78
8.0'

888

253+25 &

EL.

Push
2.2' Firm at 2'2"

DEPTH (FEET)

SOILS EXPLORATIONS

BREWER

395-3 (79)

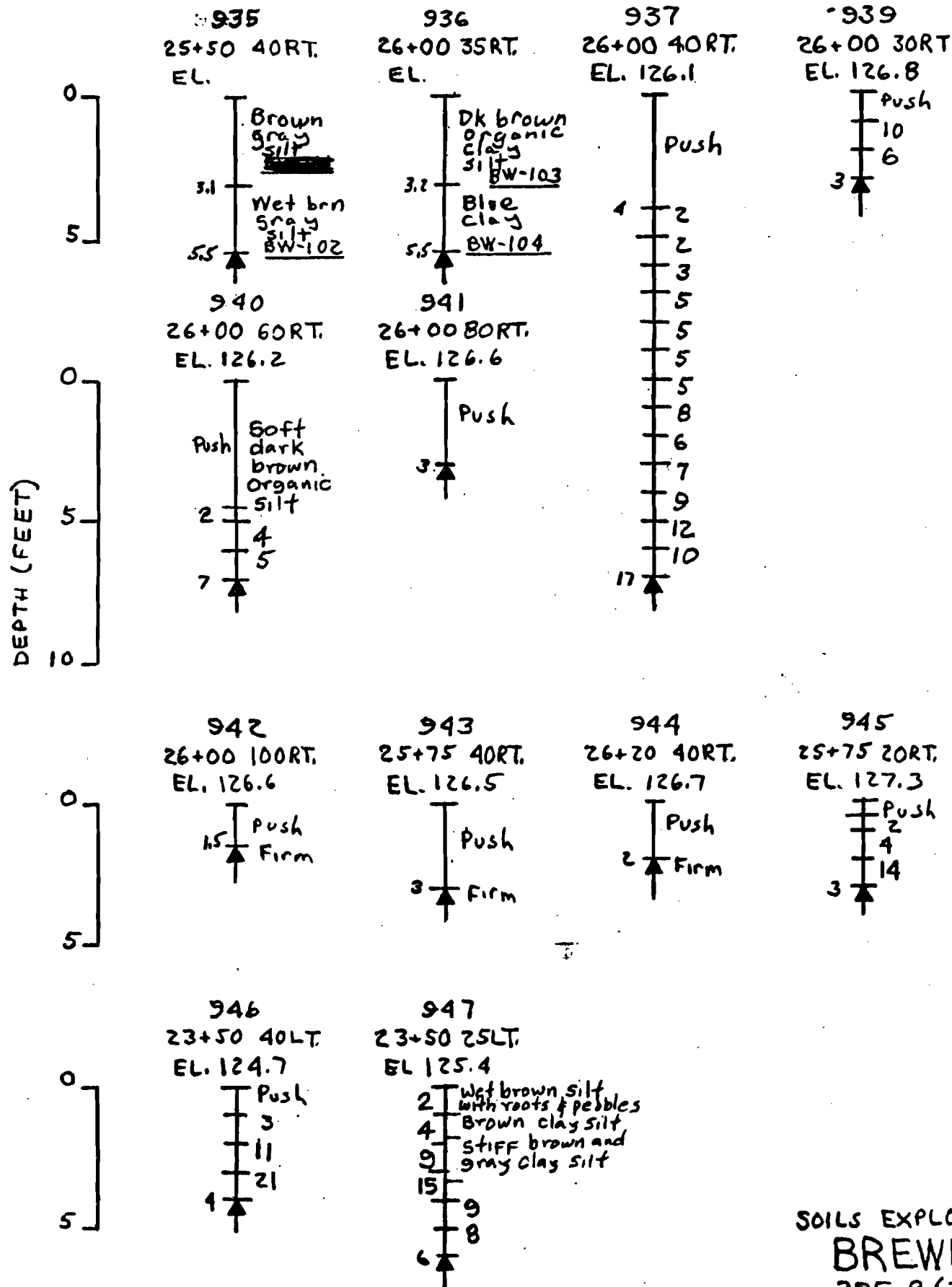
PSBL Parkway South Base Line

G.P.R.B.L. = Green Point Road Base Line

JULY 1982

GREENPOINT ROAD E

EXPLORATIONS 935-947
HAND AUGERS- SOUNDINGS



SOILS EXPLORATIONS
BREWER
395-8 (79)

EXPLORATIONS 948-951
HAND AUGER BORINGS

GREENPOINT ROAD

948
31+00 25 LT.
ELEV. 132.7

0.3 Topsoil
Stiff brown
to gray
brown
weathered
silty clay

5'

951
23+50 30 RT
EL. 125.6

0.7 wet brown organic silt
1.2 Gray clay silt with roots
stiff gray brown
clay silt

3.3

949
33+00 25 RT
EL. 140.4

0.7 Brown stony
sandy silty topsoil
olive brown
stony sandy
silt AK-G
stopped by
rocks

3.1

950
32+00 20 LT
EL. 136.2

0.3 Brown stony silt
1.0 orange brown stony
clayey silt
olive brown stony
2.5 sandy clay silt
stopped by rocks

2.5










DEPTH (FEET)

SOILS EXPLORATIONS

BREWER
395-8(79)

BORING NOTES

All samples and vanes are made ahead of casing

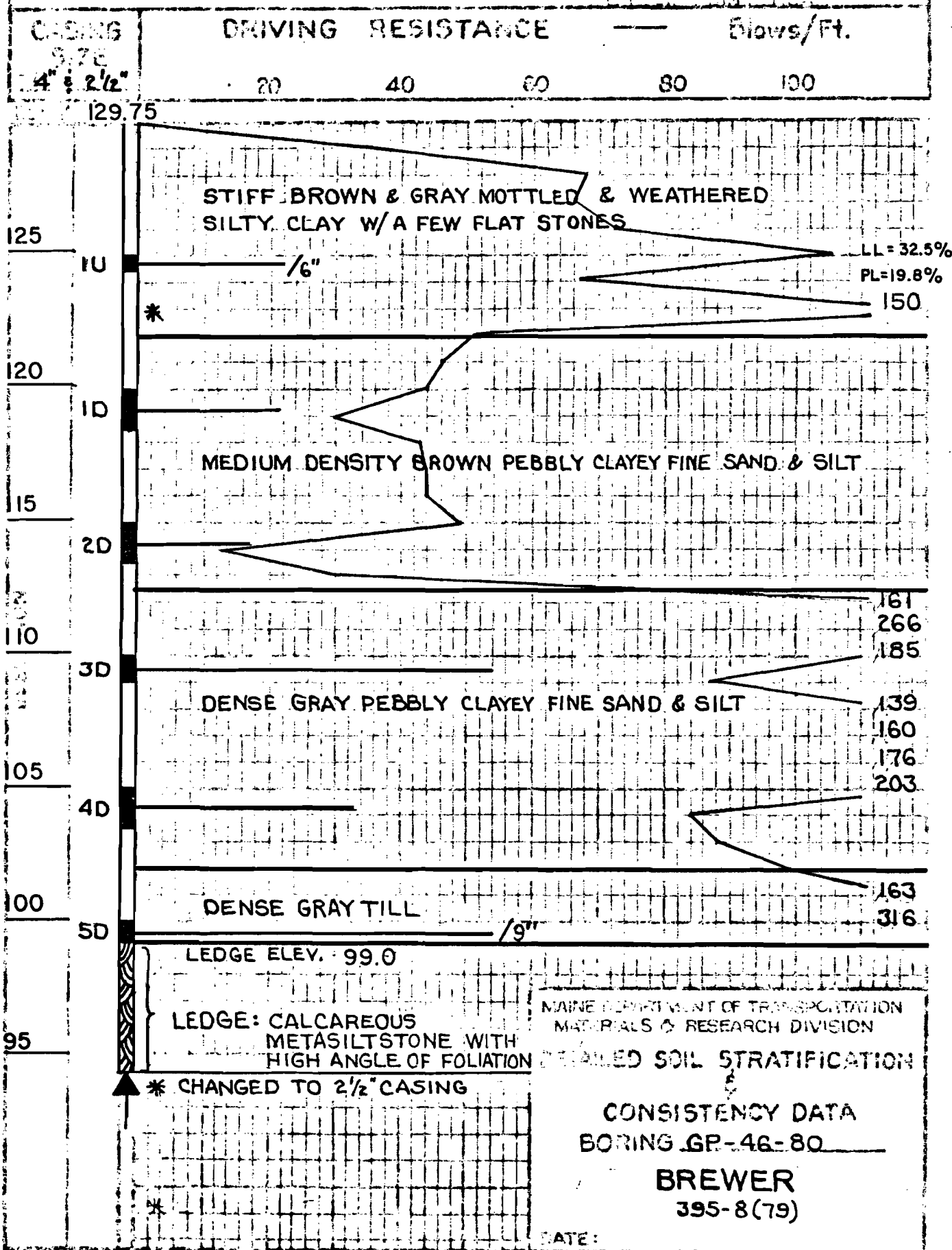
-  Water elevation
-  Number of blows required to drive extra heavy casing one foot with 400 ft. lbs. of energy per blow
-  Location of sample or sample attempt
-  Number and type of dry sample
- ID S & H Sampler #1290's
- IC 2" O.D. 16 ga. seamless tubing
- IU 3 1/2" O.D 16 ga. seamless tubing
- IW Wash sample and number
- MD Unsuccessful sample attempt and type of sampler
-  Number of blows required to drive spoon or tubing one foot with 350 ft lbs. of energy per blow
- H Sampling spoon or seamless tubing driven by static weight of drill rods and hammer
- P Piston sampler
-  Field vane test
-  Bottom of boring (may not be bottom of soil strata)
-  Refusal of drill rods or casing (may not be ledge)
-  Locations cored by diamond bit and per cent recovery of rock

SHEAR NOTES

- Field vane shear strengths
- X Laboratory vane shear strengths
- Shear strengths in excess of capacity of equipment
- One half unconfined compressive strengths

WATER CONTENT NOTES

- Natural water contents, given as per cent of dry weight
- X Plastic and liquid limits
- Ignition losses are given as per cent of dry weight

BORING GP-46-80 STATION 259+50 ϕ 

BORING GP-50-80

STATION 253+55 C

CASING
SIZE

4" & 2 1/2"

DRIVING RESISTANCE

Blows/Ft.

20

40

VANE SHEAR STRENGTH

Tons/Sq. Ft.

0.4

0.8

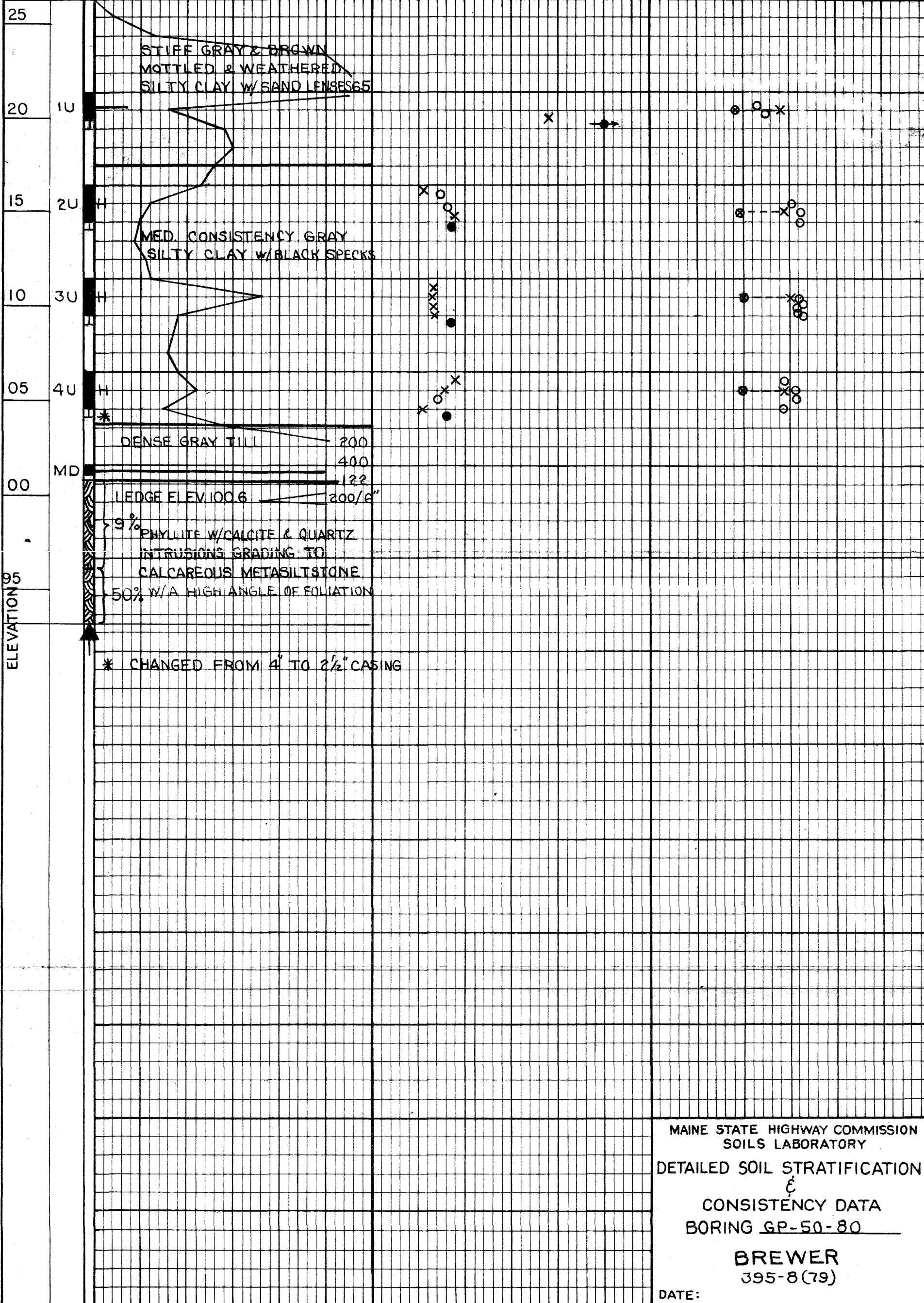
WATER CONTENT

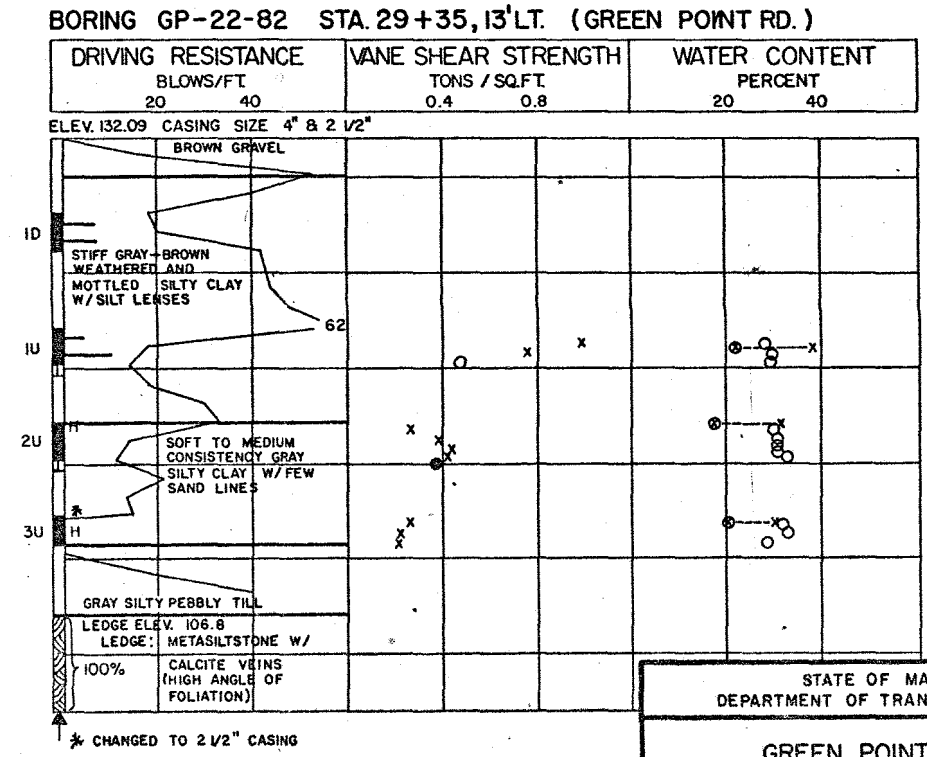
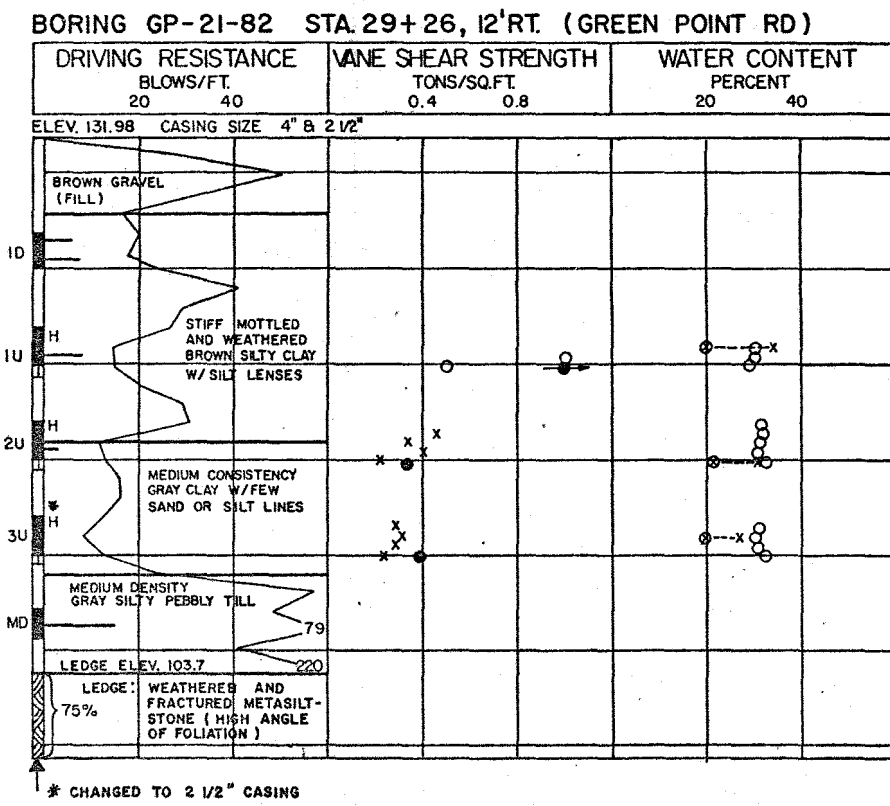
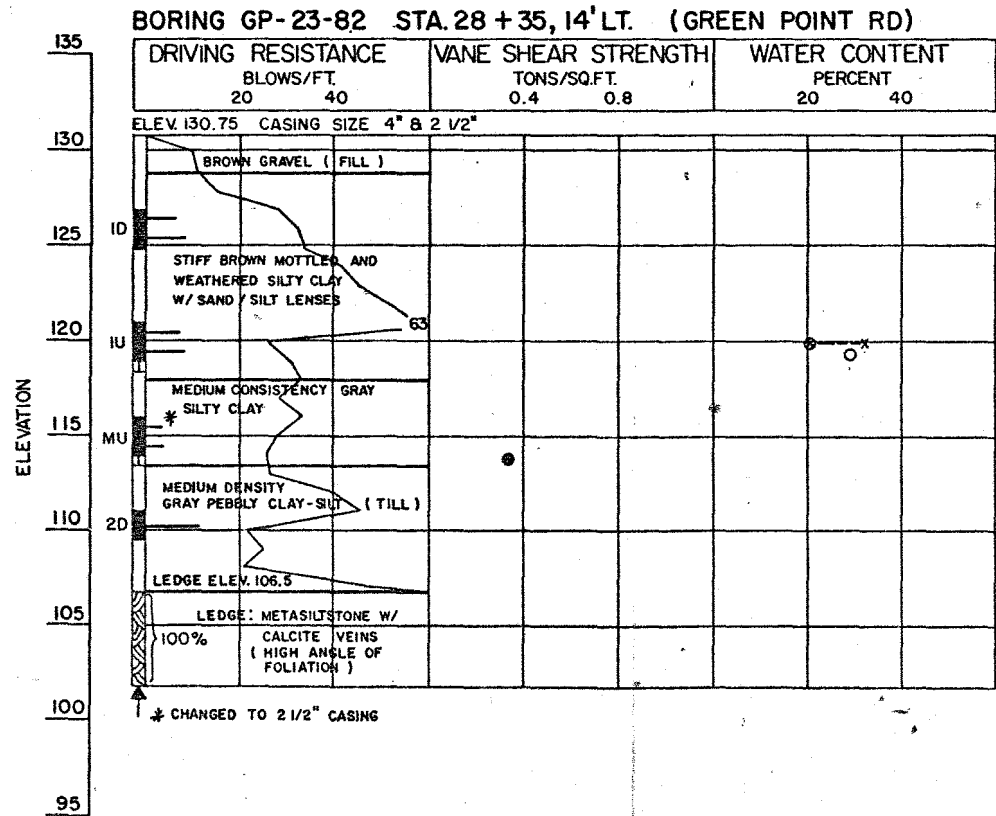
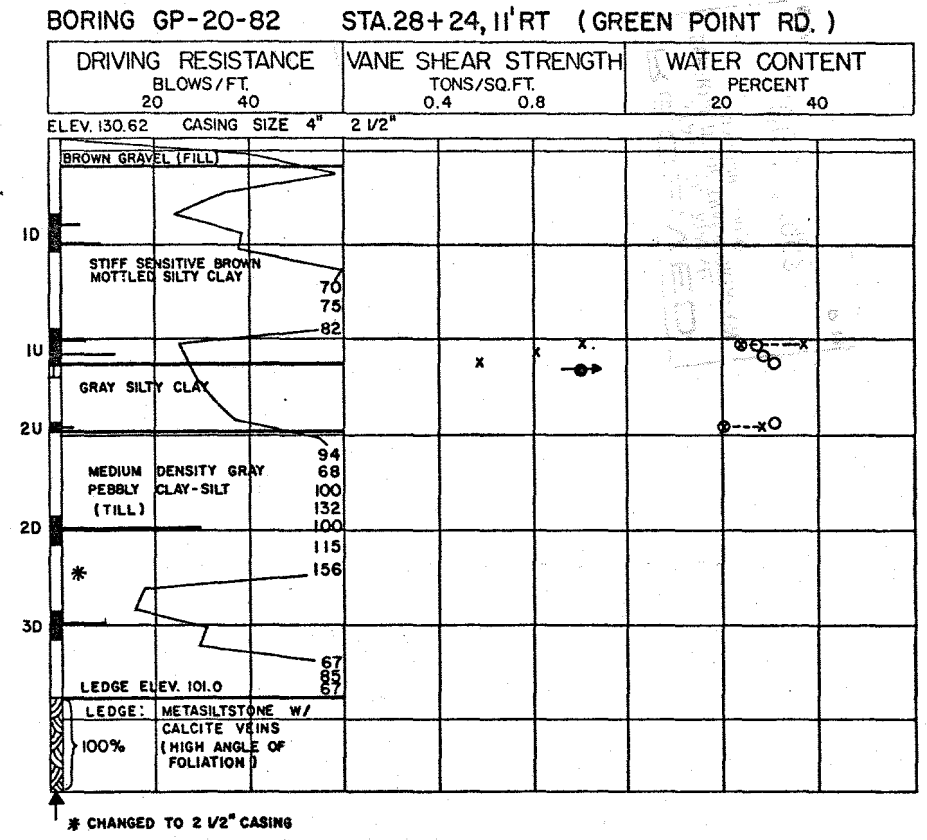
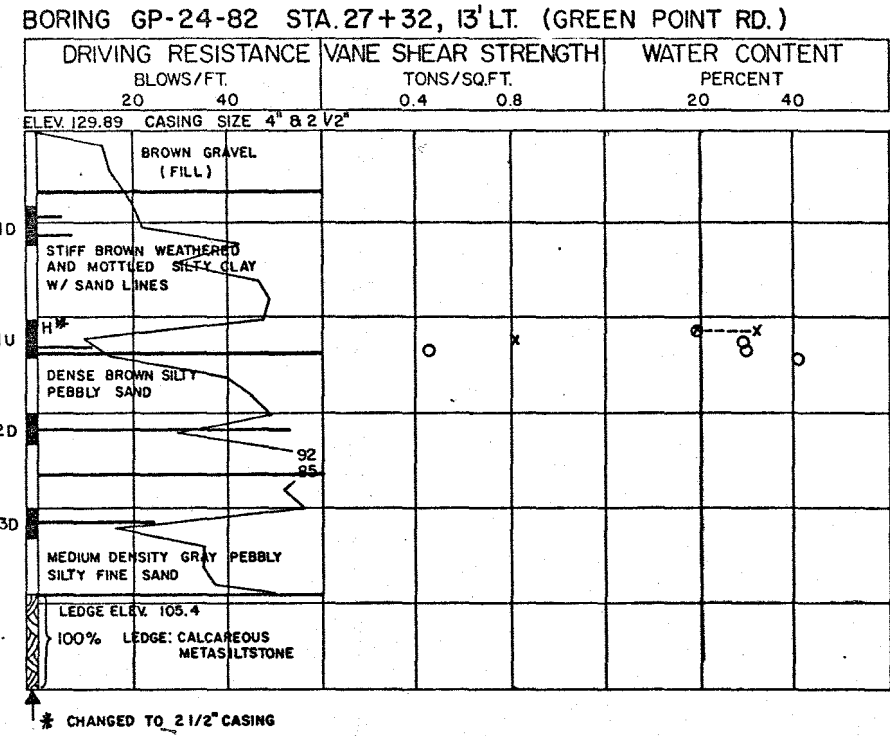
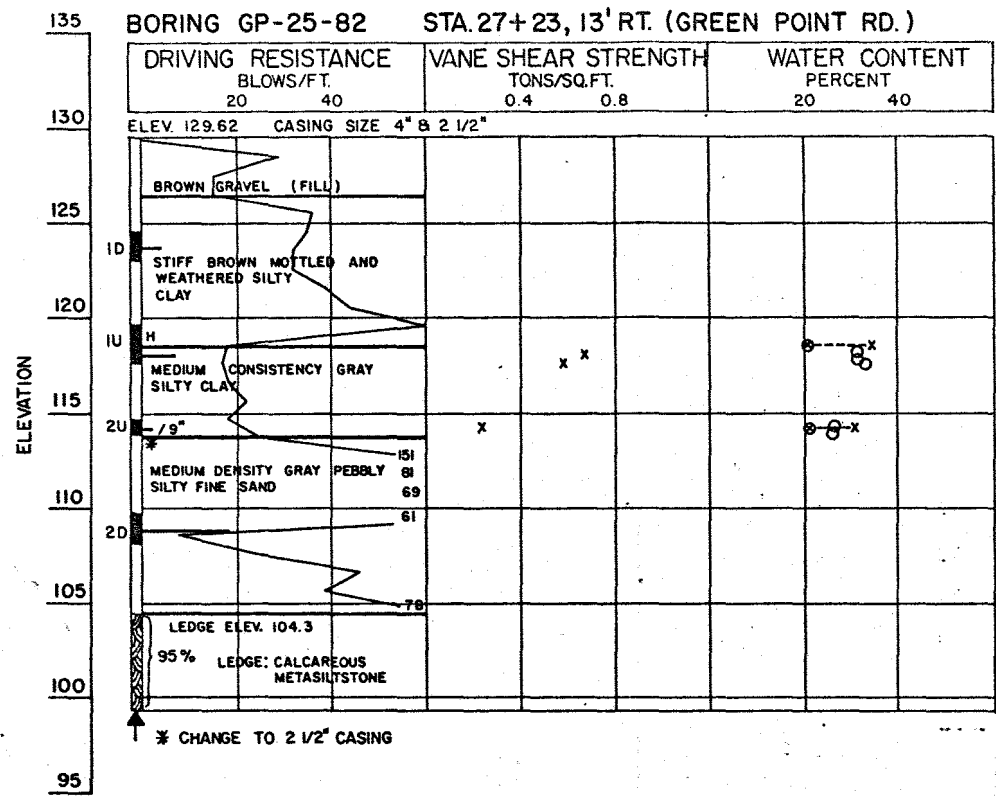
Percent

20

40

ELEV. 126.32





PROJECT DESIGN ENGINEER
DESIGN - DETAILED
CHECKED
REVISIONS
FIELD CHANGES

PLANS

DATE

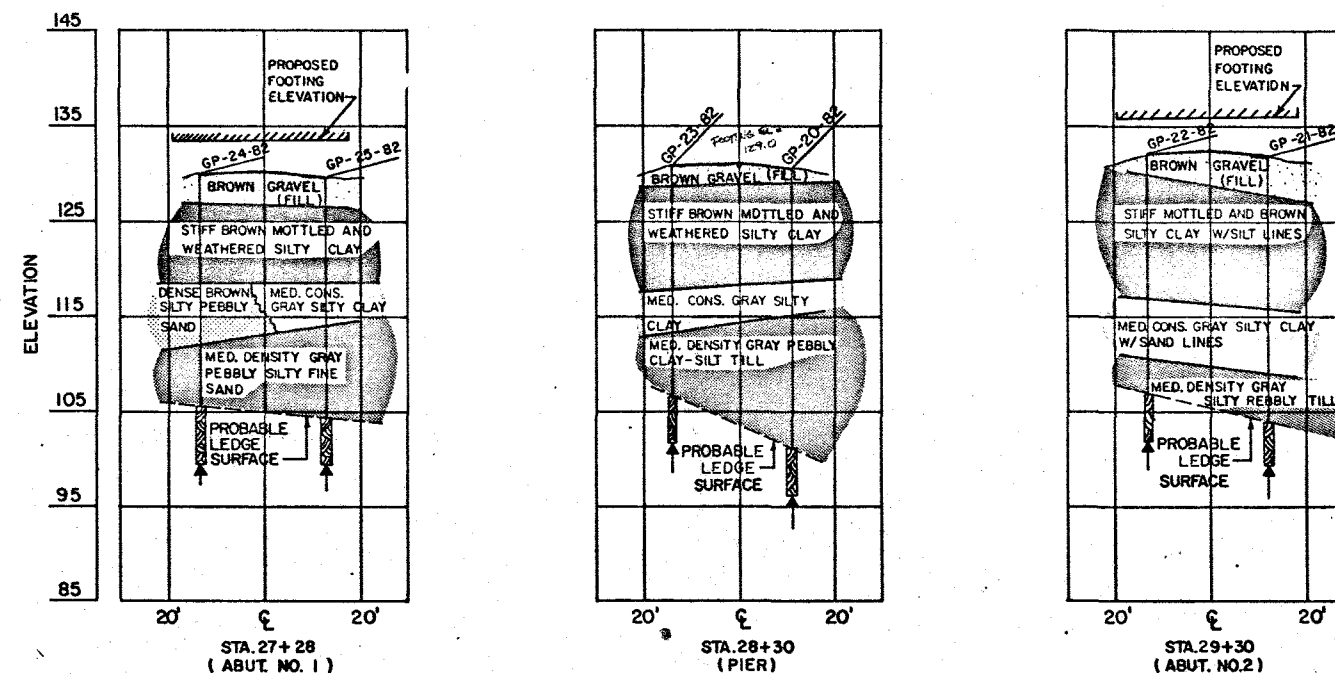
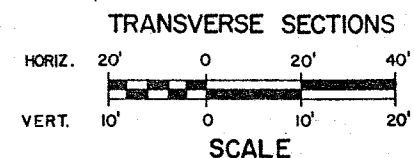
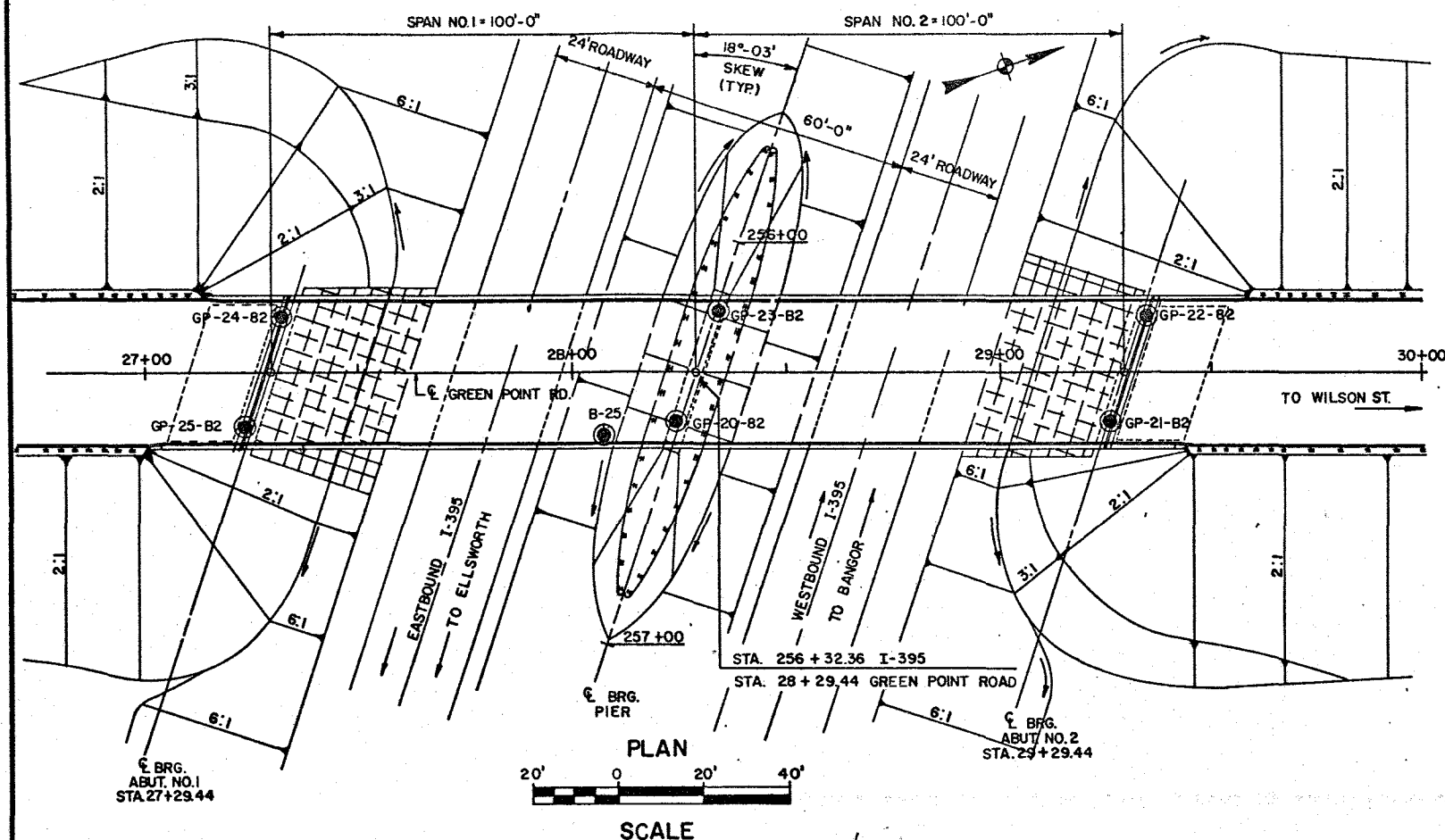
BY

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

GREEN POINT ROAD
OVER
I-395
IN THE TOWN OF
BREWER
PENOBSCOT COUNTY

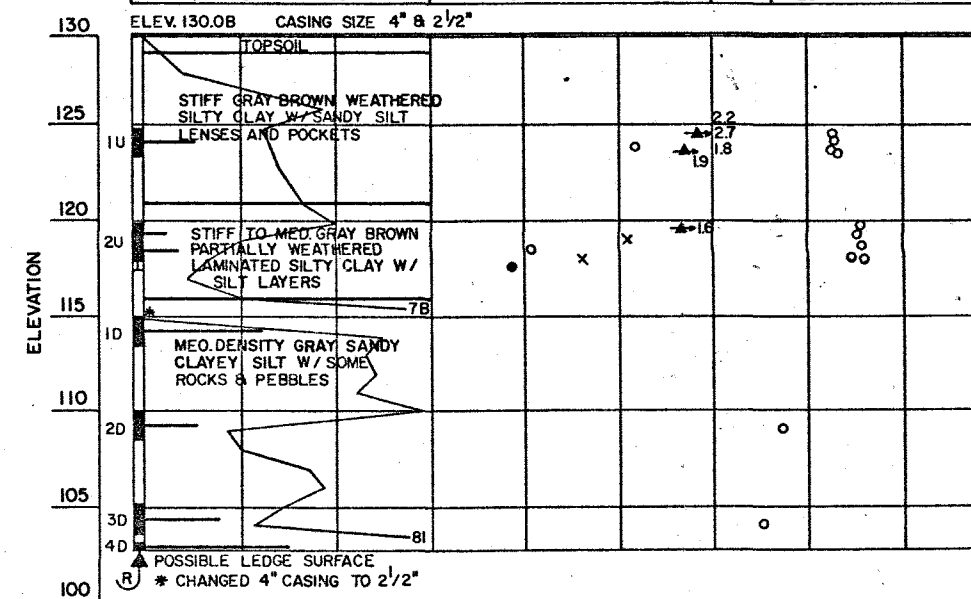
BORING DETAILS

SHEET OF AUGUSTA, MAINE



BORING GP-59-78(B-25) STA. 28+08, 15' RT.

DRIVING RESISTANCE BLOWS/FT.	VANE SHEAR STRENGTH TONS/SQ. FT.	WATER CONTENT PERCENT
20 40	0.4 0.8	20 40



BORING NOTES

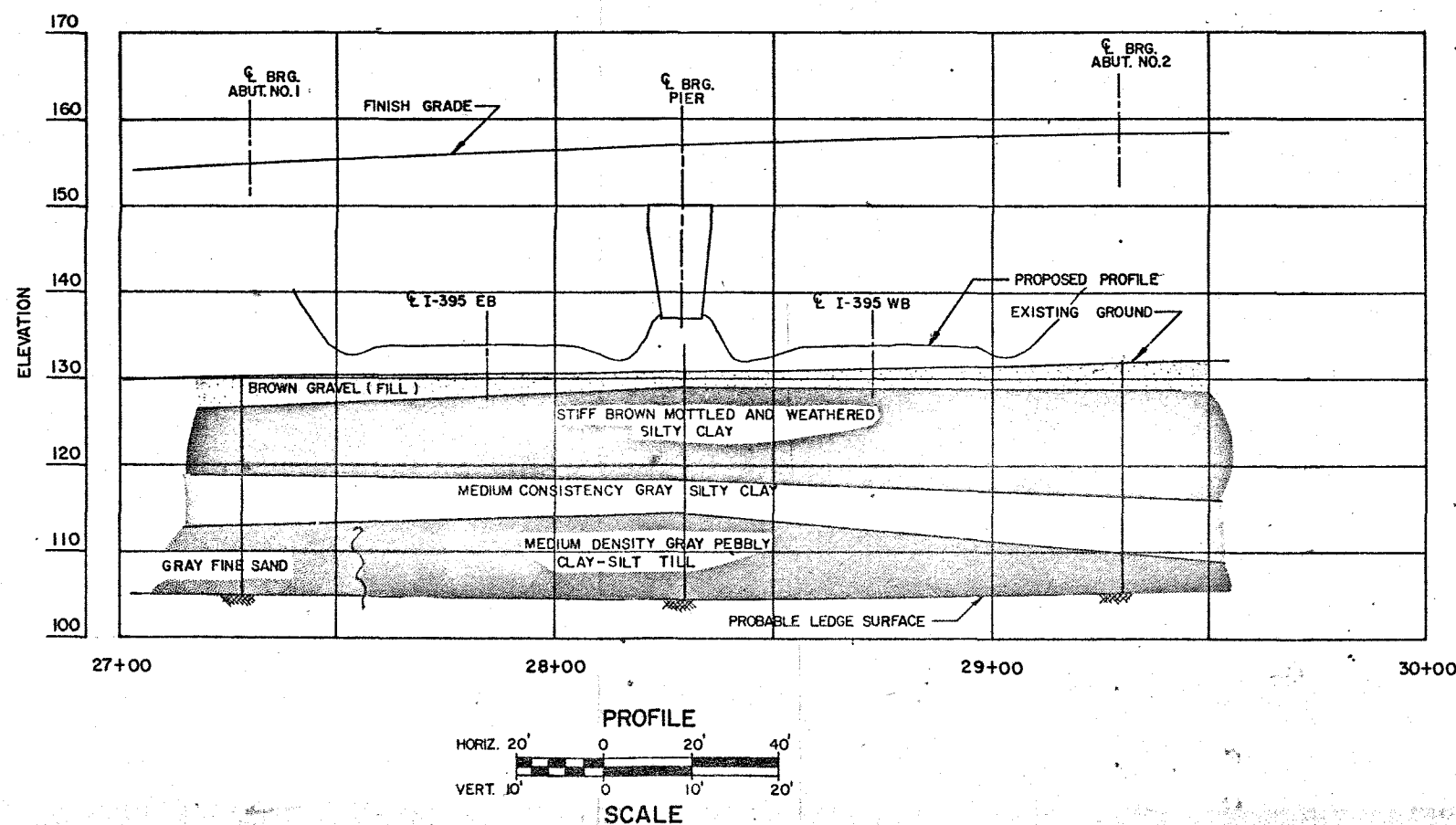
All samples and vane are made ahead of casing
Number of blows required to drive extra heavy casing one foot with 400 ft. lbs. of energy per blow
Location of sample or sample attempt
Number and type of dry sample
S.B.H. Sampler #1290's
3/2" O.D. 16 ga. seamless tubing
Unsuccessful sample attempt and type of sampler
Number of blows required to drive spoon or tubing one foot with 350 ft. lb. of energy per blow
Field vane test
Refusal of drill rods or casing (may not be ledge)

SHEAR NOTES

Field vane shear strengths
Laboratory vane shear strengths
Shear strengths in excess of capacity of equipment
One half unconfined compressive strengths

WATER CONTENT NOTES

Natural water contents, given as percent of dry weight



PROJECT DESIGN ENGINEER	DATE
DESIGN - DETAILED	
CHECKED	
REVISIONS	
FIELD CHANGES	

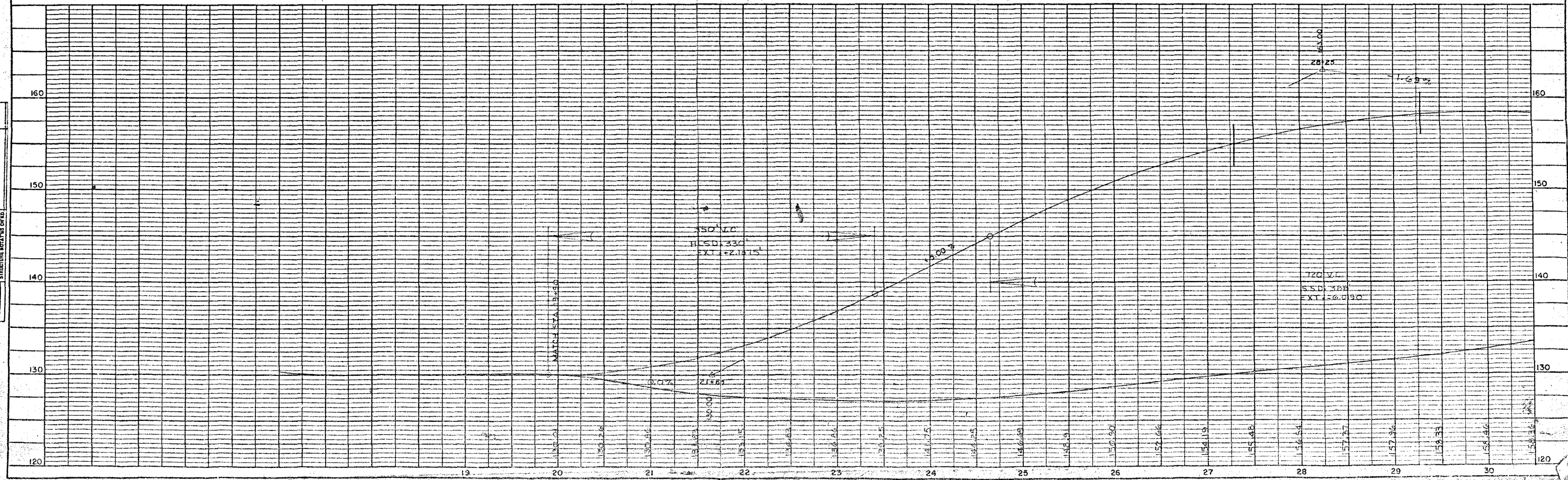
STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

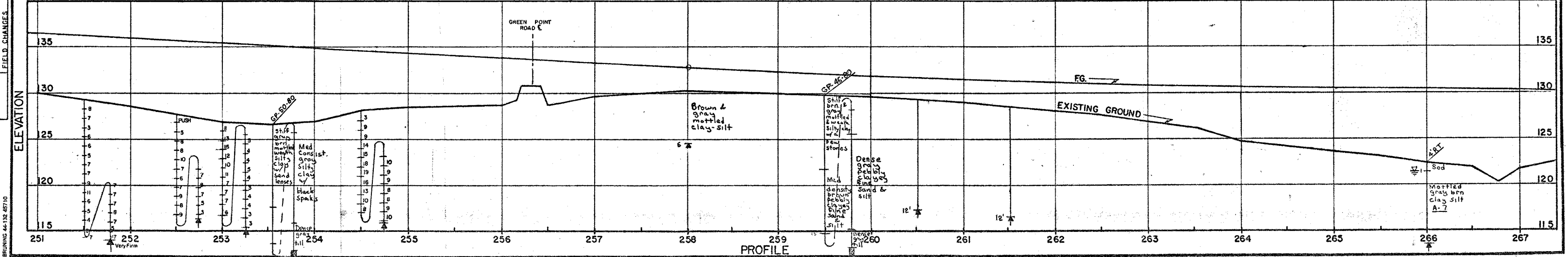
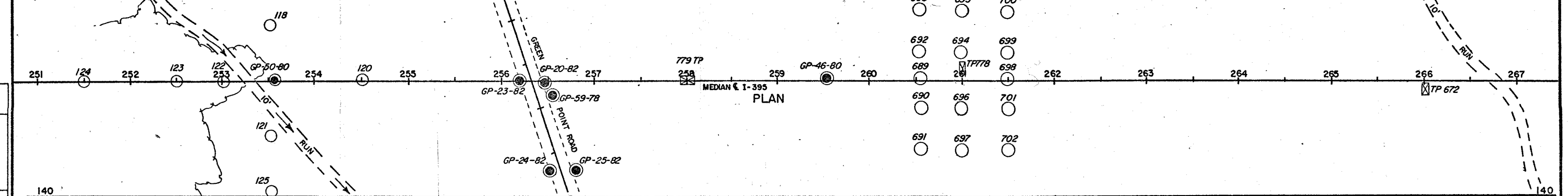
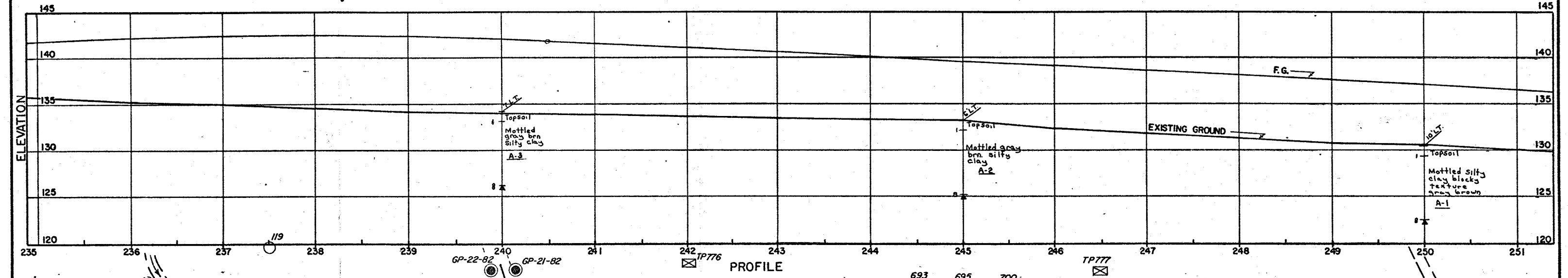
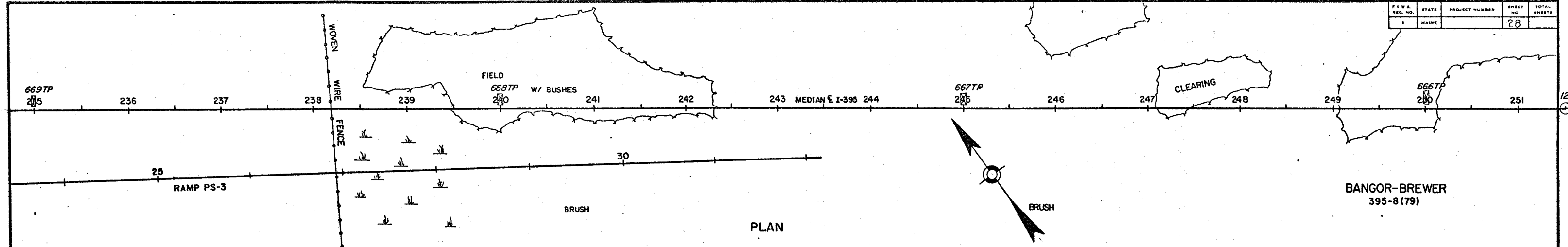
GREEN POINT ROAD
OVER
I-395
IN THE TOWN OF
BREWER
PENOBSCOT COUNTY

FOUNDATION SURVEY

SHEET OF AUGUSTA, MAINE

over I-395

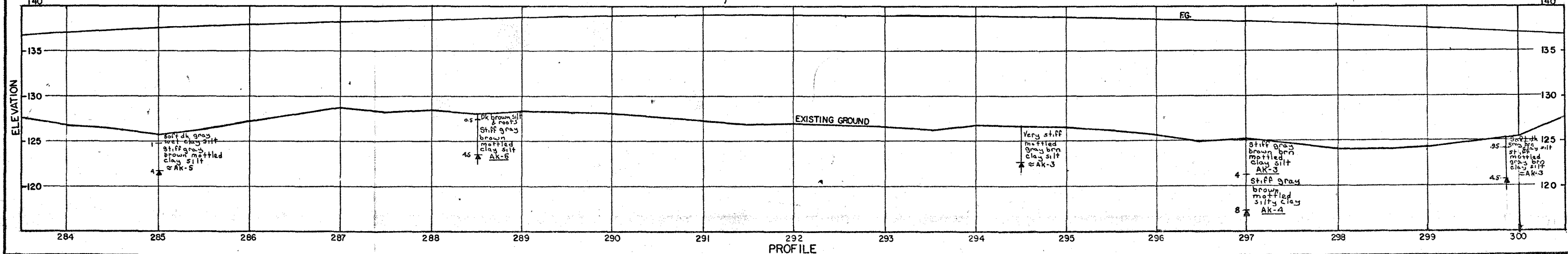
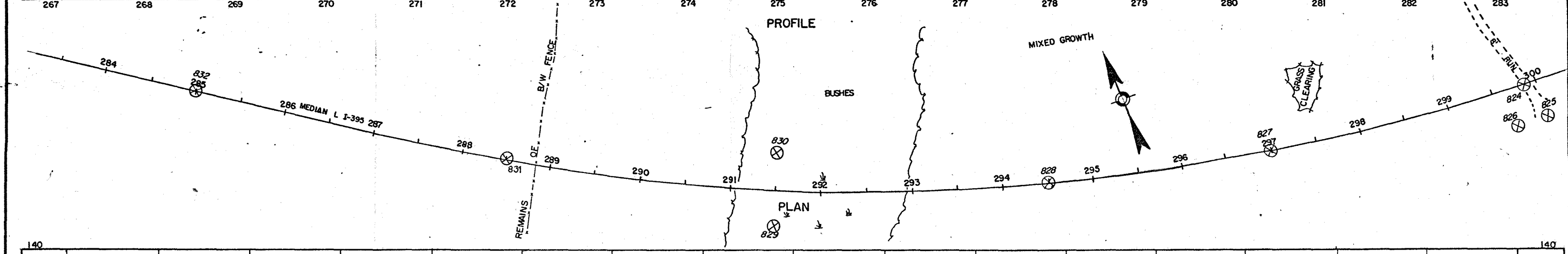
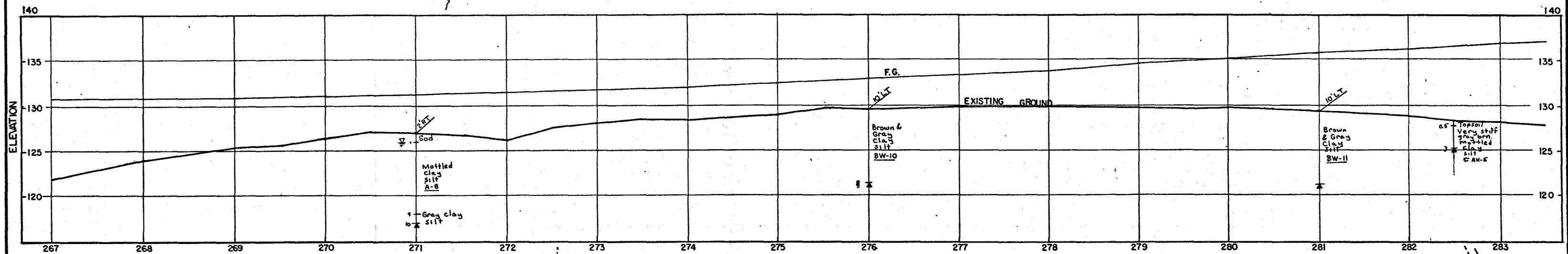
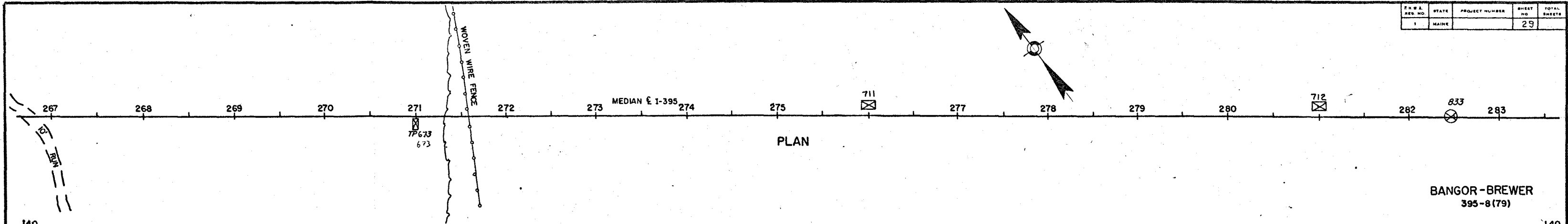




PROJECT DESIGN ENGINEER	DATE
BY	
DESIGN - DETAILED	
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REVISIONS	
FIELD CHANGES	

PLANS

BRUNING 44-132 45710



Appendix B
Drainage Study
Project I-395-8(79)
Bangor-Brewer
August 1982

Hydrologic information for nineteen proposed drainage structures on the Brewer portion of this project is tabulated on the attached data page. Ridge lines, drainageways and possible culvert and catch basin locations are shown on the attached drainage map.

Ridge lines were delineated on good quality air photos flown 5/2/69 at a scale of 1"=1000' and on 4/30/77 at a scale of 1"=500'. Slope and elevation data were estimated from topographic sheets having a scale of 1"=5208' and a contour interval of 20 feet; from maps having a scale of 1"=2000' and a contour interval of 10 feet; and from maps having a scale of 1"=200' and contour intervals of two and five feet.

A preliminary drainage study was issued in March 1982 listing data for fifteen possible culvert locations. Data for several of these areas has been changed since more complete design information was received.

Areas #1, 2 and 3 of this study are for existing structures under the Maine Central Railroad Tracks near South Main Street as requested by personnel from the Design Division. Areas #6, 7 and 8 are for possible catchbasin locations in the vicinity of the Parkway South interchange.

Data for area #19 is for Felts Brook which was originally submitted in April 1982. LF & Runoff Coefficient factors were derived from weighted determinations of land use and vegetation characteristics within each watershed. Data presented are for future "as built" conditions.


Wilbur H. Tidd

APPENDIX B DRAINAGE STUDY

TOWN(S) Bangor - Brewer
(Brewer side of river)

PROJECT NO. 395-8(79)

DATE August 1982 BY W. H. Tidd

AREA NO.	STATION	AREA		POTTER	1021	BENSON		RATIONAL					REMARKS
		ACRES	SQ. MI.	STORAGE INDEX K (%)	LF	SLOPE FT/MI.	STORAGE ACRES	ELEVATION DROP- FEET	DISTANCE FEET	RUNOFF COEF C	CHANNEL TYPE FACTOR	% FOREST	
1	185+50+ 680' rt.	357.0	.5578	2.6	0.80	90	--	105	5650	0.60	1	50	Data from existing pipe under MCRR tracks 680'+ right of sta. 185+50 main line. An extensive storm drain system in the residential portion of this area carries an unknown volume of water.
2	185+50+ 270' rt.	40.2	.0628	--	0.75	150	--	105	3800	0.50	1	10	Data for existing pipe under MCRR tracks 270'+ rt. of sta. 185+50. Assumes flow back in ditch from vicinity of Parkway South. Area listed includes #7.
3	185+50+ 210' lt.	168.6	.2634	--	1.0	125	--	110	4400	0.65	1	20	Data for existing pipe under MCRR tracks 210'+ left of sta. 185+50.
4	38+50 "New Industrial Park Rd."	3.1	.0048	--	0.42	75	--	11	400	0.34	1	60	
5	42+50 "New Industrial Park Rd."	4.2	.0065	--	0.62	210	--	32	600	0.42	1	15	A 36" CMP underdrain outlet empties into this area left of sta. 12+85 Parkway So.

APPENDIX B DRAINAGE STUDY

TOWN(S) Bangor - Brewer
(Brewer side of river)

PROJECT NO. 395-8(79)

DATE August 1982 BY W. H. Tidd

AREA NO	STATION	AREA		POTTER	1021	BENSON		RATIONAL					REMARKS
		ACRES	SQ. MI.	STORAGE INDEX K (%)	LF	SLOPE FT/MI.	STORAGE ACRES	ELEVATION DROP- FEET	DISTANCE FEET	RUNOFF COEF C	CHANNEL TYPE FACTOR	% FOREST	
6	210+00 main line	13.5	.0211	--	0.90	185	--	60	2000	0.55	1	0	Possible catch basin location between main line & ramp PS-1. Area listed includes area #9.
7	23+00 50' rt. Parkway South	9.5	.1048	--	0.50	65	--	22	950	0.38	1	60	Possible catch basin location between main line & ramp PS-1/3.
8	223+00 60' +rt. main line	7.2	.0113	--	0.68	140	--	30	1000	0.46	1	35	Possible catch basin location between main line & ramp PS-1.
9	7+50 Ramp PS-2A 2B	7.3	.0014	--	0.90	180	--	20	600	0.56	1	20	Proposed pipe location.
10	253+25 main line	62	.0969	--	0.30	25	--	18	2700	0.20	1	75	Much of area is low wet woods.
11	266+50 main line	193	.3015	0.5	0.35	30	--	17	3200	0.18	1	50	Much of area is low flat woods. Ridgeline between areas #11 & 12 lies in very flat area and is indistinct.

APPENDIX B DRAINAGE STUDY

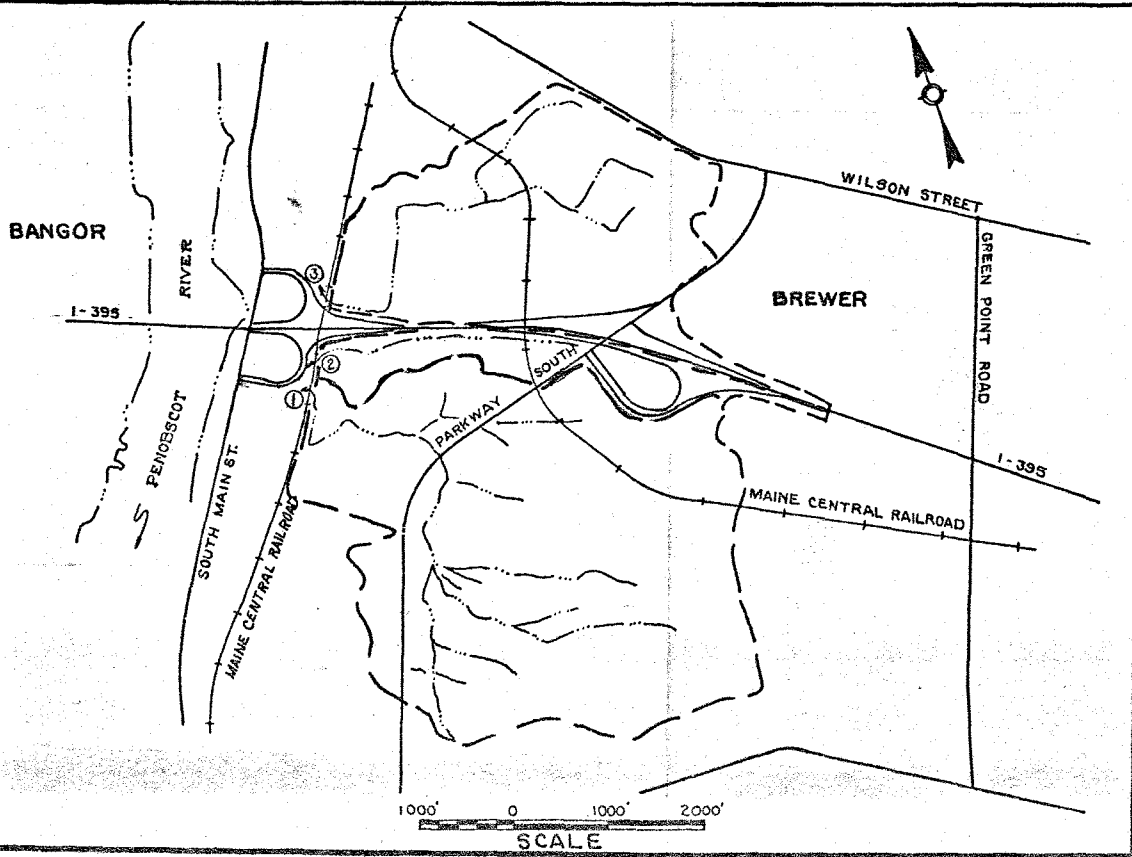
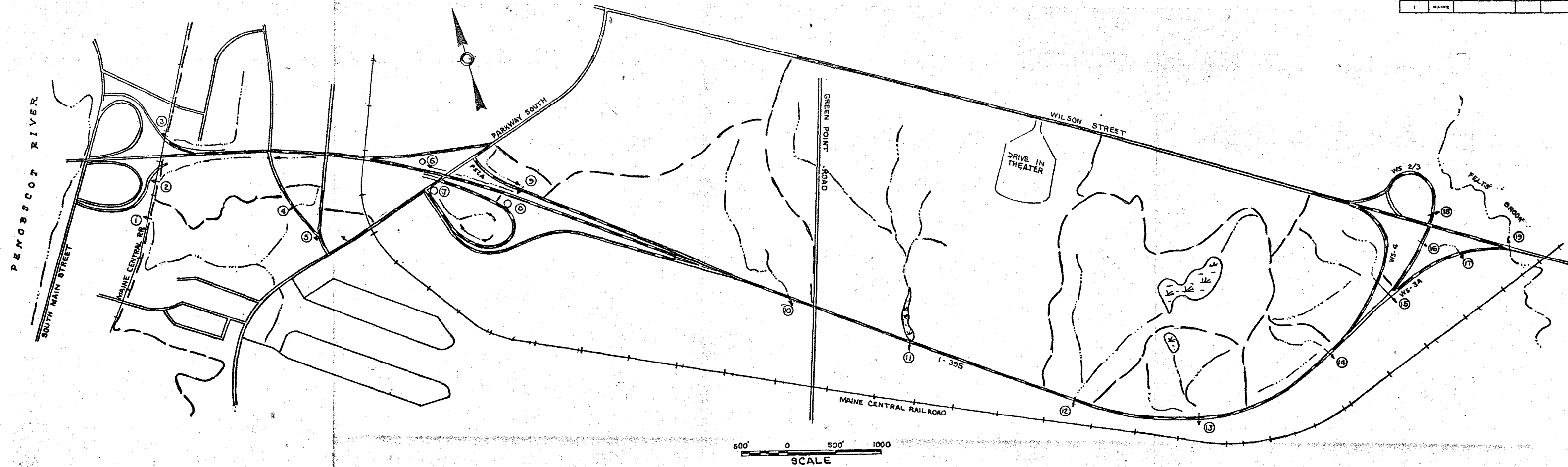
TOWN(S) Bangor - Brewer
(Brewer side of river)

PROJECT NO. 395-8(79)

DATE August 1982 BY W. H. Tidd

AREA NO	STATION	AREA		POTTER	1021	BENSON		RATIONAL					REMARKS
		ACRES	SQ. MI.	STORAGE INDEX K (%)	LF	SLOPE FT/MI.	STORAGE ACRES	ELEVATION DROP- FEET	DISTANCE FEET	RUNOFF COEF C	CHANNEL TYPE FACTOR	% FOREST	
12	285+00	76.8	.1200	5.7	0.29	33	--	58	2680	0.21	1	85	Proposed pipe at run.
13	298+00	27.3	.0427	3.7	0.31	47*	--	5**	1050**	0.21	1	75	*Slope for flatter northerly branch. Slope for steep southerly branch is 255'/mile. **Slope along ditch.
14	313+50	11.8	.0184	--	0.39	217	--	10	850	0.33	1	70	Proposed pipe at run
15	322+25	32.1	.0501	--	0.53	220	--	52	1200	0.38	1	25	Proposed pipe at run
16	328+50	5.5	.0085	--	0.60	400	--	42	650	0.40	1	0	Area between main line & ramp WS-4.
17	12+50 ramp WS-3A	10.0	.0156	--	0.60	267	--	66	1000	0.40	1	0	Includes area #16
18	332+00+ ramp WS-2/3	4.8	.0075	--	0.60	425	--	56	650	0.40	1	0	Assumes that the pipe will drain only the area within the ramps WS-2/3.

F.H.D.A. REQ. NO.	STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
1	MAINE			



PROJECT DESIGN ENGINEER	BY	DATE
DESIGN - DETAILED		
CHECKED		
REVISIONS		
FIELD CHANGES		

BRUNING 44-132-45710

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

**DRAINAGE STUDY
BANGOR - BREWER**

1-395-8 (79)
AUGUST 1982

SHEET OF AUGUSTA, MAINE