

Consulting
Engineers and
Scientists

Temporary Works Geotechnical Report Bridge Nos. 01218, 04180

I-84 EB/WB over Housatonic River
Newtown/Southbury, Connecticut

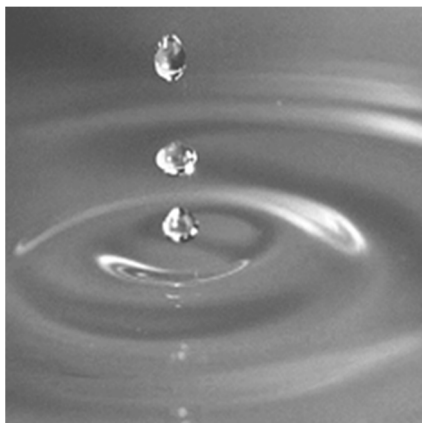
Submitted to:

CME Associates, Inc.
101 East River Drive
East Hartford, CT 06108

Submitted by:

GEI Consultants, Inc.
455 Winding Brook Drive, Suite 201
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October 11, 2019
GEI Project No. 125810



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1. Introduction

1.1 Project Summary

The project consists of rehabilitation of Bridge Nos. 01218 and 04180, carrying I-84 eastbound and westbound, respectively, over the Housatonic River in Newtown and Southbury, Connecticut.

1.2 Purpose

GEI Consultants, Inc. (GEI) was retained to perform a subsurface exploration program and prepare this Geotechnical Report in support of the temporary works required for this project, which are to include work trestles and associated temporary haul roads in the median areas to the north and south of the bridge alignments. This report presents the results of the subsurface explorations, relevant historic data, our evaluation of the subsurface conditions, and geotechnical considerations for use by the Contractor's engineer in design of the temporary works.

1.3 Scope of Services

GEI's scope of work in regard to temporary works included the following:

1. Reviewed available published geologic data, existing bridge plans, and proposed bridge design information provided to us.
2. Developed a subsurface exploration program, consisting seven (7) borings (HR-1 through HR-7) advanced within or near the proposed haul road alignments to depths between 22 and 52 feet.
3. Provided full-time observation of the test borings and classified recovered samples in general accordance with Connecticut Department of Transportation (ConnDOT) Geotechnical Engineering Manual.
4. Reviewed the results of the geotechnical explorations and developed recommended soil properties for temporary works design.
5. Conduct global slope stability analysis at maximum (critical) excavation depth along north and south haul road alignments.
6. Presented the results of the explorations and geotechnical considerations for temporary works design in this report.

1.4 Datum

Elevations shown on the attached boring logs were estimated from the project survey, as referenced to NAVD 88. Historical information, where referenced herein and on attachments, is referenced to NGVD29.

2. Site and Project Description

2.1 Site Description

Bridge No. 01218 is a four-span, continuous plate girder structure that carries I-84 Eastbound over the Housatonic River from Newtown to Southbury, Connecticut. This structure was originally built in 1953 for the relocation of US Route 6 and was reconstructed in 1979 as part of the building of I-84. The bridge carries 2 lanes of eastbound traffic and a sidewalk, outboard of the south parapet. The total structure length is approximately 792 feet.

Bridge No. 04180 is a four-span, continuous plate girder structure that carries two lanes of I-84 Westbound over the Housatonic River from Southbury to Newtown, Connecticut. This structure was built in 1977. The total structure length is approximately 792 feet.

Both bridges are supported by reinforced concrete piers and abutments with a combination of vertical and battered steel H-piles driven to presumed bedrock. These H-piles extend to varying depths, ranging from approximately 26 to 112 feet below the pile caps. Summary tables of historic pile installations are provided in Appendix B, as this may be of some interest to foundation design of the work trestle. This information is provided for reference purposes only.

2.2 Project Description

GEI was provided a copy of the Final Design plans prepared by Louis Berger/WSP dated May 30, 2019.

Temporary works on the project are to consist of the following:

- Temporary work trestles on the south (Site No. 2) and north (Site No. 1) sides of the bridge alignment.
- Temporary access/haul roads within the median areas, terminating at each work trestle.

We understand both the trestles and access roads will be constructed during Stage 1 of the project.

3. Exploration Procedures

3.1 Test Borings

New England Boring Contractors, Inc. (NEBC), under subcontract to CME, drilled seven (7) borings along or near the proposed haul road alignments between August 5 and August 29, 2019. A GEI representative observed the drilling procedures and classified the soil samples obtained.

Each boring was advanced using solid-stem augers to a depth of 10 feet, then drive and wash techniques to termination depth. Standard Penetration tests and split-spoon sampling were conducted at 5-foot intervals. The boreholes were advanced using a truck-mounted drilling rig equipped with a 140-lb safety hammer or 140-lb automatic hammer, as noted on the boring logs. After each boring was completed, the holes were backfilled with drill cuttings supplemented by Portland cement, No. 2 sand, and/or ¾" stone. All borings were patched at the road surface using cold patch asphalt.

Approximate boring locations relative to existing conditions are shown on Figure 1. Boring logs are attached in Appendix A.

3.2 Historic Borings

Borings were previously conducted from the shoreline and within the river to support design and construction of the current bridges - seventeen (17) borings along Bridge No. 01218 and twelve (12) borings along Bridge No. 04180. The results of these borings are presented on the 1950 and 1971 record drawings, which are attached in Appendix B in original form for reference.

4. Subsurface Conditions

4.1 Geologic Setting

The project area lies in the floodplain of the Housatonic River. The Surficial Materials Map of Connecticut (Stone, 1992) shows outwash sand and gravel overlying sand along the northern shore and outwash sand and gravel along the southern shore. River channel sediments are likely in sequence of outwash sand and gravel (stratified drift) over glacial till, likely with some lateral variation across the channel.

The Bedrock Geological Map of Connecticut (Rodgers, 1985) shows the Collinsville Formation present in the project area on both banks of the Housatonic River. The Collinsville Formation is described as a combination of gray and silvery, medium- to coarse-grained schist, dark, fine- to medium-grained amphibolite, and hornblende gneiss.

4.2 Subsurface Conditions

Based on our review of the available geotechnical information, the general soil strata are as follows, beginning at the ground surface. The subsurface conditions are known only at the exploration locations. Conditions between explorations may differ significantly from those described below.

I. Embankment Fill – The ground surface contours atop which the eastbound I-84 embankment was built can be found on Sheet No. 2 from the 1950 drawing set for Bridge No. 01218. Recent borings conducted through the westbound embankment show similar results for embankment thickness.

South of the bridge, borings HR-1 through HR-3 indicate Embankment Fill extending to approximate El. 131 ft. Recovered samples were classified as primarily fine to coarse-grained sand with variable proportions of gravel and generally less than 5 percent fine material. In boring HR-2, small boulders (up to about 12 inches in size) were encountered near the base of the fill, between depths of approximately 10.5 feet and 13.0 feet. This may signify a previous road base, stabilization course for the current embankment, or otherwise. Uncorrected Standard Penetration Test (SPT) N-values ranged from 9 to 46 blows/foot, indicating loose to dense conditions.

As can be seen from the record drawings and from aerial photographs, the north abutments of both bridges and approximately 200 feet of the trailing embankments were extended into the river channel. As such, borings HR-4, HR-5, and HR-6 north of the bridges encountered Embankment Fill to approximate El. 99 ft., El. 105 ft., and El. 116 ft. respectively.

Recovered samples were classified as primarily fine to coarse-grained sand with variable proportions of gravel, occasional cobbles, and generally less than 5 percent fine material. In boring HR-5, concrete debris was encountered between depths of approximately 5.6 and 7.0 feet. Uncorrected Standard Penetration Test (SPT) N-values generally ranged from 7 to 48 blows/foot, indicating loose to dense conditions. A seam of very loose sand approximately 10 feet deep in HR-6 may have been influenced by advancement of the drilling tools. Seams of very dense material with SPT N-values in excess of 50 blows/foot were also noted.

II. Riverbed Sediment – Riverbed sediment was encountered in the channel at the mudline and continuing for 2 to 14 feet. This layer is described on the historic logs as primarily dark gray fine sand with a variable amount of organic silt and trace of vegetation.

In boring HR-5, the previous mudline or immediate shoreline was encountered at approximate El. 105, signified by approximately 3 feet of sandy Organic Silt. The uncorrected SPT N-value in this material was measured as 8 blows/foot. Although not encountered within other borings, there is potential that similar organic alluvial materials exist directly below the embankment adjacent to the current and former river channel.

III. Native Sand – South of the bridges, an upper stratum of Sand was encountered in borings HR-1, HR-2, and HR-3 extending approximately to between El. 120 ft. and El. 115 ft. These soils were generally classified as primarily fine to coarse-grained sand with variable proportion of silt and trace amount of gravel. Uncorrected Standard Penetration Test (SPT) N-values generally ranged from 21 to 36 blows/foot, indicating medium dense to dense conditions.

Within the river channel, historic borings on the north side encountered a stratum of surficial sands, consisting primarily of red-brown fine sand with little silt and some fine gravel. This stratum varies in thickness from 2 to 12 feet.

IV. Sand and Gravel – Dense to very dense Sand and Gravel was encountered below the Riverbed Sediment and Native Sand, continuing to bedrock. Generally, this stratum consists of yellow-brown to brown sand, some gravel, trace amount of silt, and occasional to frequent cobble or boulder-laden seams more prevalent on the north side of the channel. Typically, SPT N-values are in excess of 50 blows/foot.

Bedrock – Bedrock within the river channel is described on the historic logs as gray, metamorphic schistose gneiss. The quality of the rock cores was highly variable from location to location. Although some cores had excellent recovery (greater than 90 percent), several cores were noted as fractured or even shattered with very poor recoveries. Quartz veins were occasionally noted. Depth to bedrock varied widely across the site and was

encountered at shallower depths moving southward across the alignment. Top of rock elevation varied from El. 36 ft to El. 100 ft (NGVD 29).

4.3 Groundwater Conditions

Because drilling fluids were introduced in each boring after advancement to 10 feet, true groundwater measurements were not obtainable in each borehole at the time of drilling. Wet samplers were noted at depths of 15 to 25 feet within the borings, generally corresponding to approximate El. 120 ft. to El. 115 ft. It would appear from the investigation that groundwater may be present near the transition from native Sand (Stratum III) to dense lower Sand and Gravel (Stratum IV).

5. Temporary Works Considerations

Design of temporary works required for the project will be done via contractor design and submittal based on their means and methods. These works should be designed by a Connecticut-registered professional engineer experienced in such construction. Based on the investigation results, preliminary geotechnical considerations for this work are provided below.

Considerations presented herein for design and construction of temporary works are based on GEI's interpretation of subsurface conditions and the conceptual layouts provided. The Contractor's design engineer shall undertake their own independent review of the subsurface data presented within this report.

5.1 General

Our services were performed in general conformance with the ConnDOT Geotechnical Engineering Manual and our approved scope dated December 18, 2018.

5.2 Soil Properties

Recommended in-place soil properties for design of the temporary works are presented below. We estimated these values based on published correlations to SPT N-values and visual soil descriptions.

Table 1 – In-place Soil Properties

STRATUM	Angle of Internal Friction (ϕ°)	Cohesion (C)	Moist Unit Weight (γ) (lb/ft ³)
(I) Embankment Fill	32	0	125
(II) Riverbed Sediment	24	0	95
(IIIA) Native Sands (South, above river level)	36	0	125
(IIIB) Native Sands (North, within river channel)	34	0	125
(IV) Lower Sand and Gravel	38	0	135

5.3 North and South Haul Road

5.3.1 General Considerations

The proposed north and south haul roads ending at each work trestle will be constructed primarily through Embankment Fill (Stratum I) and Native Sand (Stratum III). Groundwater may be encountered below approximate El. 120 ft. as the lowest portion (and deepest excavation) of the haul roads are constructed. Given the variability in Stratum I and the potential for groundwater at depth, we recommend that temporary excavation slopes be no steeper than 2H:1V. This will necessitate the use of temporary earth retaining systems (TERS) up to 20 feet in height on both sides of the excavation for a majority of the haul road alignments.

5.3.2 Alternatives

Based on the subsurface conditions and the project constraints, the following alternatives appear to be feasible for use on this project:

1. Soil Nail walls
2. Soldier-pile and Lagging walls

Soil nail wall design must take into account utilities behind the wall, in particular the temporary 15-inch RCP near the south trestle, and the potential for groundwater intrusion near the base of the wall. Sheet piles are likely to encounter significant difficulty when driving through very dense cobble-laden Sands and Gravel (Stratum IV), and therefore are not likely to achieve sufficient embedment.

Temporary MSE systems will also likely not be feasible due to constraints regarding embedment of the reinforcement towards active travel lanes.

Another system(s) not specifically mentioned herein or a hybrid TERS may also be feasible, subject to design and construction considerations presented by the Contractor's engineer.

5.3.3 Global Slope Stability

Global slope stability was checked at the maximum haul road cut section on each side of the bridges for conceptual soil nail wall configurations. The limit equilibrium analysis assumed a circular failure surface and no failure through the TERS. Proposed conditions were modeled using the Slope/W-GeoStudio software package, using the soil input properties in Table 1 and the haul road cross-sections from the design plans.

Assuming soil nails extend at least 70 percent of the TERS height behind the face (as normal to the wall face), the factor of safety against global, deep-seated slope instability of the full haul road excavation is in excess of 1.25. This meets the requirements stated in Section 6-1.3.1 of the ConnDOT Geotechnical Manual.

5.3.4 Groundwater Controls

The presence or absence of a shallow groundwater aquifer above the river level was not confirmed by the recent investigation. At the least, it can be presumed from the investigation that seams of water perched on very dense soils will be present between approximate El. 120 ft. and El. 115 ft. during and following rainfall events. Groundwater controls should be anticipated for all work that occurs below these elevations.

5.4 Work Trestle Foundations

5.4.1 General Considerations

Concept plans prepared by Louis Berger/WSP show a 149.7-foot-long trestle on the south alignment (Site No. 2), a 368.7-foot-long trestle on the north alignment (Site No. 1), and clearance for a barge-mounted crane between. Foundations are shown as 24-inch diameter piles at maximum 20-foot spacing.

The temporary work trestles and associated falsework shall be designed by the Contractor in accordance with the AASHTO Guide Design Specifications for Bridge Temporary Works 1st Edition, 1995, with latest revisions, along with the project specifications and 07-Construction drawing package.

5.4.2 Foundation Alternatives

Steel pipe piles driven into the dense lower sand and gravel (Stratum IV) or to refusal on rock appear to be suitable for support of the proposed temporary work trestle. If required for additional capacity, drilled rock sockets may be installed in the pipe piles, subject to analysis by the Contractor's engineer. Special attention should be paid to the presence of boulders and very dense soils below the trestle alignments that could cause issues during pile installation.

5.4.3 Pile Installation

Boring data presented on the 1950 and 1972 record drawings, attached in Appendix B, indicate a presence of frequent cobbles, boulders, and very dense soil zones, as evidenced by the strata descriptions ("BOULDER", "hardpan", etc.), SPT N-values in excess of 150 blows/foot, and 300-lb hammer blows on the steel casing in excess of 200 blows/foot. These conditions should be anticipated for trestle foundation installation, particularly for the north trestle. The Contractor should be prepared to implement special measures such as hardened

driving shoes, pre-drilling, reaming, etc. to prevent shallow pile refusals on boulders or very dense soils. Means and methods for overcoming these conditions, including contingency measures, should be included within the trestle foundation pile submittals.

If driven piles are to be used, prior to driving, a wave equation (WEAP) analysis of the proposed pile-hammer system should be performed to check that the necessary capacity can be achieved without overstressing the piles, and to establish preliminary driving criteria. This analysis should be submitted for review by the Contractor's engineer within the trestle foundation submittal. The WEAP analysis should be performed by the Contractor in accordance with ConnDOT specifications.

6. Limitations

The preliminary geotechnical considerations presented within this report are based on the project information provided to us at the time of this report and may require modification if there are any changes in the nature, design, or location of the proposed temporary works construction. We recommend that GEI be engaged to review the Contractor's design submittals and installation records.

The considerations in this report are based in part on the data obtained from the borings. The nature and extent of variations between borings may not become evident until construction. If variations from the anticipated conditions are encountered, it may be necessary to revise the considerations in this report.

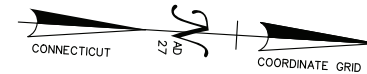
Our professional services for this project have been performed in accordance with generally accepted engineering practices; no warranty, express or implied, is made.

TEMPORARY WORKS GEOTECHNICAL REPORT
CT DOT BRIDGE NOS. 01218, 04180
I-84 EB/WB OVER HOUSATONIC RIVER
NEWTOWN/SOUTHBURY, CONNECTICUT
OCTOBER 11, 2019

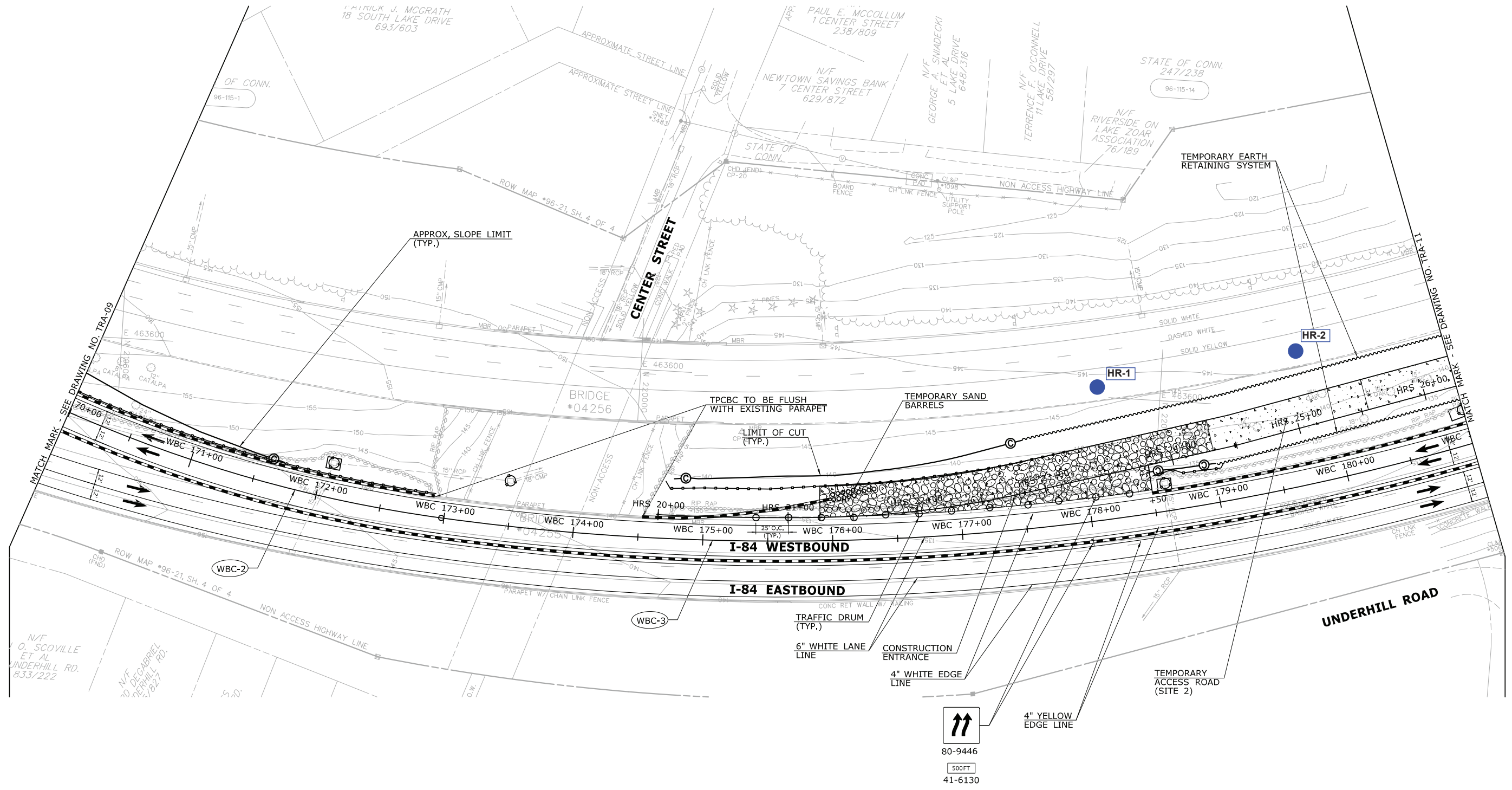
Figures

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E	462661.311
STA.	172+97.934
P.C.C.	N 219853.503
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L	385.412'
R	1065'

CURVE NO. WBC-3	
I-84 WESTBOUND	
STA.	172+97.934
P.C.C.	N 219853.502
E	463723.227
C.C.	N 219999.769
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STA.	181+67.710
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NOTES:
1. SEE DRAWING NO. TRA-02 FOR NOTES AND LEGEND.



FINAL DESIGN REVIEW

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		SHEET NO. 05.10

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 CHECKED BY: **S. SUEHR**
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STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

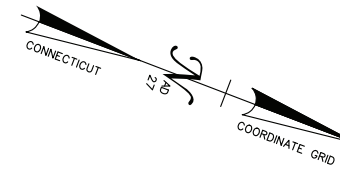
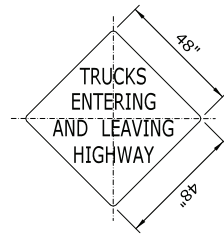
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 A WSP COMPANY
 55 CAPITAL BOULEVARD
 ROCKY HILL, CT 06067

PROJECT TITLE:
REHABILITATION OF BRIDGE NOS 01218 & 04180 - I-84 EB/WB OVER HOUSATONIC RIVER

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 PROJECT NO. **96-201**
 DRAWING NO. **TRA-10**
 SHEET NO. **05.10**

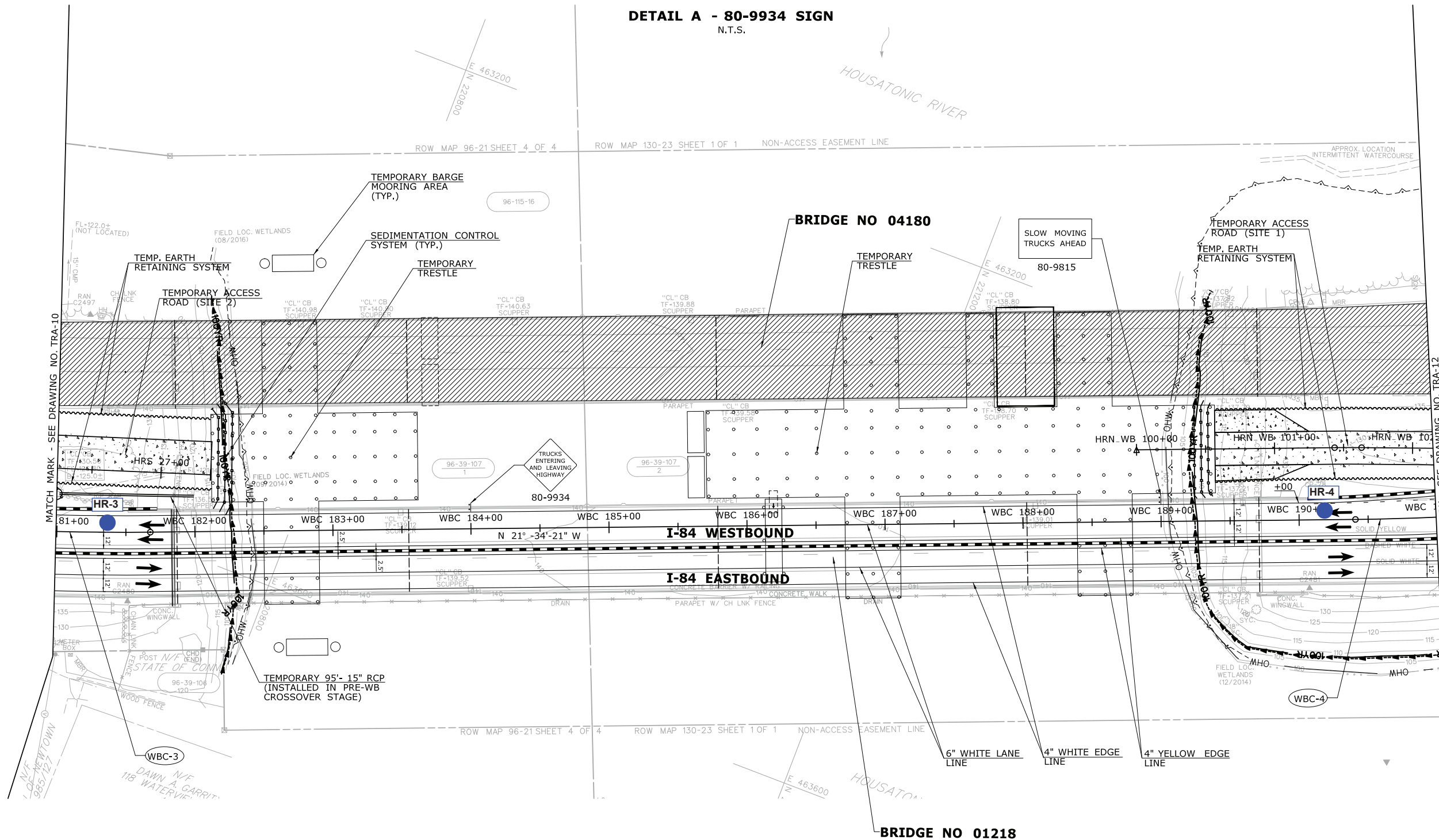
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R	1665'



NOTES:
1. SEE DRAWING NO. TRA-02 FOR NOTES AND LEGEND.

DETAIL A - 80-9934 SIGN
N.T.S.



FINAL DESIGN REVIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: 5/30/2019

DESIGNER/DRAFTER:
J. HUND
CHECKED BY:
S. SUEHR
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STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

SIGNATURE/BLOCK:

LOUIS BERGER US
A WSP COMPANY
55 CAPITAL BOULEVARD
ROCKY HILL, CT 06067

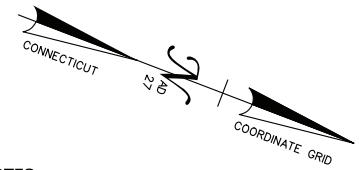
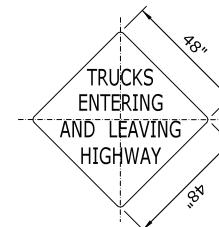
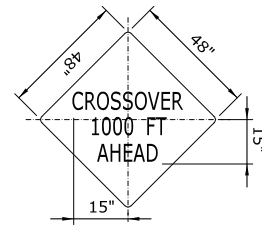
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REHABILITATION OF BRIDGE NOS 01218 & 04180 - I-84 EB/WB OVER HOUSATONIC RIVER

TOWN:
NEWTOWN/SOUTHBURY
DRAWING TITLE:
I-84 STAGE 2 WB CROSSOVER

PROJECT NO.
96-201
DRAWING NO.
TRA-11
SHEET NO.
05.11

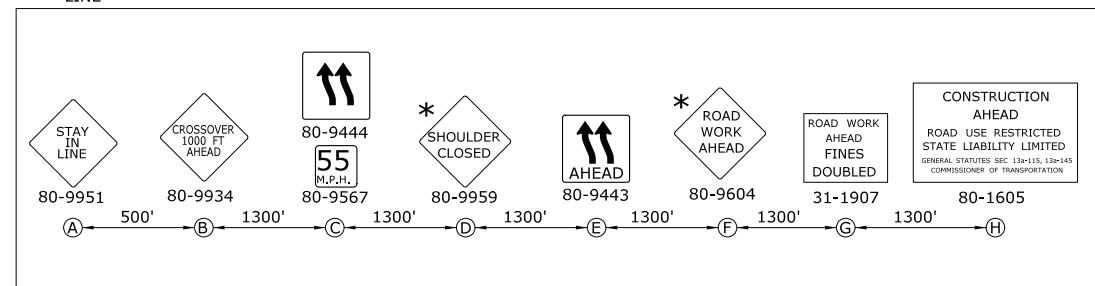
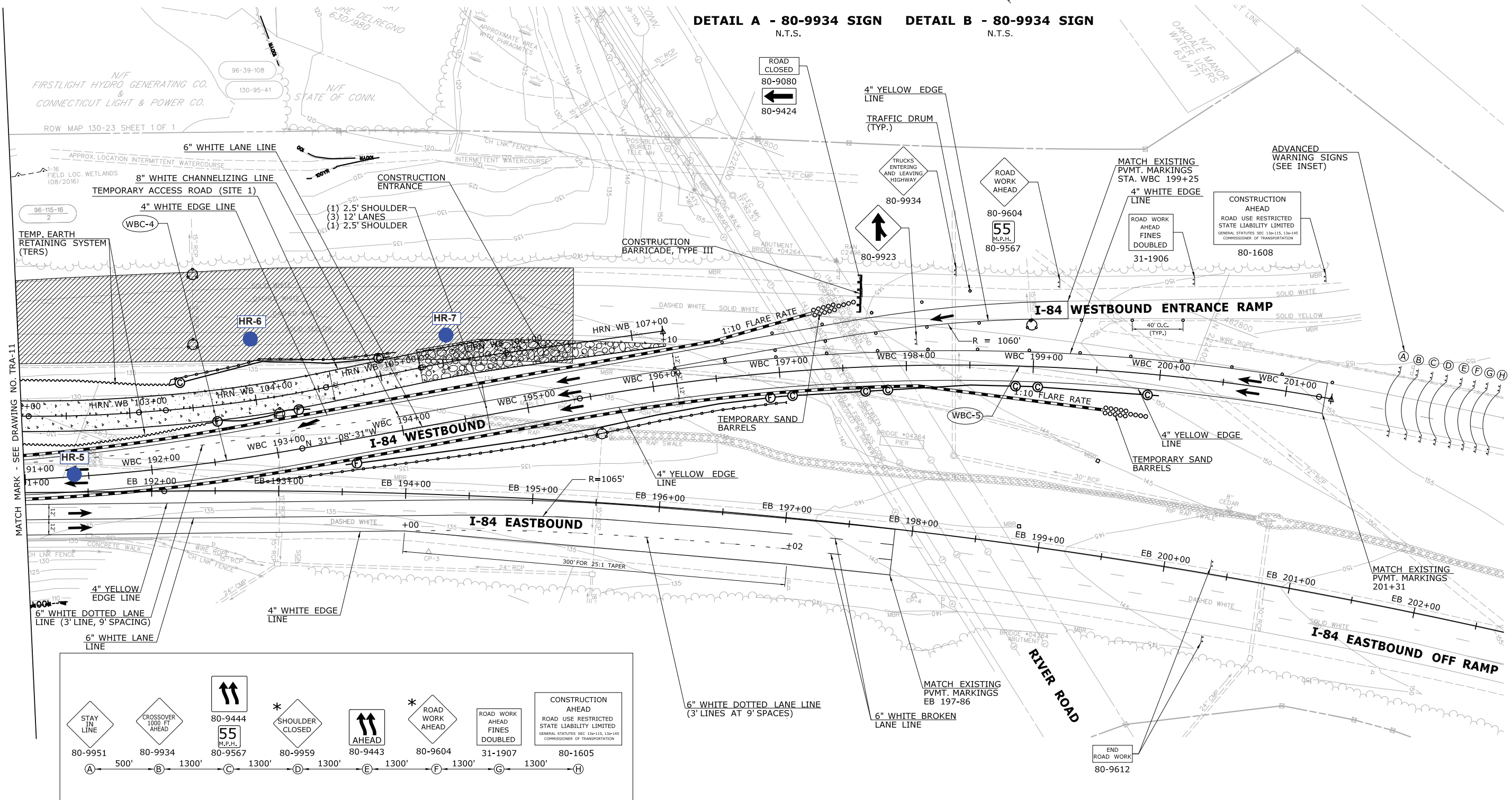
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C.C.	N 220906.705
E	461725.035
P.T.	STA. 193+19.563
N	221767.775
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Δ	9° 35'30.15" LEFT
T	139.69'
L	278.23'
R	1665'

CURVE NO. WBC-5	
I-84 WESTBOUND	
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C.C.	N 222818.779
E	464460.381
P.T.	STA. 201+26.27
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E	462826.072
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T	295.44'
L	584.80'
R	1665'



NOTES:
1. SEE DRAWING NO. TRA-02 FOR NOTES AND LEGEND.

DETAIL A - 80-9934 SIGN N.T.S.
DETAIL B - 80-9934 SIGN N.T.S.



INSET - ADVANCE WARNING SIGNS
N.T.S.

FINAL DESIGN REVIEW

DESIGNER/DRAWER: J. HUND	<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p>	SIGNATURE/ BLOCK: LOUIS BERGER US A WSP COMPANY 55 CAPITAL BOULEVARD ROCKY HILL, CT 06067	PROJECT TITLE: REHABILITATION OF BRIDGE NOS 01218 & 04180 - I-84 EB/WB OVER HOUSATONIC RIVER	TOWN: NEWTOWN/SOUTHBURY	PROJECT NO. 96-201
CHECKED BY: S. SUEHR				DRAWING TITLE: I-84 STAGE 2 WB CROSSOVER	DRAWING NO. TRA-12
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TEMPORARY WORKS GEOTECHNICAL REPORT
CT DOT BRIDGE NOS. 01218, 04180
I-84 EB/WB OVER HOUSATONIC RIVER
NEWTOWN/SOUTHBURY, CONNECTICUT
OCTOBER 11, 2019

Appendix A

Boring Logs

Driller: S. Marino	Connecticut DOT Boring Report		Hole No.: HR-1
Inspector: P. Blessing	Town: Newtown/Southbury, CT	Stat./Offset: HRS 23+55/70' L	
Engineer: GEI	Project No.: 96-201	Northing:	
Start Date: 8-7-19	Route No.: I-84	Easting:	
Finish Date: 8-7-19	Bridge No.: 01218/04180	Surface Elevation: 145.5	
Project Description: I-84 EB/WB over Housatonic River			

Casing Size/Type: " ID / 4.0" OD	Sampler Type/Size: SPT/2.0 " OD	Core Barrel Type: N/A
Hammer Type: Safety Hammer	Hammer Wt.: 140 lb Fall: 30 in.	

Groundwater Observations: Wet sample at 25.0 ft										
Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)		
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)	Rec. (in.)
0	S1	22	19	22	34	24	15	PVMT	12" ASPHALT	145
								MISC. FILL	S1: Brown to gray-brown f-c SAND, some f-c gravel up to 1", trace silt, cobble fragments, dry.	
5	S2	12	24	22	16	24	16		S2: Brown f-c SAND, little f-c gravel up to 1.5", trace silt, cobble fragments, dry.	140
10	S3	12	8	12	20	24	21		S3: Brown f-c SAND, little silt, trace f gravel up to 0.5", moist.	135
15	S4	16	18	15	11	24	8	SAND	S4: Brown to red-brown f SAND, little silt, trace f -m gravel up to 1", some fine roots, moist.	130
20	S5	18	13	12	42	24	18		S5: Orange-brown f-c SAND, little silt, trace f-c gravel up to 1", moist.	125
25										

Sample Type: S = Split Spoon R = Rock Core T = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42 ft. Rock: ft.	NOTES: Solid-stem auger to 10 ft, rotary wash to termination	Sheet 1 of 2
No. of Soil Samples: 9	No. of Core Runs: 0	SM-001-M REV. 1/02

Driller: S. Marino	Connecticut DOT Boring Report		Hole No.: HR-1
Inspector: P. Blessing	Town: Newtown/Southbury, CT	Stat./Offset: HRS 23+55/70' L	
Engineer: GEI	Project No.: 96-201	Northing:	
Start Date: 8-7-19	Route No.: I-84	Easting:	
Finish Date: 8-7-19	Bridge No.: 01218/04180	Surface Elevation: 145.5	

Project Description: I-84 EB/WB over Housatonic River

Casing Size/Type: " ID / 4.0" OD	Sampler Type/Size: SPT/2.0 " OD	Core Barrel Type: N/A
Hammer Type: Safety Hammer	Hammer Wt.: 140 lb Fall: 30 in.	

Groundwater Observations: Wet sample at 25.0 ft

Depth (ft)	SAMPLES						Generalized Strata Description	Material Description and Notes	Elevation (ft)	
	Sample Type/No.	Blows on Sampler per 6 inches				Pen. (in.)				Rec. (in.)
25	S6	16	11	10	9	24	12		S6: Brown to gray-brown f-c GRAVEL up to 1", some f-c sand, trace silt, wet.	120
30	S7	26	29	33	36	24	17		S7: Brown to orange-brown f-c SAND, some f-c gravel up to 1.5", little silt, wet.	115
35	S8	21	41	42	47	24	16		S8: Brown to gray-brown f-c GRAVEL up to 1" and f-m SAND, trace silt, wet.	110
40	S9	19	33	29	35	24	16		S9: Brown to red-brown f-c SAND and f-c GRAVEL up to 1.5", little silt, wet.	105

End of Boring at 42 ft.

Borehole backfilled and asphalt patched upon completion.

Sample Type: S = Split Spoon R = Rock Core T = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42 ft. Rock: ft.	NOTES: Solid-stem auger to 10 ft, rotary wash to termination	Sheet 2 of 2
No. of Soil Samples: 9	No. of Core Runs: 0	SM-001-M REV. 1/02

Driller: S. Marino	Connecticut DOT Boring Report		Hole No.: HR-2
Inspector: P. Blessing	Town: Newtown/Southbury, CT	Stat./Offset: HRS 25+10/58' L	
Engineer: GEI	Project No.: 96-201	Northing:	
Start Date: 8-6-19	Route No.: I-84	Easting:	
Finish Date: 8-7-19	Bridge No.: 01218/04180	Surface Elevation: 144.0	

Project Description: I-84 EB/WB over Housatonic River

Casing Size/Type: " ID / 4.0" OD	Sampler Type/Size: SPT/2.0 " OD	Core Barrel Type: N/A
Hammer Type: Safety Hammer	Hammer Wt.: 140 lb Fall: 30 in.	

Groundwater Observations: Wet sample at 15.0 ft.

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)			
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)	Rec. (in.)	RQD %
0	S1	18	16	13	23	24	13		PVMT	12" ASPHALT	140
									MISC. FILL	S1: Gray-brown f-c SAND, little f-c gravel up to 1", little silt, moist.	
5	S2	5	5	4	5	24	16			S2: Brown to red-brown f-m SAND, little silt, trace f gravel, moist.	135
10	S3	17	75/2"			8	4			S3: Gray-brown f-c GRAVEL, little f-c sand, little silt, boulder fragments, damp. Roller bit grinding through small boulders at 10.5 ft -11.5 ft and 12.0 ft -13.0 ft	130
15	S4	9	13	10	11	24	14		SAND	S4: Gray-brown f SAND, some silt, trace f gravel, wet.	125
20	S5	17	19	11	8	24	12			S5A (0-10"): Gray-brown f-c SAND, little silt, little f-c gravel, wet. S5B (10-12"): Gray-brown f-c SAND, little silt, moist, with decomposed wood fragments.	120
25											

Sample Type: S = Split Spoon R = Rock Core T = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 52 ft. Rock: ft.	NOTES: Solid-stem auger to 10 ft, rotary wash to termination	Sheet 1 of 3
No. of Soil Samples: 11	No. of Core Runs: 0	SM-001-M REV. 1/02

Driller: S. Marino	Connecticut DOT Boring Report		Hole No.: HR-2
Inspector: P. Blessing	Town: Newtown/Southbury, CT	Stat./Offset: HRS 25+10/58' L	
Engineer: GEI	Project No.: 96-201	Northing:	
Start Date: 8-6-19	Route No.: I-84	Easting:	
Finish Date: 8-7-19	Bridge No.: 01218/04180	Surface Elevation: 144.0	

Project Description: I-84 EB/WB over Housatonic River

Casing Size/Type: " ID / 4.0" OD	Sampler Type/Size: SPT/2.0 " OD	Core Barrel Type: N/A
Hammer Type: Safety Hammer	Hammer Wt.: 140 lb Fall: 30 in.	

Groundwater Observations: Wet sample at 15.0 ft.

Depth (ft)	SAMPLES						Generalized Strata Description	Material Description and Notes	Elevation (ft)		
	Sample Type/No.	Blows on Sampler per 6 inches				Pen. (in.)				Rec. (in.)	RQD %
25	S6	14	17	15	14	24	11		GRAVELLY SAND	S6: Brown f-c SAND, some f-c gravel, little silt, wet. Rig chatter between 28.0-30.0 ft	115
30	S7	23	26	27	33	24	12			S7: Gray-brown f-c SAND, some f-c gravel up to 2" , wet. Rig chatter between 31.0-33.0 ft	110
35	S8	51	41	49	47	24	10			S8: Gray-brown f-c SAND, some f-c gravel up to 1", little silt, wet.	105
40	S9	22	22	21	20	24	6			S9: Gray-brown f-c SAND, some f-c gravel, little silt, wet. Difficult drilling between 40-45 ft	100
45	S10	63	18	13	13	24	7		SAND	S10: Brown f SAND, trace silt, wet.	95

Sample Type: S = Split Spoon R = Rock Core T = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 52 ft. Rock: ft.	NOTES: Solid-stem auger to 10 ft, rotary wash to termination	Sheet 2 of 3
No. of Soil Samples: 11	No. of Core Runs: 0	SM-001-M REV. 1/02

Driller: S. Marino	Connecticut DOT Boring Report		Hole No.: HR-2
Inspector: P. Blessing	Town: Newtown/Southbury, CT	Stat./Offset: HRS 25+10/58' L	
Engineer: GEI	Project No.: 96-201	Northing:	
Start Date: 8-6-19	Route No.: I-84	Easting:	
Finish Date: 8-7-19	Bridge No.: 01218/04180	Surface Elevation: 144.0	
Project Description: I-84 EB/WB over Housatonic River			

Casing Size/Type: " ID / 4.0" OD	Sampler Type/Size: SPT/2.0 " OD	Core Barrel Type: N/A
Hammer Type: Safety Hammer	Hammer Wt.: 140 lb Fall: 30 in.	

Groundwater Observations: Wet sample at 15.0 ft.

Depth (ft)	SAMPLES						Generalized Strata Description	Material Description and Notes	Elevation (ft)		
	Sample Type/No.	Blows on Sampler per 6 inches				Pen. (in.)				Rec. (in.)	RQD %
50	S11	36	24	17	24	23	2		SANDY GRAVEL	S11: Brown to gray-brown f-c GRAVEL up to 1.5", some f- c sand, trace silt, wet.	

End of Boring at 52 ft.
Borehole backfilled and asphalt patched upon completion.

Sample Type: S = Split Spoon R = Rock Core T = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 52 ft. Rock: ft.	NOTES: Solid-stem auger to 10 ft, rotary wash to termination	Sheet 3 of 3
No. of Soil Samples: 11	No. of Core Runs: 0	SM-001-M REV. 1/02

Driller: S. Marino	Connecticut DOT Boring Report		Hole No.: HR-3
Inspector: P. Blessing	Town: Newtown/Southbury, CT	Stat./Offset: HRS 26+65/38' R	
Engineer: GEI	Project No.: 96-201	Northing:	
Start Date: 8-8-19	Route No.: I-84	Easting:	
Finish Date: 8-8-19	Bridge No.: 01218/04180	Surface Elevation: 136.0	

Project Description: I-84 EB/WB over Housatonic River

Casing Size/Type: " ID / 4.0" OD	Sampler Type/Size: SPT/2.0 " OD	Core Barrel Type: N/A
Hammer Type: Automatic Hammer	Hammer Wt.: 140 lb Fall: 30 in.	

Groundwater Observations: Wet sample at 20.0 ft.

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)		
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)	Rec. (in.)
0	S1	19	19	23	19	24	15	PVMT	12" ASPHALT	135
								MISC. FILL	S1: Brown to gray-brown f-c GRAVEL up to 1.5" and f-c SAND, trace silt, dry.	
5	S2	9	10	13	10	24	18	SAND	S2: Brown to light brown f- m SAND, trace f-c gravel up to 1", trace silt, dry.	130
10	S3	13	18	18	26	24	14		S3: Brown to light brown f SAND, trace f-c gravel up to 1", trace silt, dry.	125
15	S4	23	26	57	69	24	5	SANDY GRAVEL	S4: Brown m-c GRAVEL, some f-c sand, trace silt, moist.	120
20	S5	19	24	26	33	24	14	GRAVELLY SAND	S5: Brown to gray-brown f-c SAND and f-c GRAVEL up to 1", trace silt, wet.	115
25										

Sample Type: S = Split Spoon R = Rock Core T = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42 ft. Rock: ft.	NOTES: Solid-stem auger to 10 ft, rotary wash to termination	Sheet 1 of 2
No. of Soil Samples: 9	No. of Core Runs: 0	SM-001-M REV. 1/02

Driller: S. Marino	Connecticut DOT Boring Report		Hole No.: HR-3
Inspector: P. Blessing	Town: Newtown/Southbury, CT	Stat./Offset: HRS 26+65/38' R	
Engineer: GEI	Project No.: 96-201	Northing:	
Start Date: 8-8-19	Route No.: I-84	Easting:	
Finish Date: 8-8-19	Bridge No.: 01218/04180	Surface Elevation: 136.0	

Project Description: I-84 EB/WB over Housatonic River

Casing Size/Type: " ID / 4.0" OD	Sampler Type/Size: SPT/2.0 " OD	Core Barrel Type: N/A
Hammer Type: Automatic Hammer	Hammer Wt.: 140 lb Fall: 30 in.	

Groundwater Observations: Wet sample at 20.0 ft.

Depth (ft)	SAMPLES						Generalized Strata Description	Material Description and Notes	Elevation (ft)	
	Sample Type/No.	Blows on Sampler per 6 inches				Pen. (in.)				Rec. (in.)
25	S6	13	18	11	14	24	11		S6: Brown to gray-brown f-c SAND and f-c GRAVEL up to 1.5", trace silt, wet.	110
30	S7	19	15	11	12	24	0		S7: NO RECOVERY.	105
35	S8	15	25	42	28	24	13		S8: Brown to gray-brown f-c SAND and f-c GRAVEL up to 1", trace silt, wet.	100
40	S9	16	24	15	11	24	7	SANDY GRAVEL	S9: Brown to gray-brown f-c GRAVEL up to 1.5" and f-c SAND, trace silt, wet.	95

End of Boring at 42 ft.

Borehole backfilled and asphalt patched upon completion.

Sample Type: S = Split Spoon R = Rock Core T = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 42 ft. Rock: ft.	NOTES: Solid-stem auger to 10 ft, rotary wash to termination	Sheet 2 of 2
No. of Soil Samples: 9	No. of Core Runs: 0	SM-001-M REV. 1/02

Driller: S. Marino	Connecticut DOT Boring Report		Hole No.: HR-4
Inspector: P. Blessing	Town: Newtown/Southbury, CT	Stat./Offset: HRN 101+40/55' R	
Engineer: GEI	Project No.: 96-201	Northing:	
Start Date: 8-8-19	Route No.: I-84	Easting:	
Finish Date: 8-9-19	Bridge No.: 01218/04180	Surface Elevation: 134.0	

Project Description: I-84 EB/WB over Housatonic River

Casing Size/Type: " ID / 4.0" OD	Sampler Type/Size: SPT/2.0 " OD	Core Barrel Type: N/A
Hammer Type: Safety Hammer	Hammer Wt.: 140 lb Fall: 30 in.	

Groundwater Observations: Wet sample at 15.0 ft.

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)			
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)	Rec. (in.)	RQD %
0	S1	14	17	10	9	24	14		PVMT	12" ASPHALT	130
									MISC. FILL	S1: Brown f-c SAND, some f-m gravel up to 1.5", trace silt, dry.	
5	S2	13	26	17	14	24	19		S2: Brown f-c SAND and f-c GRAVEL up to 1.5", trace silt, cobble fragments, dry.	125	
10	S3	3	4	3	4	24	11		S3: Brown f-c SAND, some f-m gravel up to 1", trace silt, moist.	120	
15	S4	5	4	4	23	24	5		S4: Brown f-c SAND and f-c GRAVEL up to 1", little silt, wet.	115	
20	S5	13	22	31	22	24	17		S5: Brown f-c SAND and f-c GRAVEL up to 1", trace silt, wet.	110	
25											

Sample Type: S = Split Spoon R = Rock Core T = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 52 ft. Rock: ft.	NOTES: Solid-stem auger to 10 ft, rotary wash to termination	Sheet 1 of 3
No. of Soil Samples: 11	No. of Core Runs: 0	SM-001-M REV. 1/02

Driller: S. Marino	Connecticut DOT Boring Report		Hole No.: HR-4
Inspector: P. Blessing	Town: Newtown/Southbury, CT	Stat./Offset: HRN 101+40/55' R	
Engineer: GEI	Project No.: 96-201	Northing:	
Start Date: 8-8-19	Route No.: I-84	Easting:	
Finish Date: 8-9-19	Bridge No.: 01218/04180	Surface Elevation: 134.0	

Project Description: I-84 EB/WB over Housatonic River

Casing Size/Type: " ID / 4.0" OD	Sampler Type/Size: SPT/2.0 " OD	Core Barrel Type: N/A
Hammer Type: Safety Hammer	Hammer Wt.: 140 lb Fall: 30 in.	

Groundwater Observations: Wet sample at 15.0 ft.

Depth (ft)	SAMPLES						Generalized Strata Description	Material Description and Notes	Elevation (ft)	
	Sample Type/No.	Blows on Sampler per 6 inches				Pen. (in.)				Rec. (in.)
25	S6	16	16	19	17	24	14		S6: Brown f-c SAND and f-c GRAVEL up to 1.5", trace silt, wet.	105
30	S7	26	28	31	67	24	12		S7: Brown to gray-brown f-c GRAVEL up to 1" and f-c SAND, trace silt, wet.	100
35	S8	7	4	3	7	24	12	SAND	S8: Brown f-m SAND, little silt, trace f-m gravel up to 1/2", wet.	95
40	S9	6	3	6	11	24	7	GRAVELLY SAND	S9: Gray-brown f-m SAND, some f-c gravel up to 1.5", trace silt, wet.	90
45	S10	7	3	11	16	24	5	SAND	S10: Gray-brown f-m SAND, trace silt, wet.	85

Sample Type: S = Split Spoon R = Rock Core T = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 52 ft. Rock: ft.	NOTES: Solid-stem auger to 10 ft, rotary wash to termination	Sheet 2 of 3
No. of Soil Samples: 11	No. of Core Runs: 0	SM-001-M REV. 1/02

Driller: S. Marino	Connecticut DOT Boring Report		Hole No.: HR-4
Inspector: P. Blessing	Town: Newtown/Southbury, CT	Stat./Offset: HRN 101+40/55' R	
Engineer: GEI	Project No.: 96-201	Northing:	
Start Date: 8-8-19	Route No.: I-84	Easting:	
Finish Date: 8-9-19	Bridge No.: 01218/04180	Surface Elevation: 134.0	

Project Description: I-84 EB/WB over Housatonic River

Casing Size/Type: " ID / 4.0" OD	Sampler Type/Size: SPT/2.0 " OD	Core Barrel Type: N/A
Hammer Type: Safety Hammer	Hammer Wt.: 140 lb Fall: 30 in.	

Groundwater Observations: Wet sample at 15.0 ft.

Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)
	Sample Type/No.	Blows on Sampler per 6 inches	Pen. (in.)	Rec. (in.)	RQD %			
50	S11	100/0.5"	1	0			S11: NO RECOVERY.	

End of Boring at 52 ft.

Borehole backfilled and asphalt patched upon completion.

Sample Type: S = Split Spoon R = Rock Core T = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 52 ft. Rock: ft.	NOTES: Solid-stem auger to 10 ft, rotary wash to termination	Sheet 3 of 3
No. of Soil Samples: 11	No. of Core Runs: 0	SM-001-M REV. 1/02

Driller: S. Marino	Connecticut DOT Boring Report				Hole No.: HR-5						
Inspector: P. Blessing	Town: Newtown/Southbury, CT			Stat./Offset: HRN 102+60/54' R							
Engineer: GEI	Project No.: 96-201			Northing:							
Start Date: 8-28-19	Route No.: I-84			Easting:							
Finish Date: 8-29-19	Bridge No.: 01218/04180			Surface Elevation: 135.0							
Project Description: I-84 EB/WB over Housatonic River											
Casing Size/Type: " ID / 4.0" OD		Sampler Type/Size: SPT/2.0 " OD			Core Barrel Type: N/A						
Hammer Type: Safety Hammer		Hammer Wt.: 140 lb Fall: 30 in.									
Groundwater Observations: Wet sample at 15.0 ft.											
Depth (ft)	SAMPLES					Generalized Strata Description	Material Description and Notes	Elevation (ft)			
	Sample Type/No.	Blows on Sampler per 6 inches							Pen. (in.)	Rec. (in.)	RQD %
0	S1	11	26	60	27	24	16		PVMT MISC. FILL	6" ASPHALT S1: Brown to red-brown f-c SAND and f-c GRAVEL up to 1", trace silt, dry.	135
5	S2	8 100/2"				8	4			S2: Brown f-c SAND, trace f-m gravel, trace silt, moist, asphalt fragment in sample. Grinding through concrete debris between 5.6 and 7.0 ft.	130
10	S3	23	21	17	29	24	18			S3: Brown to orange-brown m-c GRAVEL up to 1.5" and f-c SAND, trace silt, dry.	125
15	S4	23	24	24	22	24	12			S4: Brown f-c SAND, some f-m gravel up to 3/4", trace silt, wet.	120
20	S5	29	26	37	26	24	12			S5: Brown f-c SAND, little f-m gravel up to 1", trace silt,	115
25											110
<p>Sample Type: S = Split Spoon R = Rock Core T = Undisturbed Piston V = Vane Shear Test Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%</p>											
Total Penetration in Earth: 47 ft. Rock: ft.						NOTES: Solid-stem auger to 10 ft, rotary wash to termination Offset 5 feet east after obstruction encountered at 5.5 ft				Sheet 1 of 2	
No. of Soil Samples: 10						No. of Core Runs: 0				SM-001-M REV. 1/02	

Driller: S. Marino	Connecticut DOT Boring Report		Hole No.: HR-5
Inspector: P. Blessing	Town: Newtown/Southbury, CT	Stat./Offset: HRN 102+60/54' R	
Engineer: GEI	Project No.: 96-201	Northing:	
Start Date: 8-28-19	Route No.: I-84	Easting:	
Finish Date: 8-29-19	Bridge No.: 01218/04180	Surface Elevation: 135.0	

Project Description: I-84 EB/WB over Housatonic River

Casing Size/Type: " ID / 4.0" OD	Sampler Type/Size: SPT/2.0 " OD	Core Barrel Type: N/A
Hammer Type: Safety Hammer	Hammer Wt.: 140 lb Fall: 30 in.	

Groundwater Observations: Wet sample at 15.0 ft.

Depth (ft)	SAMPLES						Generalized Strata Description	Material Description and Notes	Elevation (ft)	
	Sample Type/No.	Blows on Sampler per 6 inches				Pen. (in.)				Rec. (in.)
25	S6	10	12	11	14	24	0		S6: NO RECOVERY.	110
30	S7	5	4	4	5	24	16	ORGANIC SILT	S7: Dark brown low plasticity ORGANIC SILT and f-SAND, trace f gravel, fine roots and fibrous organics, wet.	105
								GRAVELLY SAND		
35	S8	10	13	18	19	24	13		S8: Brown f-c SAND and f-c GRAVEL up to 1", trace silt, wet.	100
40	S9	7	8	7	7	24	17	SAND	S9: Red-brown f SAND, trace silt, wet.	95
45	S10	8	8	6	7	24	15		S10: Brown f-c SAND, trace silt, trace gravel up to 1/2", wet.	90

End of Boring at 47 ft.

Borehole backfilled and asphalt patched upon completion.

Sample Type: S = Split Spoon R = Rock Core T = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 47 ft. Rock: ft.	NOTES: Solid-stem auger to 10 ft, rotary wash to termination Offset 5 feet east after obstruction encountered at 5.5 ft	Sheet 2 of 2 SM-001-M REV. 1/02
No. of Soil Samples: 10 No. of Core Runs: 0		

Driller: S. Marino		Connecticut DOT Boring Report				Hole No.: HR-6					
Inspector: P. Blessing		Town: Newtown/Southbury, CT				Stat./Offset: HRN 104+08/45' L					
Engineer: GEI		Project No.: 96-201				Northing:					
Start Date: 8-5-19		Route No.: I-84				Easting:					
Finish Date: 8-6-19		Bridge No.: 01218/04180				Surface Elevation: 136.0					
Project Description: I-84 EB/WB over Housatonic River											
Casing Size/Type: " ID / 4.0" OD		Sampler Type/Size: SPT/2.0 " OD				Core Barrel Type: N/A					
Hammer Type: Safety Hammer		Hammer Wt.: 140 lb Fall: 30 in.									
Groundwater Observations: Wet sample at 20.0 ft.											
Depth (ft)	SAMPLES						Generalized Strata Description	Material Description and Notes	Elevation (ft)		
	Sample Type/No.	Blows on Sampler per 6 inches				Pen. (in.)				Rec. (in.)	RQD %
0	S1	2	3	14	20	24	23		S1A (0-12"): Brown f-c SAND, some silt, trace f-m gravel up to 1/2", fine roots, moist. S1B (12-23"): Brown f-c SAND, little f-c gravel up to 1", trace silt, dry.	135	
								TOPSOIL MISC. FILL			
5	S2	10	10	10	8	24	16		S2: Brown to light brown f-c SAND, some f-m gravel up to 1", trace silt, moist.	130	
10	S3	1	1	2	7	24	10		S3: Brown f-c SAND, trace f-c gravel up to 1.5", trace silt, moist.	125	
15	S4	14	11	10	17	24	0		S4: NO RECOVERY.	120	
20	S5	20	30	15	19	24	5	SANDY GRAVEL	S5: Light brown to gray-brown f-c GRAVEL up to 1.5" and f-c SAND, trace silt, wet.	115	
25	<p>Sample Type: S = Split Spoon R = Rock Core T = Undisturbed Piston V = Vane Shear Test</p> <p>Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%</p>										
Total Penetration in Earth: 39.1 ft. Rock: ft.						NOTES: Solid-stem auger to 10 ft, rotary wash to termination			Sheet 1 of 2		
No. of Soil Samples: 9		No. of Core Runs: 0								SM-001-M REV. 1/02	

Driller: S. Marino	Connecticut DOT Boring Report		Hole No.: HR-6
Inspector: P. Blessing	Town: Newtown/Southbury, CT	Stat./Offset: HRN 104+08/45' L	
Engineer: GEI	Project No.: 96-201	Northing:	
Start Date: 8-5-19	Route No.: I-84	Easting:	
Finish Date: 8-6-19	Bridge No.: 01218/04180	Surface Elevation: 136.0	

Project Description: I-84 EB/WB over Housatonic River

Casing Size/Type: " ID / 4.0" OD	Sampler Type/Size: SPT/2.0 " OD	Core Barrel Type: N/A
Hammer Type: Safety Hammer	Hammer Wt.: 140 lb Fall: 30 in.	

Groundwater Observations: Wet sample at 20.0 ft.

Depth (ft)	SAMPLES						Generalized Strata Description	Material Description and Notes	Elevation (ft)		
	Sample Type/No.	Blows on Sampler per 6 inches				Pen. (in.)				Rec. (in.)	RQD %
25	S6	51	46	88	66	24	3		SAND	S6: Brown f-c SAND, trace silt, trace f-m gravel, wet, spoon pushing cobble.	110
30	S7	69	24	28	13	24	6		SAND GRAVEL	S7: Brown f- c GRAVEL up to 1.5" and f-c SAND, little silt, wet.	105
35	S8	10	17	18	19	24	12		SAND	S8: Red-brown to brown f SAND, little silt, wet. Bit grinding and difficult advancement at 37.0-39.0 ft	100
	S9	100/0.5"				1	0			S9: NO RECOVERY.	

End of Boring at 39.1 ft.

Borehole backfilled and asphalt patched upon completion.

Sample Type: S = Split Spoon R = Rock Core T = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 39.1 ft. Rock: ft.	NOTES: Solid-stem auger to 10 ft, rotary wash to termination	Sheet 2 of 2
No. of Soil Samples: 9	No. of Core Runs: 0	SM-001-M REV. 1/02

Driller: S. Marino	Connecticut DOT Boring Report		Hole No.: HR-7
Inspector: P. Blessing	Town: Newtown/Southbury, CT	Stat./Offset: HRN 105+42/18' L	
Engineer: GEI	Project No.: 96-201	Northing:	
Start Date: 8-5-19	Route No.: I-84	Easting:	
Finish Date: 8-5-19	Bridge No.: 01218/04180	Surface Elevation: 138.0	

Project Description: I-84 EB/WB over Housatonic River

Casing Size/Type: " ID / 4.0" OD	Sampler Type/Size: SPT/2.0 " OD	Core Barrel Type: N/A
Hammer Type: Safety Hammer	Hammer Wt.: 140 lb Fall: 30 in.	

Groundwater Observations: Wet sample at 15.0 ft.

Depth (ft)	SAMPLES						Generalized Strata Description	Material Description and Notes	Elevation (ft)
	Sample Type/No.	Blows on Sampler per 6 inches				Pen. (in.)			
0	S1	4	15	21	31	24	21		135
								TOPSOIL SANDY GRAVEL	
5	S2	6	7	6	5	24	9		130
								GRAVELLY SAND	
10	S3	5	5	6	6	24	21		125
								SAND	
15	S4	2	6	7	10	24	19		120
								SANDY SILT SAND	
20	S5	5	8	11	13	24	22		

End of Boring at 22 ft.

Borehole backfilled and asphalt patched upon completion.

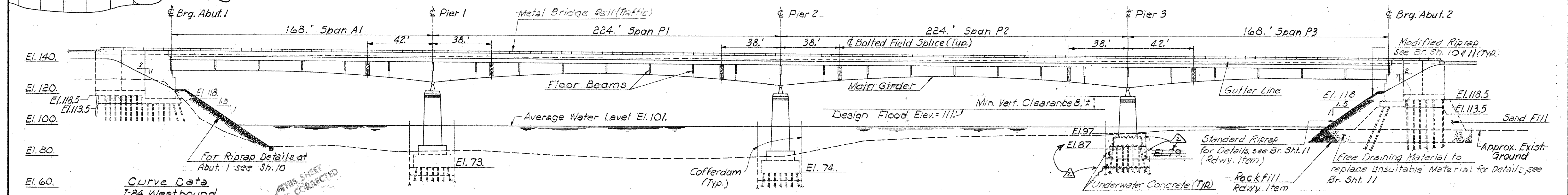
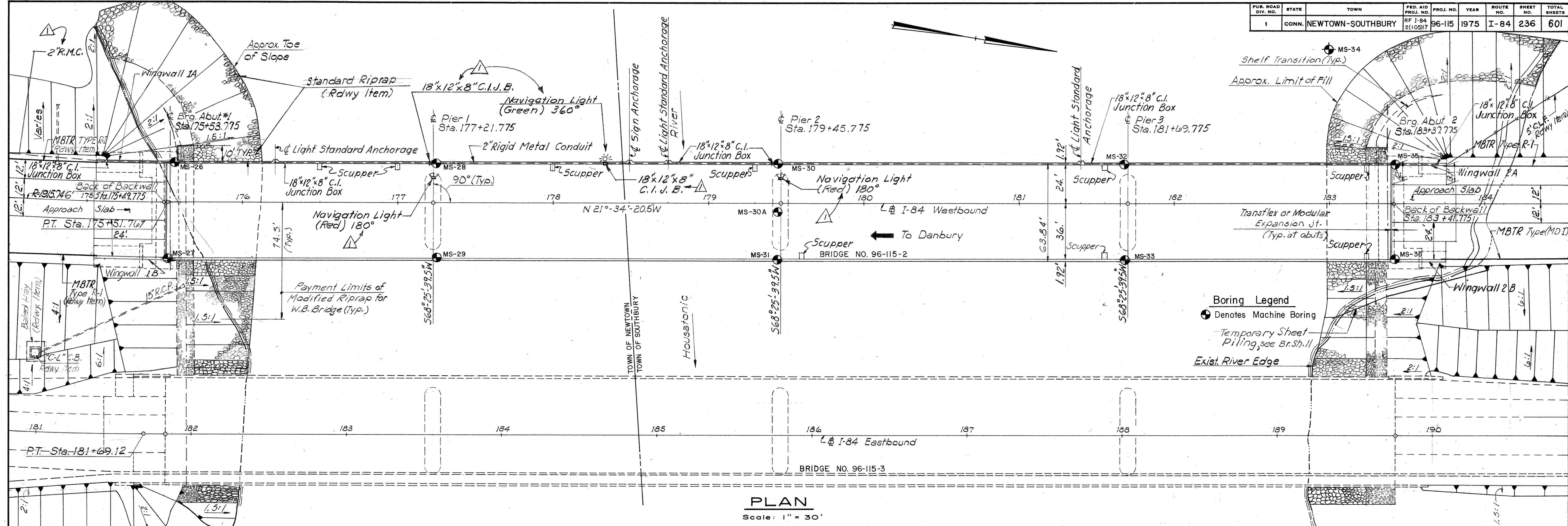
Sample Type: S = Split Spoon R = Rock Core T = Undisturbed Piston V = Vane Shear Test
Proportions Used: Trace = 1 - 10%, Little = 10 - 20%, Some = 20 - 35%, And = 35 - 50%

Total Penetration in Earth: 22 ft. Rock: ft.	NOTES: Advanced to planned depth using Hollow Stem Augers.	Sheet 1 of 1
No. of Soil Samples: 5	No. of Core Runs: 0	SM-001-M REV. 1/02

TEMPORARY WORKS GEOTECHNICAL REPORT
CT DOT BRIDGE NOS. 01218, 04180
I-84 EB/WB OVER HOUSATONIC RIVER
NEWTOWN/SOUTHBURY, CONNECTICUT
OCTOBER 11, 2019

Appendix B

Relevant Historical Data



Curve Data
I-84 Westbound
 $\Delta = 34^\circ 46' 49.7''$
 $D = 2^\circ 59' 26.8''$
 $T = 600'$
 $L = 1162.92'$
 $R = 1915.746'$
 $P.C.C. = 163+88.844$
 $P.T. = 175+51.767$

LIST OF DRAWINGS	
SHEET NO.	DESCRIPTION
1-3	GENERAL PLANS, LAYOUT, PROFILES & COORDINATES
4-6	BORINGS
7-11	PILE & ABUTMENT PLANS & ABUTMENT DETAILS
12-13	PIER PLANS & DETAILS
14-19	FRAMING PLANS & STEEL DETAILS
20	SLAB ELEVATIONS, CAMBERS & DEFLECTIONS
21-24	SLAB PLANS & DETAILS
25	SCUPPER DETAILS
26-27	EXPANSION JOINT DETAILS
28-29	METAL BRIDGE RAIL DETAILS
30	ELECTRICAL DETAILS

Hydraulic Data	
Magnitude (5* M.A.F.)	= 100 Year Frequency
Effective Drainage Area	= 1221 Sq. Miles
Design Q	= 95000 C.F.S.
Design Flood Elevation	= Westbound Baseline 111.1 Ft.

REVISIONS		
NO.	DATE	DESCRIPTION
1	6/7/77	Revise Pier 3 Footing

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FEDERAL AID PROJECT NO. RFI-84-2(105)17

CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS

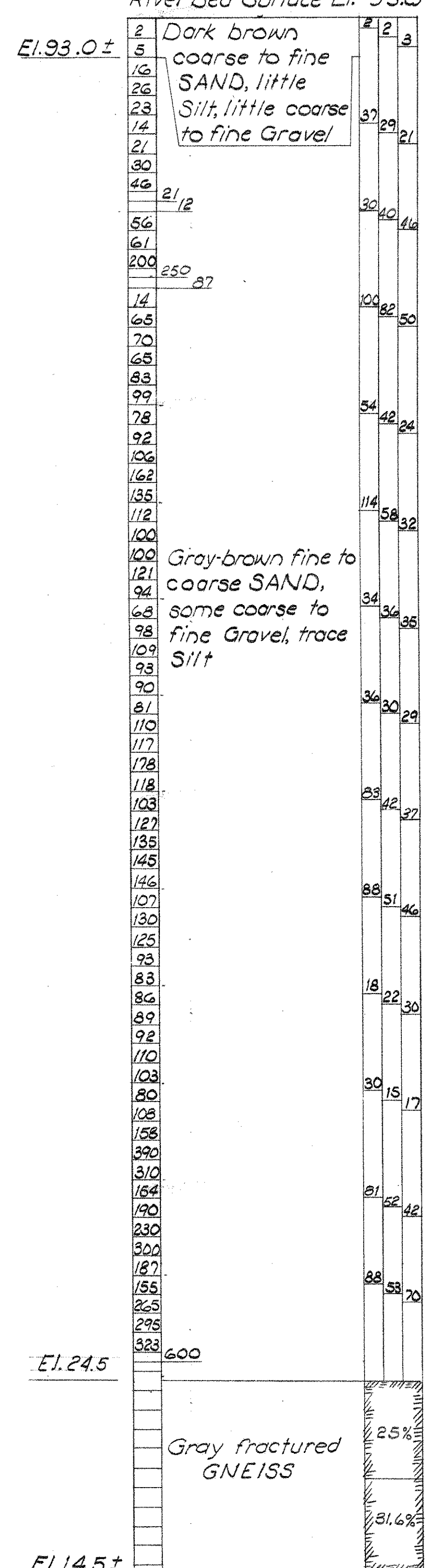
NEWTOWN - SOUTHBURY

INTERSTATE ROUTE 84
WESTBOUND OVER
HOUSATONIC RIVER

GENERAL PLAN NO. 1

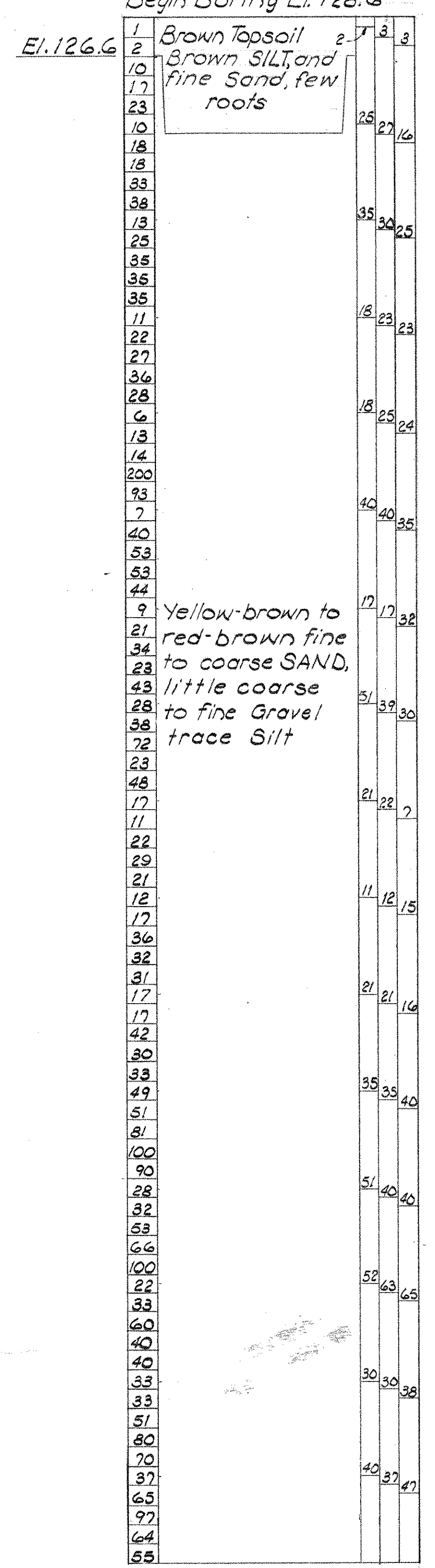
ENGINEER: JAMES P. PURCELL ASSOCIATES
 APPROVED: [Signature] DATE: 5-9-72
 DRAFTSMAN: D.P.S. CHECKER: R.E.L. DESIGNER: R.F.L.
 STRUCTURE NO.: 96-115-2 STRUCTURE SHEET 1 of 30

HOLE NO. MS-26
STA. 175+57 @ W.B. RDWY.
OFFSET 25' LEFT
N 220671.1
E 463444.1
River Bed Surface El. 95.0



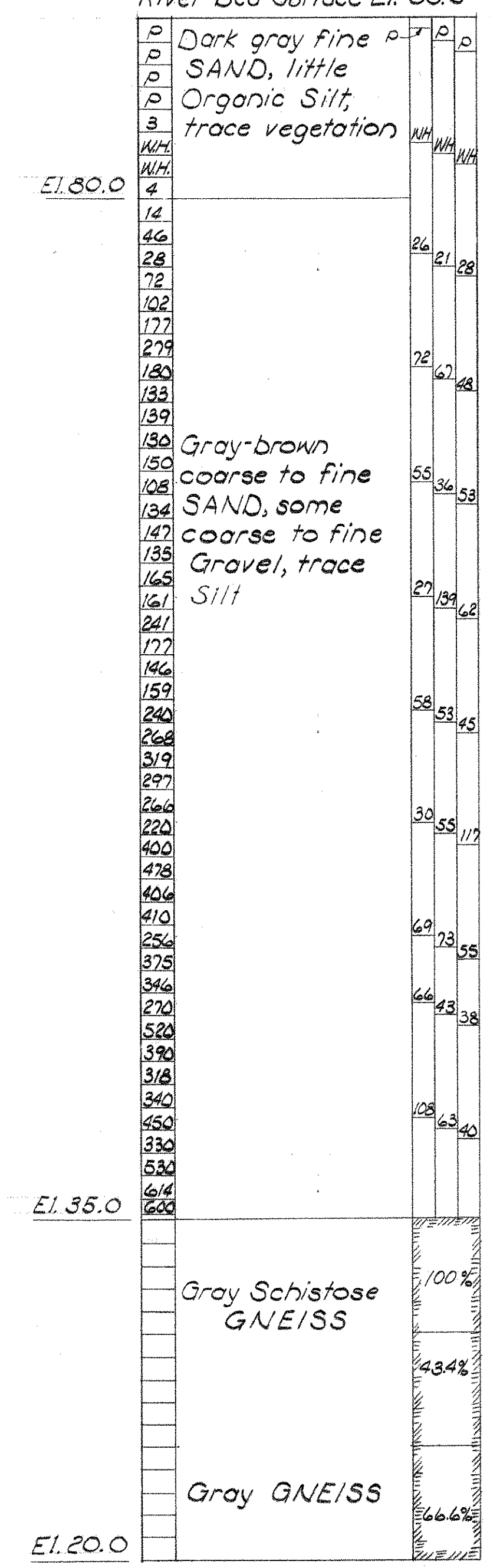
End of Boring
River Bed Surface to 70.5 ft.
Used 2 1/2" Casing then
no casing to 80.5

HOLE NO. MS-27
STA. 175+52 @ W.B. RDWY.
OFFSET 36' RIGHT
N 220688.9
E 463502.9
Begin Boring El. 128.6



Yellow-brown to
red-brown fine
to coarse SAND,
little coarse
to fine Gravel
trace Silt

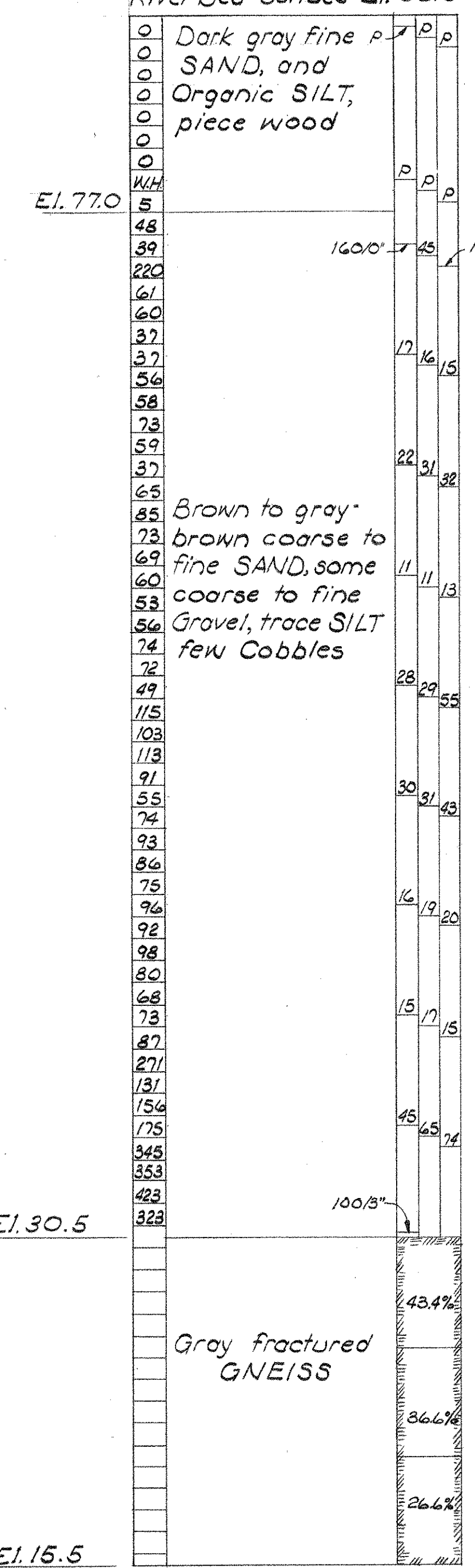
HOLE NO. MS-28
STA. 177+25 @ W.B. RDWY.
OFFSET 25' LEFT
N 220827.3
E 463382.6
River Bed Surface El. 88.0



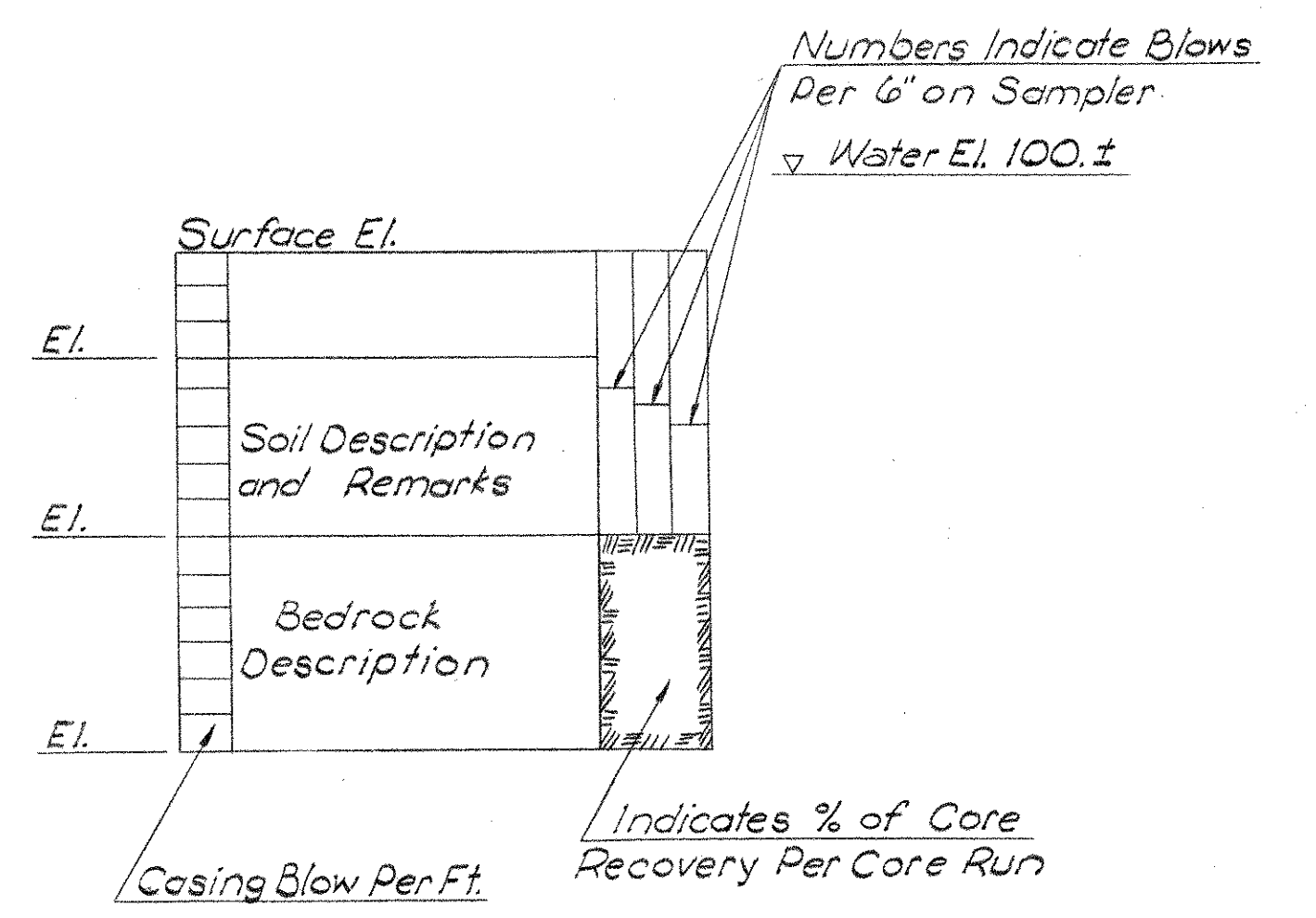
End of Boring
River Bed Surface to 53 ft.
Used 4" Casing then no
casing to 68 ft.

Note:
All Borings on this sheet were taken in October, 1971

HOLE NO. MS-29
STA. 177+25 @ W.B. RDWY.
OFFSET 35' RIGHT
N 220849.3
E 463438.4
River Bed Surface El. 86.0



End of Boring
River Bed Surface to 55.5 ft.
Used 2 1/2" Casing then no
casing to 70.5 ft



KEY

Scale: 1" = 5'-0"

DRILLING DATA MS-26

Type	Casing	Sampler	Core Barrel
Type	Pipe	S.S.	Ax
Size I.D.	2 1/2"	2"	1 1/8"
Hammer Wt.	300#	140#	
Hammer Fall	24"	30"	

DRILLING DATA MS-27

Type	Casing	Sampler	Core Barrel
Type	F.J.	S.S.	A x M
Size I.D.	2 1/2"	1 3/8"	1 1/8"
Hammer Wt.	300#	140#	Diamond
Hammer Fall	24"	30"	

DRILLING DATA MS-28

Type	Casing	Sampler	Core Barrel
Type	Pipe	S.S.	N x M
Size I.D.	4"	2"	2 1/8"
Hammer Wt.	300#	140#	
Hammer Fall	24"	30"	

DRILLING DATA MS-29

Type	Casing	Sampler	Core Barrel
Type	Pipe	S.S.	Ax
Size I.D.	2 1/2"	2"	1 1/8"
Hammer Wt.	300#	140#	Single Tube
Hammer Fall	24"	30"	

THIS SHEET
NOT CORRECTED

CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS

NEWTOWN - SOUTHBURY

**INTERSTATE ROUTE 84
WESTBOUND OVER
HOUSATONIC RIVER**

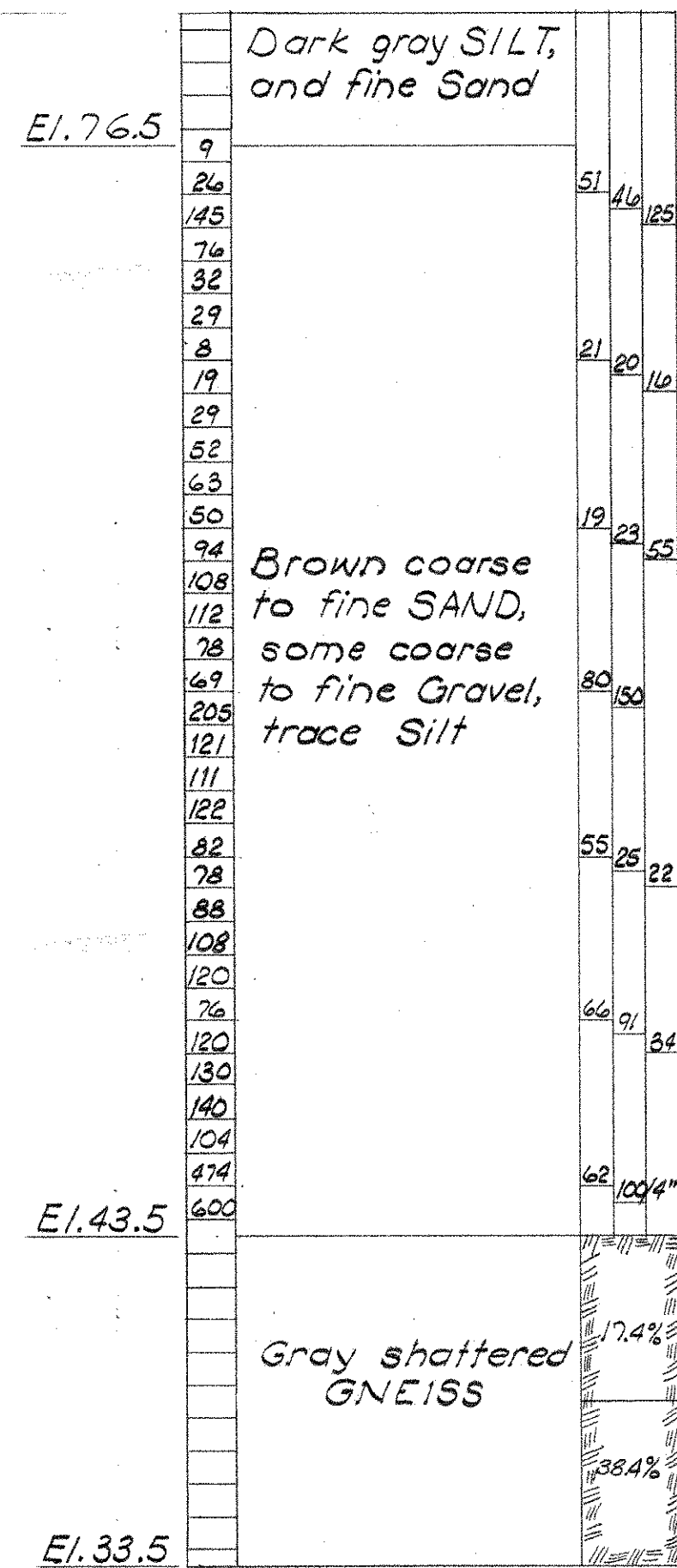
BORINGS No. 1

ENGINEER: JAMES P. PURCELL ASSOCIATES
APPROVED: *James P. Purcell* DATE: 5-9-72
DRAFTSMAN: G.J.Z. CHECKER: A.P. DESIGNER: N.A.
STRUCTURE NO: 96-115-2 STRUCTURE SHEET 4 of 30

REVISIONS		
NO.	DATE	DESCRIPTION

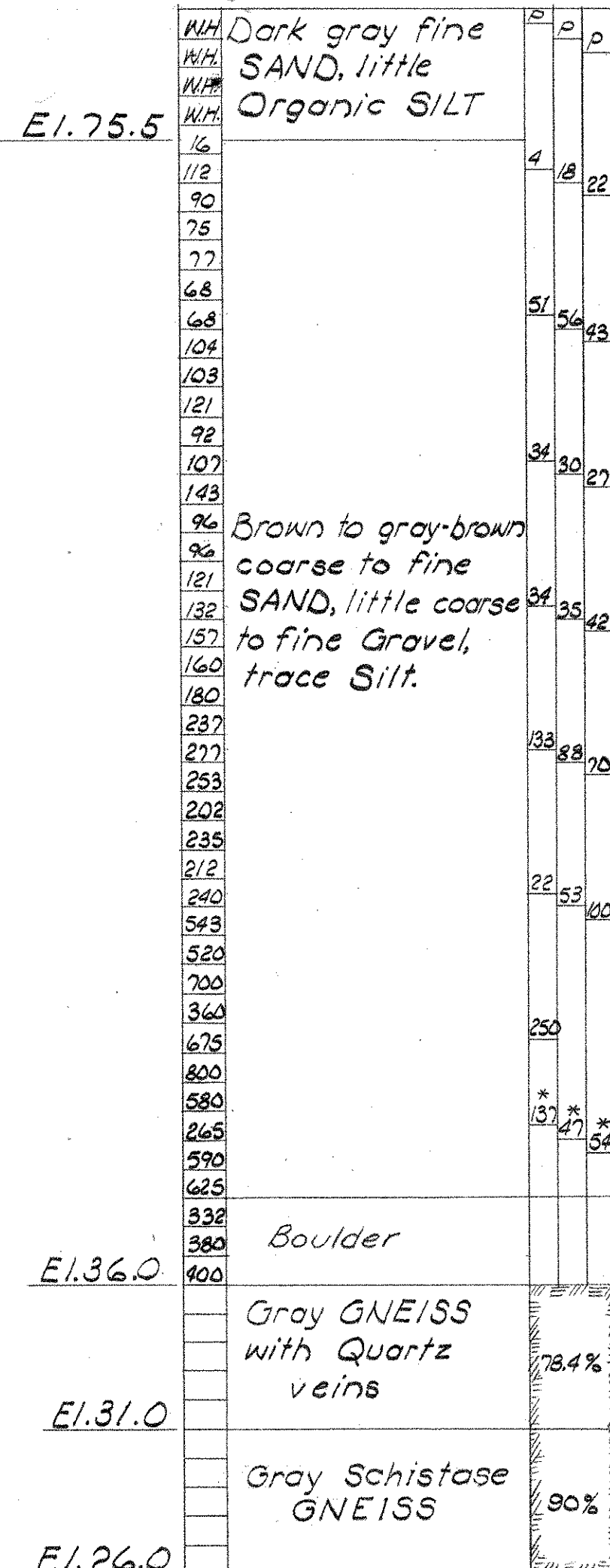
THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE TRUE CONDITIONS OR ACTUAL QUANTITIES OR DISTRIBUTION OF QUANTITIES OF WORK WHICH WILL BE REQUIRED.

HOLE NO. MS-30
STA. 179+45 @ W.B. RDWY.
OFFSET 25' LEFT
N 221031.9
E 463301.7
River Bed Surface El. 80.5



End of Boring
River Bed Surface to 37 ft.
Used 2 1/2" Casing then no casing to 47 ft.

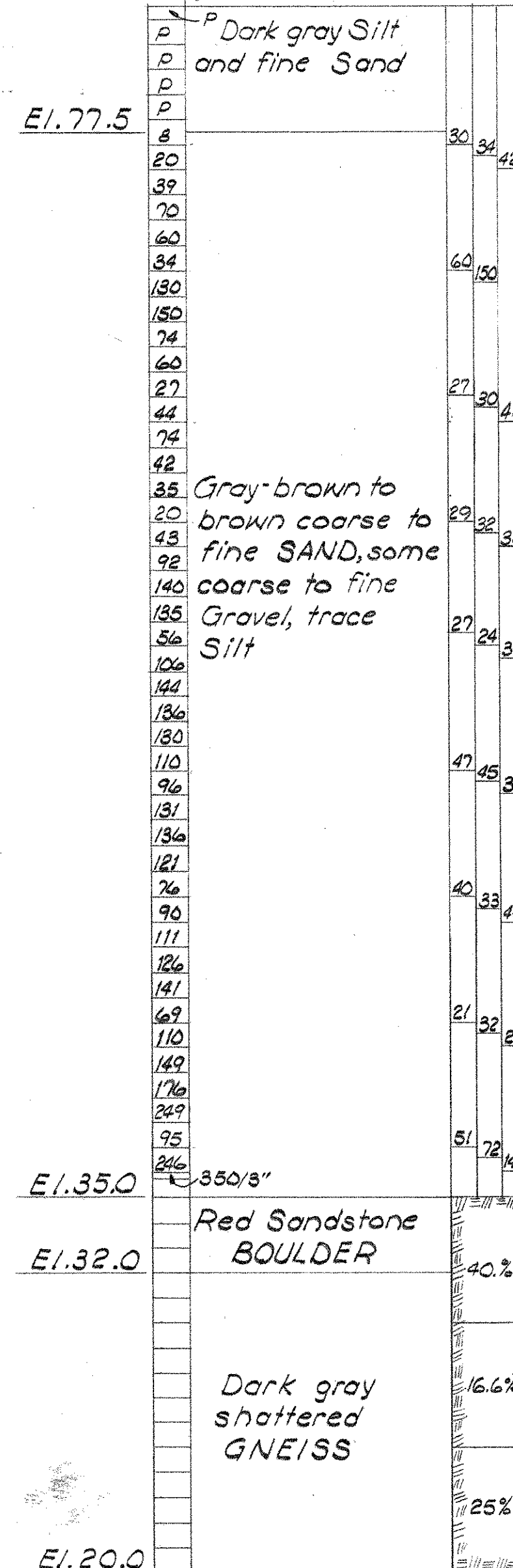
HOLE NO. MS-30A
STA. 179+45 @ W.B. RDWY.
OFFSET 5' RIGHT
N 221042.9
E 463329.6
River Bed Surface El. 80.0



End of Boring
River Bed Surface to 44 ft.
Used 4" Casing then no casing to 54 ft.

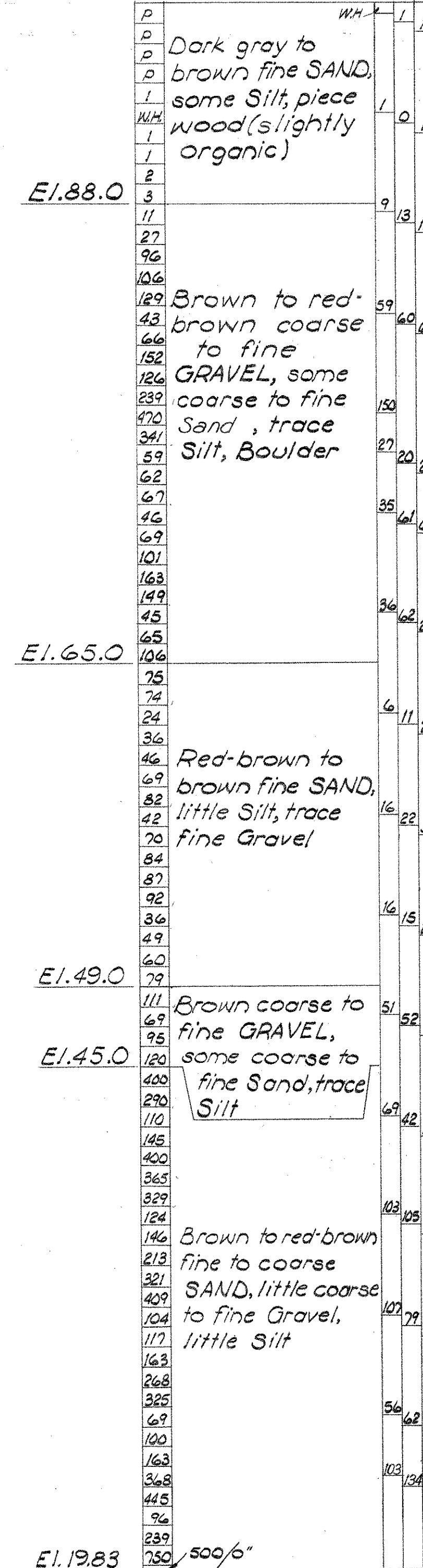
* Used open end rod and 140# Hammer.

HOLE NO. MS-31
STA. 179+45 @ W.B. RDWY.
OFFSET 36' RIGHT
N 221054.3
E 463358.4
River Bed Surface El. 82.5

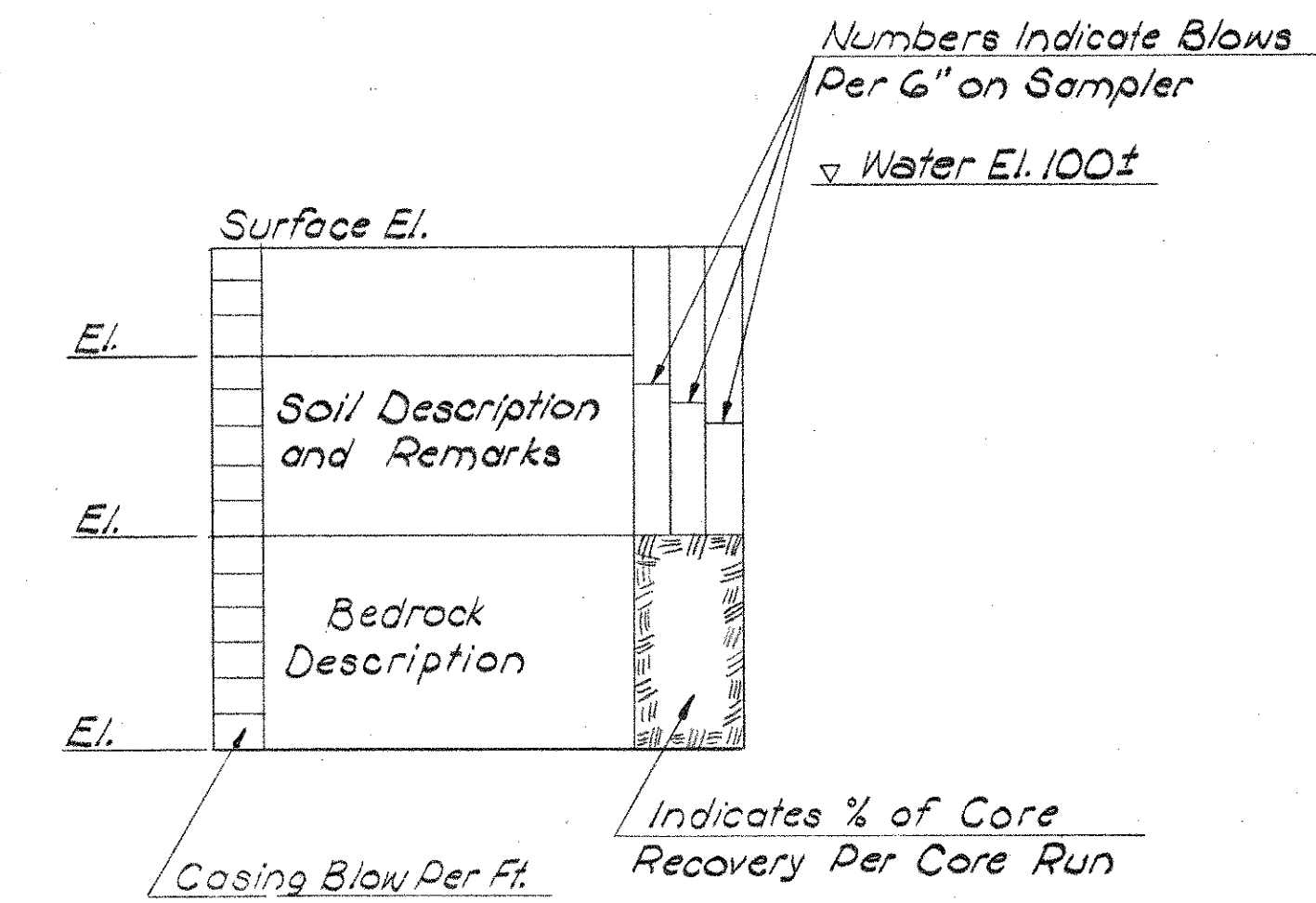


End of Boring
River Bed Surface to 47.5 ft.
Used 2 1/2" Casing then no casing to 62.5 ft.

HOLE NO. MS-32
STA. 181+68 @ W.B. RDWY.
OFFSET 25' LEFT
N 221257.6
E 463266.2
River Bed Surface El. 98.0



End of Boring
River Bed Surface El. to 78.17 ft.
Used 2 1/2" Casing



KEY
Scale: 1" = 5'-0"
P = Push
W.H. = Weight of Hammer

DRILLING DATA MS-30

	Casing	Sampler	Core Barrel
Type	Pipe	5.5	Ax
Size I.D.	2 1/2"	2"	1 1/8"
Hammer Wt.	300#	140#	
Hammer Fall	24"	30"	

DRILLING DATA MS-30A

	Casing	Sampler	Core Barrel
Type	Pipe	5.5	N x M
Size I.D.	4"	2"	2 1/8"
Hammer Wt.	300#	140#	
Hammer Fall	24"	30"	

DRILLING DATA MS-31, MS-32

	Casing	Sampler	Core Barrel
Type	—	5.5	—
Size I.D.	—	2 1/2"	—
Hammer Wt.	—	140#	—
Hammer Fall	—	30"	—

THIS SHEET NOT CORRECTED

Note: Boring MS-30A was taken in November, 1971
Borings MS-30, MS-31, & MS-32 were taken in October, 1971.

CONNECTICUT
DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS

NEWTOWN - SOUTHBURY

**INTERSTATE ROUTE 84
WESTBOUND OVER
HOUSATONIC RIVER**

BORINGS No. 2

ENGINEER: JAMES P. PURCELL ASSOCIATES
APPROVED: *James P. Purcell* DATE: 5-9-72
DRAFTSMAN: G.J.Z. CHECKER: A.P. DESIGNER: N.A.
STRUCTURE NO: 96-115-2 STRUCTURE SHEET 5 of 30

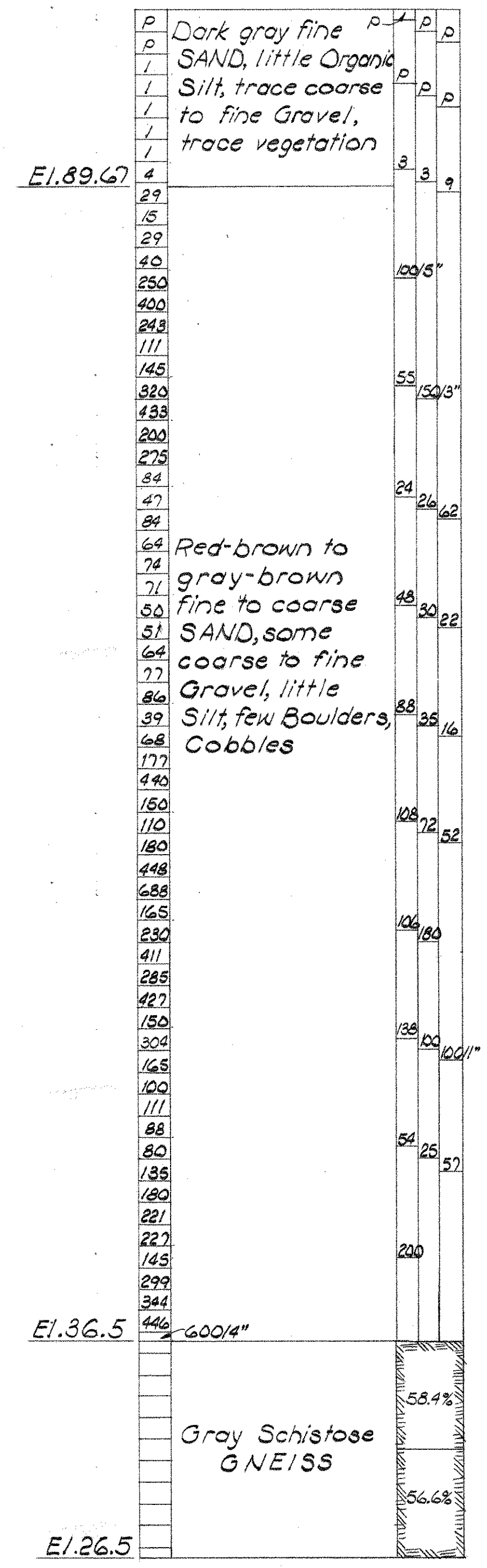
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REVISIONS

NO.	DATE	DESCRIPTION

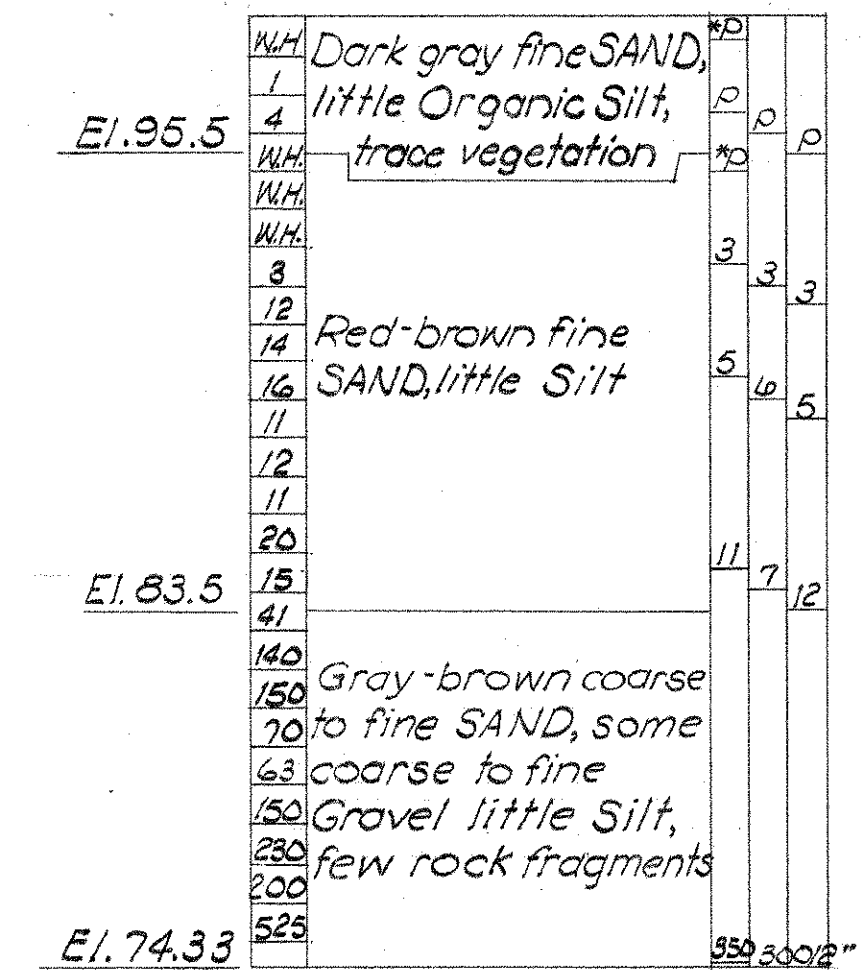
M 462 01

HOLE NO. MS-33
 STA. 181+68 @ W.B. RDWY.
 OFFSET 36' RIGHT
 N 221261.7
 E 463276.4
 River Bed Surface El. 98.0



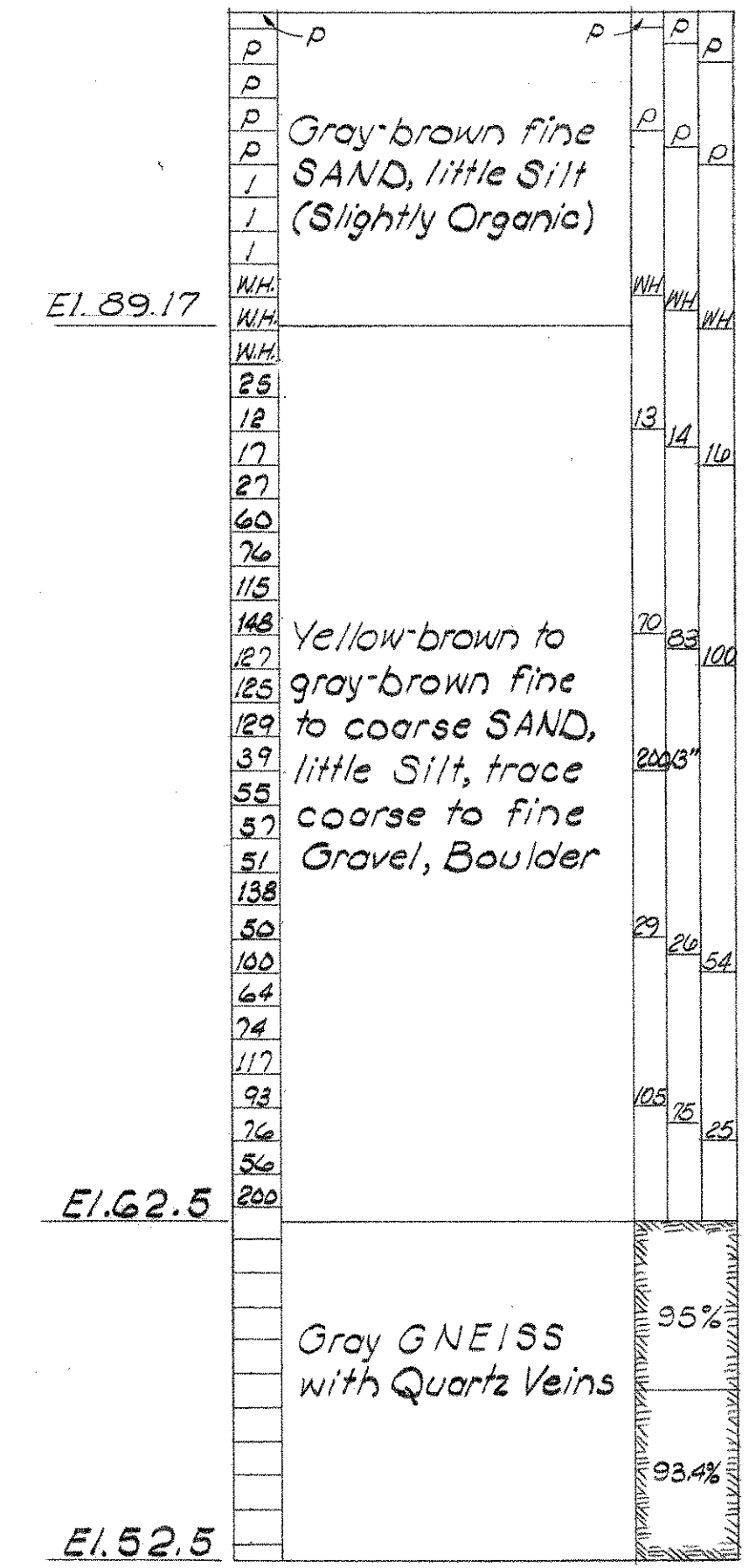
End of Boring
 River Bed Surface to 61.5 ft.
 Used 2 1/2" Casing then no casing to 71.5 ft.

HOLE NO. MS-34
 STA. 183+00 @ W.B. RDWY.
 OFFSET 100' LEFT
 N 221334.4
 E 463101.4
 River Bed Surface El. 99.0



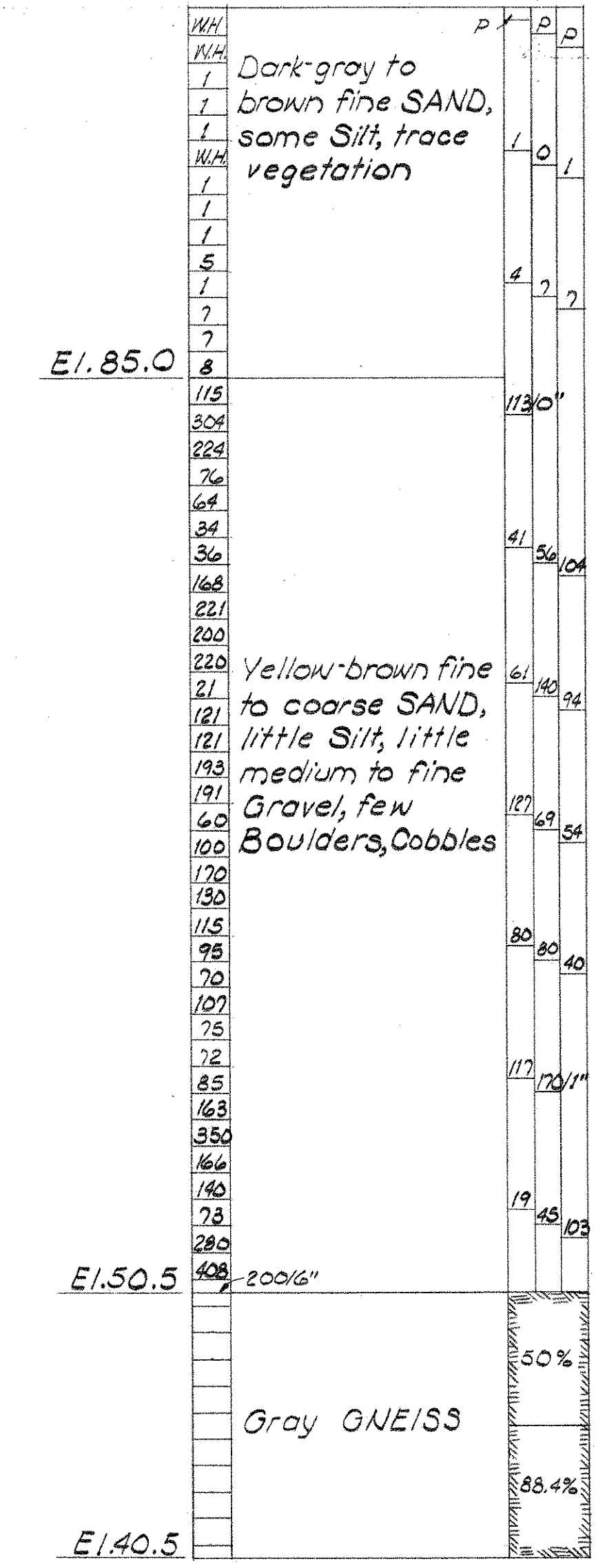
End of Boring
 River Bed Surface to 24.67 ft.
 Used 3 1/2" Casing * P=24"
 MS-34 is Undisturbed Boring

HOLE NO. MS-35
 STA. 183+42 @ W.B. RDWY.
 OFFSET 25' LEFT
 N 221401.1
 E 463155.7
 River Bed Surface El. 98.5

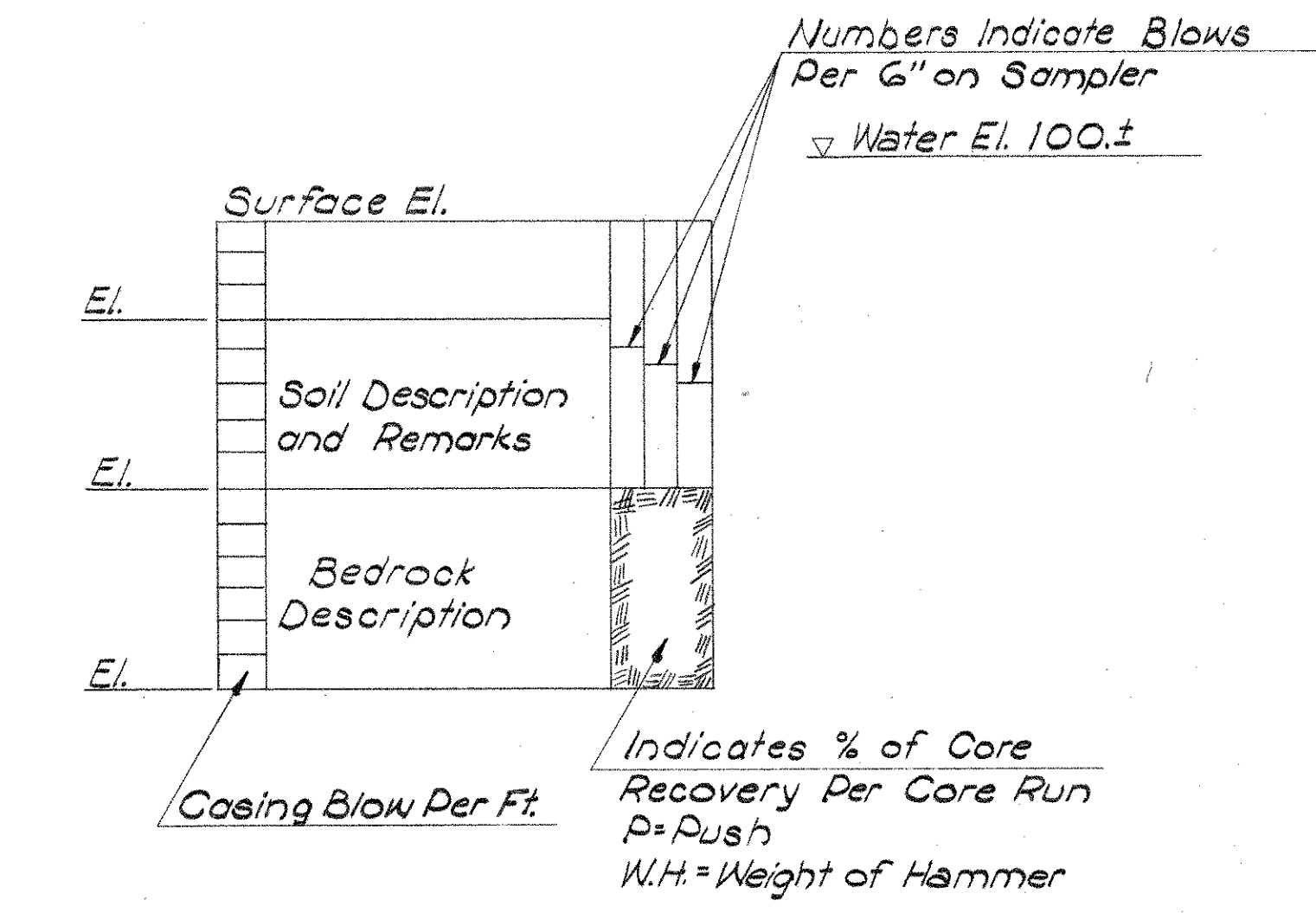


End of Boring
 River Bed Surface to 36 ft.
 Used 2 1/2" Casing then no casing to 46 ft.

HOLE NO. MS-36
 STA. 183+42 @ W.B. RDWY.
 OFFSET 36' RIGHT
 N 221423.5
 E 463212.5
 River Bed Surface El. 99.0



End of Boring
 River Bed Surface to 48.5 ft.
 Used 2 1/2" Casing then no casing to 58.5 ft.



KEY
 Scale: 1" = 5'-0"

DRILLING DATA MS-33, MS-35

Type	Casing Pipe	Sampler S.S.	Core Barrel Ax
Size I.D.	2 1/2"	2"	1 1/8"
Hammer Wt.	300#	140#	
Hammer Fall	24"	30"	

DRILLING DATA MS-34

Type	Casing Pipe	Sampler S.S.	Core Barrel Steel
Size I.D.	3 1/2"	2"	3"
Hammer Wt.	300#	140#	Hydr.
Hammer Fall	24"	30"	

DRILLING DATA MS-36

Type	Casing Pipe	Sampler S.S.	Core Barrel
Size I.D.	2 1/2"	2"	
Hammer Wt.	300#	140#	
Hammer Fall	24"	30"	

THIS SHEET NOT CORRECTED

THIS SHEET NOT CORRECTED

Note: Boring MS-34 was taken in November 1971
 Borings MS-33, MS-35 & MS-36 were taken in October, 1971

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REVISIONS		
NO.	DATE	DESCRIPTION

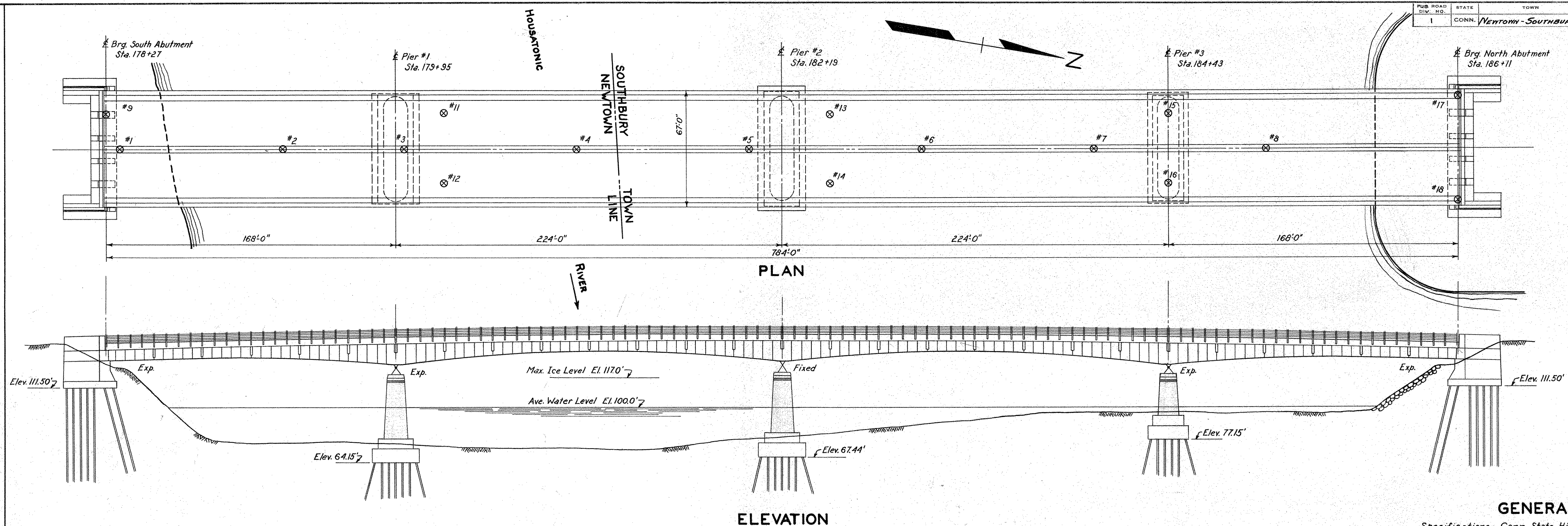
CONNECTICUT
 DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAYS

NEWTOWN - SOUTHBURY

INTERSTATE ROUTE 84
 WESTBOUND OVER
 HOUSATONIC RIVER

BORINGS No. 3

ENGINEER: JAMES P. PURCELL & ASSOCIATES
 APPROVED: James P. Purcell DATE: 5-9-72
 DRAFTSMAN: G.J.Z. CHECKER: A.P. DESIGNER: NA
 STRUCTURE NO. 96-115-2 STRUCTURE SHEET 6 of 30



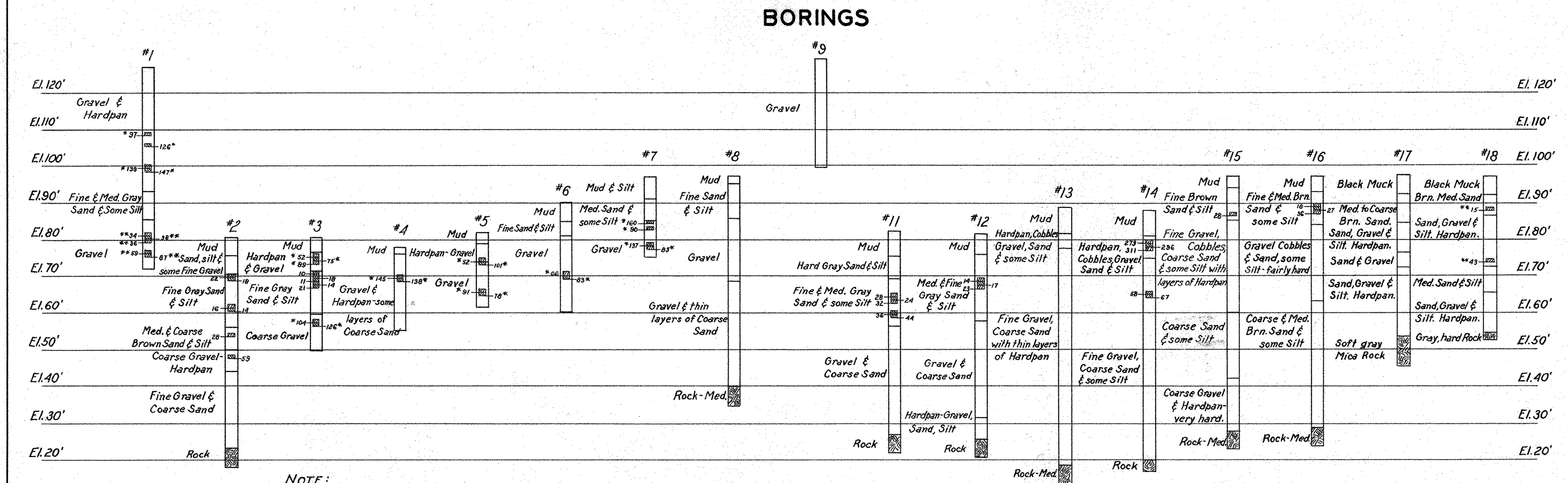
GENERAL NOTES

Specifications - Conn. State Highway Dept. Form 807, 1947 and AASHTO H20-S16-49 and Special Provisions.
 Structural Steel and Metal Bridge Rail to be painted one shop coat of Zinc Chromate and Iron Oxide and two field coats of Aluminum. See Special Provisions. No paint to be used on those surfaces in contact with the concrete.
 All necessary welding and weld material to be included in the item of Structural Steel.
 Class A Concrete to be used thruout except as noted for grid flooring. Deformed Bars shall be of an approved type.
 Quantities are approximate only and do not relieve the Contractor of the responsibility of checking them in preparing his bid.

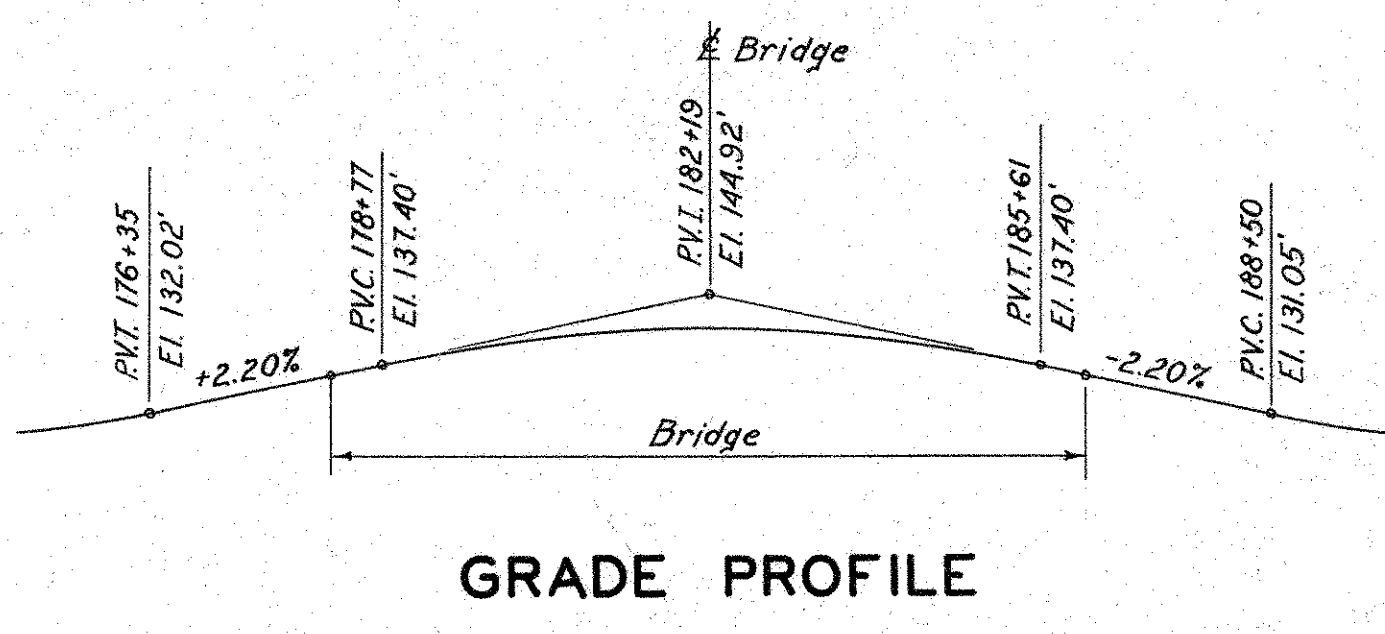
DISTRIBUTION OF CLASS A CONCRETE

FOOTING	SUBSTRUCTURE	SUPERSTRUCTURE	TOTAL
2850 c.y.	2800 c.y.	1028 c.y.	6681 c.y.

TREMIE CONCRETE 772 c.y.



NOTE:
 The number opposite the strata is the number of blows needed to drive the Sampler Pipe 1'-0" with a 300 lb. hammer falling 2'-0" & using a 3" diameter Pipe.
 * denotes 4" casing Pipe used.
 ** denotes 2 1/2" casing Pipe used.



GRADE PROFILE

Bridge No. 01218 (I-84 EB over Housatonic River)

REVISIONS		
NO.	DATE	DESCRIPTION

Fed. Aid Proj. FI-41(8)

CONNECTICUT
 STATE HIGHWAY DEPARTMENT
HOUSATONIC RIVER BRIDGE
 RELOCATION U.S. ROUTE NO. 6
 BETWEEN
 NEWTOWN AND SOUTHURBY
GENERAL PLAN-PROFILE

DESIGNED BY F.J.T.
 SCALES 1"=30'-0"
 MADE BY V.J.B. DATE 6-27-50
 CHECKED BY F.J.T. DATE 7-24-50
 APPROVED J.D. DUNN DATE 7-28-50

PROJECT NO. 96-49-03
 BRIDGE SHEET NO. 1 OF 9

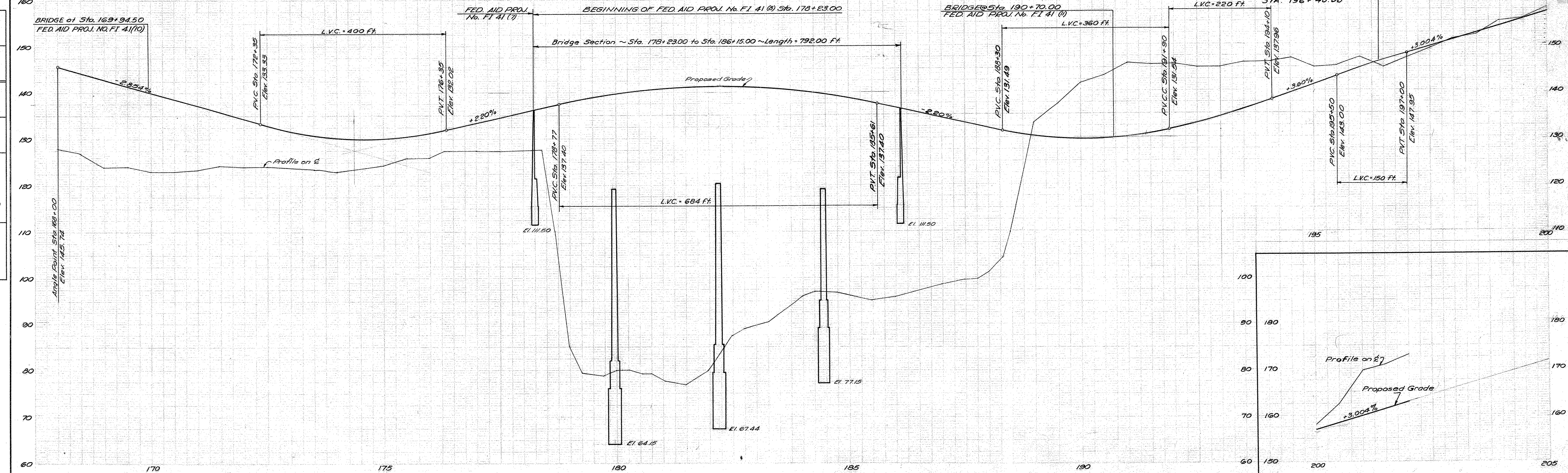
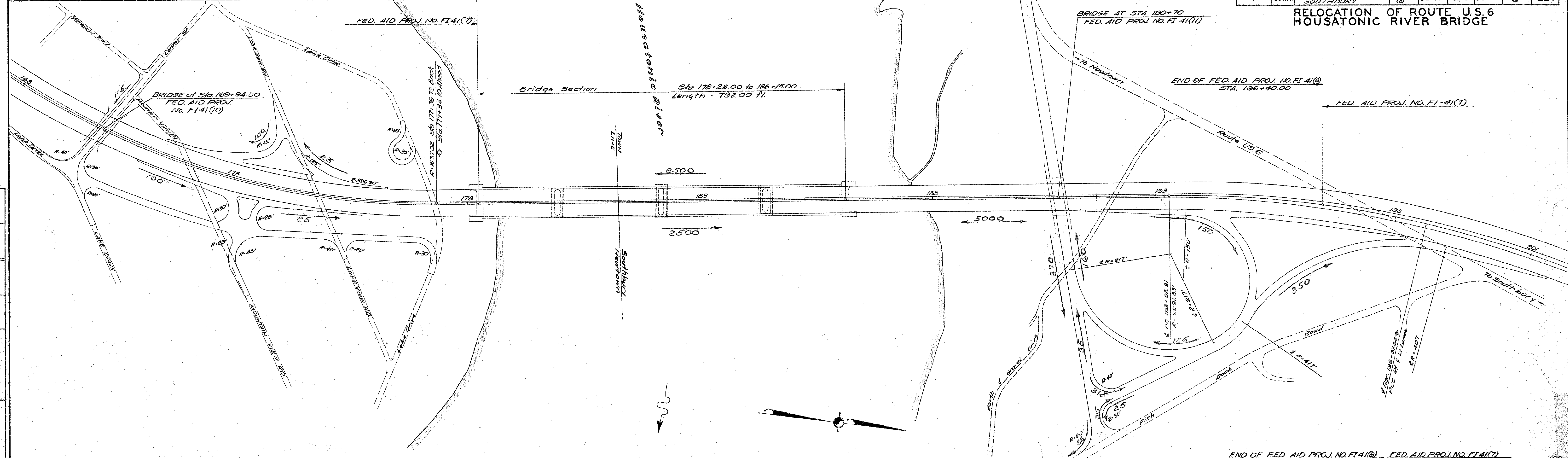
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INDEX PLAN

SCALE - 1"=100'

PUB. ROAD DIV. NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	NEWTOWN & SOUTH BURY	FI-41 (2)	96-49	1990	US 6	2	25

RELOCATION OF ROUTE U.S. 6 HOUSATONIC RIVER BRIDGE

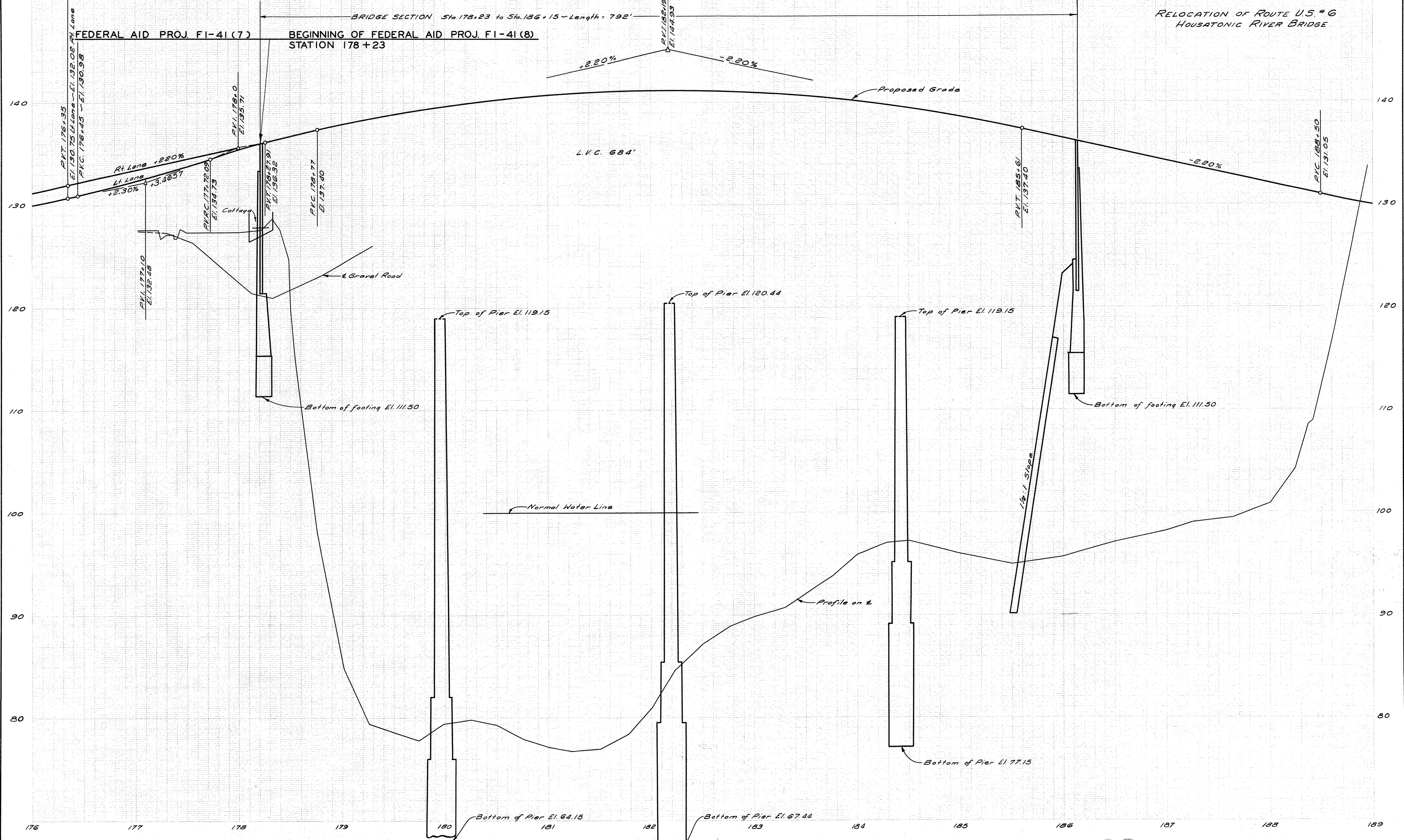


PLAN	NOTE BOOK NO.
Surveyed	
Plotted	
Alignment	
Traced	
New Const. Noted	
Designed	

PROFILE	NOTE BOOK NO.
Surveyed	
Plotted	
Grade	
Traced	
New Const. Noted	
Designed	

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PUB. ROAD DIV. NO.		STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1		CONN.	Newtown-Southbury	F1-41(7)	96-49	1950	U.S. 6	5	25



PROFILE	Lead	Year	Surveys	Plotted	Traced	New Const.	Noted	Designed
NO. 26-324	1943	1950	Original	1950	1950	1950	1950	1950

Available Historical Information: Pier 2 - Eastbound
GEI Project # 125810-8
Newtown Bridge No. 01218 - Rt. 84 EB over Housatonic River

Pile ID	Pile Length (ft)	Cutoff Elev (ft)	Tip Elev (ft)	Embedment below Cap (ft)
1	52.3	78.4	26.1	51.3
10	54.1	78.4	24.3	53.1
18	60.9	78.4	17.5	59.9
25	58.9	78.4	19.5	57.9
34	59.6	78.4	18.8	58.6
41	54.3	78.4	24.1	53.3
49	56.8	78.4	21.6	55.8
55	52.6	78.4	25.8	51.6
62	56.8	78.4	21.6	55.8
71	61	78.4	17.4	60.0
78	59	78.4	19.4	58.0
85	58.1	78.4	20.3	57.1
95	57.3	78.4	21.1	56.3
105	56.4	78.4	22	55.4
115	59.3	78.4	19.1	58.3
125	53.5	78.4	24.9	52.5

Available Historical Information: Pier 3 - Eastbound
GEI Project # 125810-8
Newtown Bridge No. 01218 - Rt. 84 EB over Housatonic River

Pile ID	Cutoff Elev (ft)	Tip Elev (ft)	Embedment below Cap (ft)
3	87.2	29	53.2
4	87.2	29	53.2
5	87.2	29	53.2
6	87.2	29	53.2
7	87.2	28	54.2
8	87.2	28	54.2
22	87.2	29	53.2
23	87.2	36	46.2
24	87.2	31	51.2

Available Historical Information: North Abutment - Eastbound
GEI Project # 125810-8
Newtown Bridge No. 01218 - Rt. 84 EB over Housatonic River

Pile ID	Cutoff Elev (ft)	Tip Elev (ft)	Embedment below Cap (ft)
3	112.5	63.8	47.7
7	112.5	58.9	52.6
13	112.5	55	56.5
14	112.5	55	56.5
15	112.5	55	56.5
16	112.5	55	56.5
17	112.5	55	56.5
18	112.5	55	56.5
19	112.5	55	56.5
23	112.5	59.8	51.7
32	112.5	62.8	48.7
33	112.5	69.1	42.4
34	112.5	73	38.5
35	112.5	69.9	41.6
36	112.5	62.9	48.6
37	112.5	55.8	55.7
38	112.5	55.9	55.6

Available Historical Information: South Abutment - Eastbound
GEI Project # 125810-8
Newtown Bridge No. 01218 - Rt. 84 EB over Housatonic River

Pile ID	Pile Length (ft)	Cutoff Elev (ft)	Tip Elev (ft)	Embedment below Cap (ft)
1	95	112.5	17.5	94.0
2	94	112.5	18.5	93.0
3	91	112.5	21.5	90.0
4	93	112.5	19.5	92.0
5	88	112.5	24.5	87.0
6	88	112.5	24.5	87.0
7	87	112.5	25.5	86.0
8	86	112.5	26.5	85.0
9	88	112.5	24.5	87.0
10	88	112.5	24.5	87.0
11	88	112.5	24.5	87.0
12	87	112.5	25.5	86.0
13	90	112.5	22.5	89.0
14	88	112.5	24.5	87.0
15	90	112.5	22.5	89.0
16	91	112.5	21.5	90.0
17	86	112.5	26.5	85.0
18	87	112.5	25.5	86.0
19	90	112.5	22.5	89.0
20	90	112.5	22.5	89.0
21	90	112.5	22.5	89.0
22	90	112.5	22.5	89.0
23	90	112.5	22.5	89.0
24	85	112.5	27.5	84.0
25	86	112.5	26.5	85.0
26	97	112.5	15.5	96.0
27	95	112.5	17.5	94.0
28	93	112.5	19.5	92.0
29	88	112.5	24.5	87.0
30	85	112.5	27.5	84.0
31	85	112.5	27.5	84.0
32	85	112.5	27.5	84.0
33	85	112.5	27.5	84.0
34	84	112.5	28.5	83.0
35	81	112.5	31.5	80.0
36	90	112.5	22.5	89.0
37	82	112.5	30.5	81.0
38	82	112.5	30.5	81.0

Available Historical Information: Pier 1 - Westbound
GEI Project # 125810-8
Newtown Bridge No. 04180 - Rt. 84 WB over Housatonic River

Pile ID	Groundwater Elev.	Cutoff Elev (ft)	Tip Elev (ft)	Embedment below Cap (ft)
1	102	74	35.43	37.6
2	102	74	36	37.0
3	102	74	39	34.0
4	101	74	42.92	30.1
5	101	74	42	31.0
6	101	74	42.33	30.7
7	101	74	44	29.0
8	101	74	44.25	28.8
9	101	74	40.25	32.8
10	102	74	36.08	36.9
11	102	74	34.58	38.4
12	102	74	31.17	41.8
13	102	74	36.08	36.9
14	102	74	41.42	31.6
15	102	74	40.33	32.7
16	101	74	42.92	30.1
17	101	74	35.83	37.2
18	101	74	41	32.0
19	100	74	41.33	31.7
20	101	74	40.61	32.4
21	101	74	41.75	31.3
22	102	74	31.92	41.1
23	102	74	31.92	41.1
24	102	74	30.25	42.8
25	102	74	37.17	35.8
26	102	74	38	35.0
27	102	74	39	34.0
28	101	74	42.25	30.8
29	101	74	43.75	29.3
30	100.2	74	38.17	34.8
31	101	74	41.25	31.8
32	101	74	37	36.0
33	101	74	39	34.0
34	102	74	36.92	36.1
35	102	74	35.08	37.9
36	102	74	31.75	41.3
37	102	74	39.48	33.5
38	102	74	37.33	35.7
39	102	74	37	36.0
40	101	74	36.25	36.8
41	101	74	36.08	36.9

42	101	74	40.33	32.7
43	101	74	45.25	27.8
44	101	74	45.25	27.8
45	101	74	41.25	31.8
46	102	74	33.25	39.8
47	102	74	33.33	39.7
48	102	74	30.83	42.2
49	102	74	37.25	35.8
50	102	74	36	37.0
51	102	74	39.08	33.9
52	101	74	37.25	35.8
53	101	74	40.25	32.8
54	101	74	41.42	31.6
55	101	74	45	28.0
56	101	74	44.25	28.8
57	101	74	40.25	32.8
58	102	74	35.5	37.5
59	102	74	31.83	41.2
60	102	74	31.17	41.8
61	102	74	36.25	36.8
62	102	74	36	37.0
63	102	74	39.08	33.9
64	101	74	42	31.0
65	101	74	42.33	30.7
66	101	74	44.92	28.1
67	101	74	46.75	26.3
68	101	74	46.25	26.8
69	101	74	40.18	32.8
70	102	74	34.67	38.3
71	102	74	33.43	39.6
72	102	74	30.17	42.8

Available Historical Information: Pier 2 - Westbound

GEI Project # 125810-8

Newtown Bridge No. 04180 - Rt. 84 WB over Housatonic River

Pile ID	Groundwater Elev.	Tip Elev (ft)	Embedment below Cap (ft)
54	101	39.4	34.6
56	101	37.2	36.8

Available Historical Information: Pier 3 - Westbound
GEI Project # 125810-8
Newtown Bridge No. 04180 - Rt. 84 WB over Housatonic River

Pile ID	Cutoff Elev (ft)	Tip Elev (ft)	Embedment below Cap (ft)
1	88	24.75	62.3
2	88	22.5	64.5
3	88	18.5	68.5
4	88	25.17	61.8
5	88	28.75	58.3
6	88	28.25	58.8
7	88	25.25	61.8
8	88	25.5	61.5
9	88	30.33	56.7
10	88	34.25	52.8
11	88	36.83	50.2
12	88	36.83	50.2
13	88	21.25	65.8
14	88	20.25	66.8
15	88	18.25	68.8
16	88	22.08	64.9
17	88	28.75	58.3
18	88	28.75	58.3
19	88	29.25	57.8
20	88	28.25	58.8
21	88	27.92	59.1
22	88	33.43	53.6
23	88	35.33	51.7
24	88	35.58	51.4
25	88	23.83	63.2
26	88	22.58	64.4
27	88	14.75	72.3
28	88	27.25	59.8
29	88	31.17	55.8
30	88	30.4	56.6
31	88	30.42	56.6
32	88	29.43	57.6
33	88	31	56.0
34	88	34.5	52.5
35	88	37.75	49.3
36	88	36.67	50.3
37	88	19.25	67.8
38	88	20.75	66.3
39	88	14.75	72.3
40	88	24.25	62.8
41	88	31.75	55.3

42	88	31.75	55.3
43	88	30.17	56.8
44	88	29.83	57.2
45	88	26.75	60.3
46	88	34.83	52.2
47	88	35.17	51.8
48	88	34.25	52.8
49	88	17.25	69.8
50	88	20.07	66.9
51	88	20.92	66.1
52	88	25.08	61.9
53	88	31.17	55.8
54	88	29.25	57.8
55	88	28.92	58.1
56	88	30.17	56.8
57	88	31.33	55.7
58	88	35.33	51.7
59	88	36.17	50.8
60	88	33.75	53.3
61	88	16.84	70.2
62	88	23.5	63.5
63	88	18.5	68.5
64	88	20.33	66.7
65	88	31.17	55.8
66	88	27.67	59.3
67	88	27.67	59.3
68	88	61.25	25.8
69	88	32.58	54.4
70	88	34.17	52.8
71	88	34.25	52.8
72	88	34.75	52.3

Available Historical Information: Abutment 1 - Westbound
GEI Project # 125810-8
Newtown Bridge No. 04180 - Rt. 84 WB over Housatonic River

Pile ID	Cutoff Elev (ft)	Tip Elev (ft)	Embedment below Cap (ft)
9	114.5	25.36	88.14
10	119.5	26.68	
11	119.5	24.37	
12	119.5	22.98	
13	119.5	17.12	
14	119.5	33.17	
15	119.5	23.57	
16	119.5	23.47	
17	119.5	22.57	
18	119.5	25.47	
19	119.5	24.17	
20	114.5	19.17	94.33
21	114.5	23.07	90.43
22	114.5	24.17	89.33
23	114.5	25.27	88.23
24	114.5	25.72	87.78
25	114.5	24.17	89.33
26	114.5	22.17	91.33
27	114.5	22.12	91.38
28	114.5	23.47	90.03
29	114.5	24.17	89.33
30	114.5	40.97	72.53
31	114.5	23.92	89.58
32	114.5	24.17	89.33
33	114.5	22.72	90.78
34	114.5	22.5	91
35	114.5	26.27	87.23
36	114.5	29.97	83.53
37	114.5	29.37	84.13
38	114.5	28.22	85.28
39	114.5	30.17	83.33
40	114.5	33.47	80.03
41	114.5	34.77	78.73
42	114.5	37.17	76.33
43	114.5	36.17	77.33
44	114.5	36.87	76.63
45	114.5	37.17	76.33
46	114.5	25.17	88.33
47	114.5	22.37	91.13
48	114.5	22.37	91.13
49	119.5	21.77	

50	119.5	20.97	
51	119.5	22.97	
52	119.5	17.77	
53	119.5	22.87	
54	119.5	17.97	
55	119.5	20.57	
56	119.5	24.17	
57	119.5	20.97	

Note: Cutoff elevation of 119.5 corresponds to wingwall piles

Available Historical Information: Abutment 2 - Westbound
GEI Project # 125810-8
Newtown Bridge No. 04180 - Rt. 84 WB over Housatonic River

Pile ID	Cutoff Elev (ft)	Tip Elev (ft)	Embedment below Cap (ft)
1	119.5	59.17	
2	119.5	61.57	
3	114.5	61.37	52.13
4	114.5	63.57	49.93
5	114.5	64.17	49.33
6	114.5	62.27	51.23
7	114.5	58.17	55.33
8	114.5	51.67	61.83
9	114.5	57.87	55.63
10	114.5	55.17	58.33
11	114.5	53.67	59.83
12	114.5	56.47	57.03
13	114.5	56.67	56.83
14	119.5	53.17	
15	119.5	47.67	
16	119.5	57.17	
17	119.5	51.07	
18	119.5	50.27	
19	114.5	48.17	65.33
20	114.5	47.57	65.93
21	114.5	47.17	66.33
22	114.5	42.07	71.43
23	114.5	42.37	71.13
24	114.5	42.57	70.93
25	114.5	43.07	70.43
26	114.5	44.07	69.43
27	114.5	44.37	69.13
28	114.5	43.57	69.93
29	114.5	43.47	70.03
30	114.5	43.07	70.43
31	114.5	43.8	69.7
32	114.5	46.1	67.4
33	114.5	44.1	69.4
34	114.5	40.6	72.9
35	114.5	43.9	69.6
36	114.5	45.1	68.4
37	114.5	42.9	70.6
38	114.5	43.1	70.4
39	114.5	44.8	68.7
40	114.5	40.9	72.6
41	114.5	44.8	68.7
42	114.5	61.93	51.57
43	114.5	57.57	55.93
44	114.5	59.47	54.03
45	119.5	57.97	
46	119.5	58.57	
47	119.5	55.77	

Note: Cutoff elevation of 119.5 corresponds to wingwall piles

REPORT OF MEETING

Town: Newtown-Southbury
Project: 96-114 and 115
Date: January 31, 1973
Attending: B. Steinberg CJM
G. Holly FHWA
B. Dirgins C DOT
P. Zysk C DOT

A. Discussion of pile capacities for the Rochambeau Bridge, Eastbound I-84 over Housatonic River was the principal topic. The following conclusions were drawn:

1. South Abutment: According to graphs and records by P. Keene, all steel H-piles were driven to refusal. Monotube wingwall piles were driven 20 to 25 feet below cutoff.
2. North Abutment: Keene's records are inconclusive but a telephone report from interview of Mr. Pat Anderson of District IV by John Shirlaw of Fenton-Keyes disclosed that all piles on this substructure unit were driven to refusal.
3. Pier #3: Graph by Keene shows some piles driven to about elevation 30.0. Rock is at elevation 28±. Apparently the pier piles were driven to refusal.
4. Pier #2: Graphs and charts by Keene indicate that piles were driven to approximate rock elevation.
5. Pier #1: No driving information is available.

Refusal is generally defined in the above situations as 15 blows/inch using a hammer energy rating of 13,100 ft. lb.

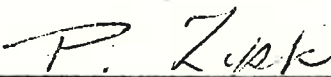
B. Points for further consideration were brought out by G. Holly regarding the Westbound I-84 structure.

1. Estimated pile lengths for the abutments should be based on end bearing piles driven to rock.
2. Abutment earth slopes should be the same as the existing structure, i.e., 1½:1.

Note: A follow-up telephone call on 2-1-73 was made by P. Zysk to Mr. Pat Anderson, District IV. Mr. Anderson stated that all of the steel H-piles on the entire structure were driven to refusal; the monotube piles were driven to "formula" value.

PWZysk:ecg

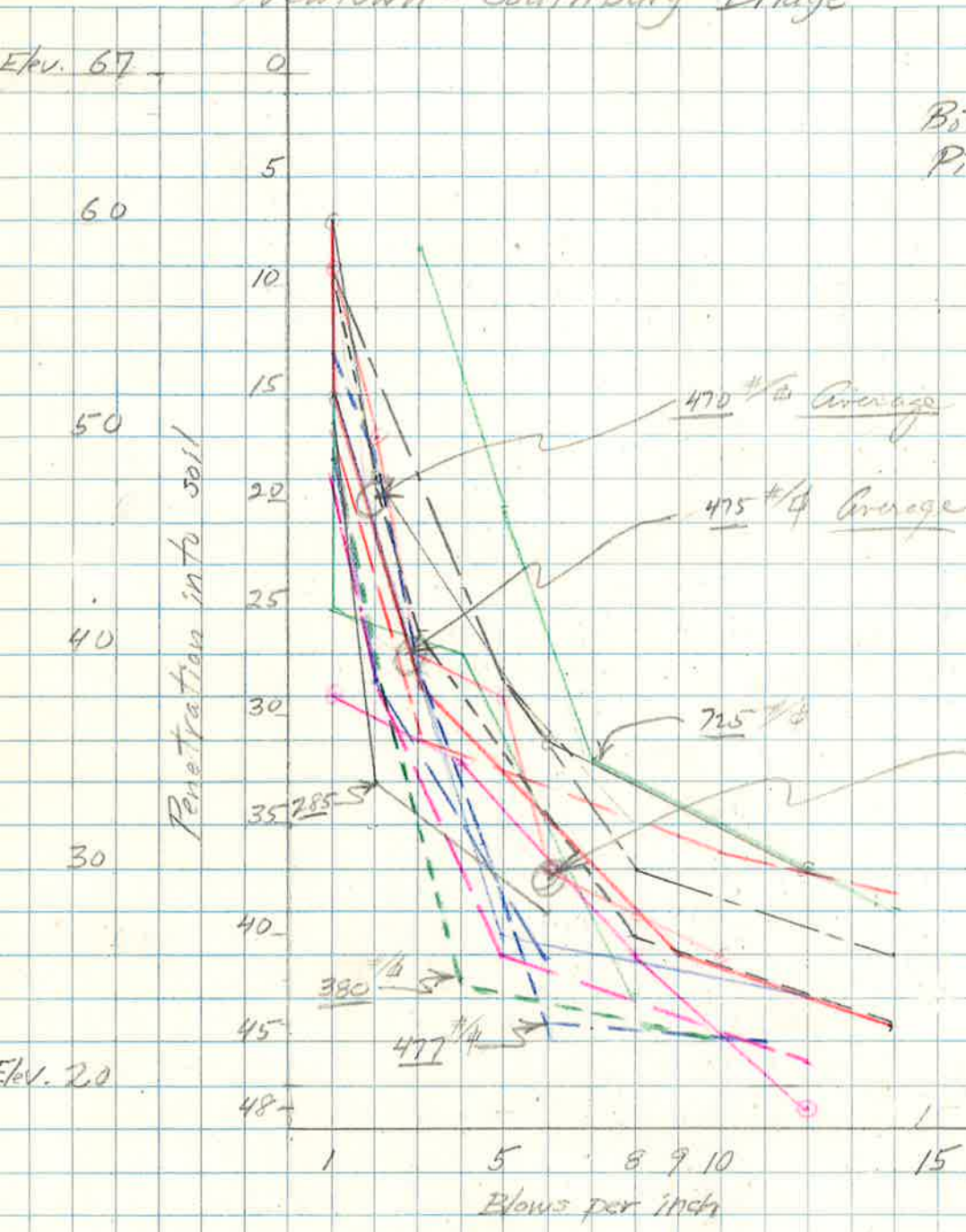
cc: Mr. S. T. Bothwell
Mr. B. Steinberg
Mr. G. Holly
Mr. B. Dirgins


Prepared by: P. Zysk
Date: February 5, 1973

SUBJECT: *Newtown - Southbury Bridge Pier #2*

Elev. 67

*Bottom Tremie Elev. 67
 Pike Cutoff 76.4*



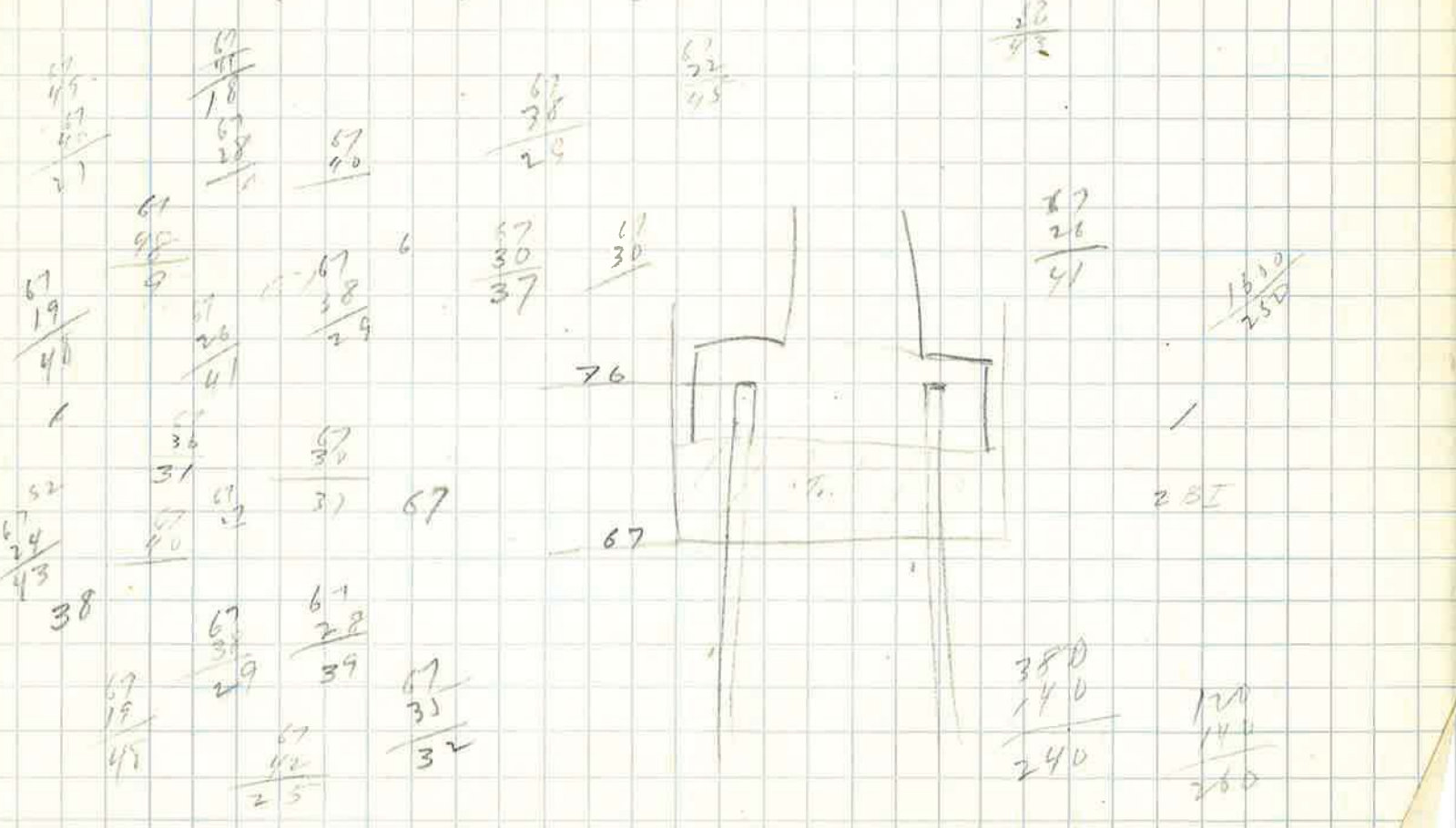
Elev. 2.0

*8 22 30 38 44 49 54 58 62 65
 TONS*

*Borings #13 Fine gravel, Coarse Sand, 1/2" of hardpan
 #14 Fine gravel, Coarse sand, some silt*

SUBJECT: *Pier #2 C.O. Elev. 78.44
 Tremie at Elev. 67*

		12bl/in. @ El. 30	Driven
1	1-60, 2-48, 6-36, 12-30		52.3
10	1-55, 2-30, 3-40, 5-38, 6-30, 8-28, 10-26		54.1
18	1-38, 4-35, 8-26, 12-19		60.9
25	1-52, 5-27, 12-24		58.9
34	1-52, 1-42, 4-40, 8-24, 12-22		59.6
41	1-49, 2-34, 6-28, 14-26		54.3
49	1-49, 2-39, 6-26, 10-24		56.8
55	3-59, 5-47, 6-35, 14-28		52.6
62	1-59, 1-51, 2-43, 6-24, 12-22		56.8
71	1-50, 4-36, 10-31, 14-29		61.0
78	1-48, 2-39, 5-26, 12-21		59.0
85	1-49, 2-39, 4-25, 10-22, 14-21		58.1
95	1-54, 2-49, 3-29, 6-23, 12-22		57.3
105	1-60, 1-52, 3-37, 8-26, 14-23		56.4
115	1-58, 2-48, 3-41, 8-27, 14-23		59.3
125	1-58, 5-37, 8-30, 14-26		53.5



CONTRACTING LIAISON ENGINEERING SERVICES

TELEPHONE REPORT FORM

PROJECT NO. 96-114,115TITLE: I-84 Newtown - SouthburyDATE: Sept. 17, 1971 TIME: 2 p.m.FROM: Mr. Pat Anderson TO: Mr. John Shirlaw
District IV Unit 410K

Formerly an Assistant Engineer on construction of the Rochambeau Bridge

SUBJECT: Pile Driving Logs and Information on Pile Driving
for Abutments of the Rochambeau Bridge.

COMMENTS:

To assist the Contracting Engineer with the design of the modified Rochambeau Bridge, Mr. Pat Anderson gave the following information:

1. The Pile Driving logs for both N. and S. abutments were burnt.
2. Only on the South abutment were Cast-in-place piles used for the wingwalls.
3. Capped 14 P 73 H piles were used entirely for the N. abutment.
4. These piles on the N. abutment were driven to full-refusal.
5. Except for C.I.P. piles, the N. Abutment piles were driven in accordance with the bridge plans (including batter piles where called-for.)

All H piles were driven to refusal according to Mr. Anderson (PZ 2/1/73) The Monotubes were driven to formula value (Dist. IV 134-68)

BY:

John L.W. Shirlaw

(Forward this info to Sudie.
" other " " "
Explain to me the other info. P.)