Planning [illegible]

Structure Geotechnical Report

FAU 6177 (North St.) over FAI I-57
Section (46-3) HBR
Kankakee County
SN 046-0088 (Existing)
SN 046-0139 (Proposed)
P93-025-03
PTB 137/16

Prepared By: Terry McCleary
Geotechnical Engineer
IDOT Region 2, District 3
(815) 433-7079

Date: Revised 7/8/08 to accommodate change in abutment type.

Prepared For: ESCA Consultants, Inc.

Attachments:
Preliminary TSL Drawing
Subsurface Profile
Boring Logs
Slope Stability Results

Contact the author if there are any questions regarding this report or if there are modifications to structure location, size, geometry, or vertical alignment.

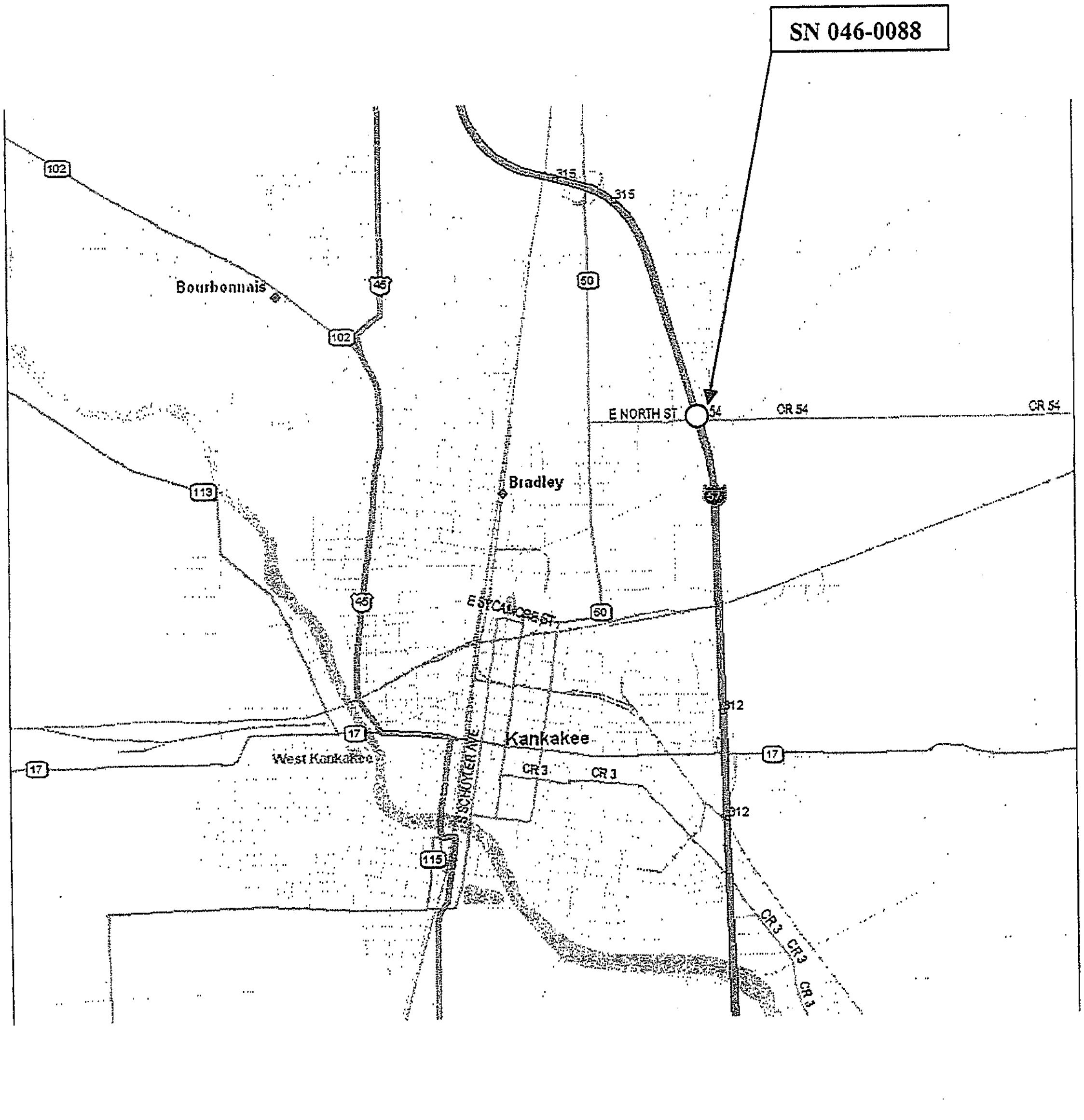
Electronic copies of the boring logs in PDF, GDW or DXF output are available upon request

TLM:lw/SGR-NORTH ST.

Introduction

The original structure with a current sufficiency rating of 65.2 was built in 1960. The existing four span, 226 foot long structure has a 6 ½" concrete slab deck with non-composite wide flange beams. This structure carries North Street over I-57 on the east side of the City of Kankakee, in Kankakee County.

The project includes removing the original structure and replacing it with a two span 212'-7 ¼" bridge with steel I-beams and concrete deck on integral abutments.



Subsurface Conditions

Geology

Quaternary Deposits

Physiographically, the project location lies within the Kankakee Plain of the Till Plains Section of the Central Lowland Physiographic Province of Illinois. Specifically, the project lies to the east of the eastern most edge of the Rockdale Moraine, a member of the Joliet Sublobe of the Lake Michigan Lobe.

The project site does not have any developed Quaternary deposits. This may be due to the sites location within the ancient Lake Wauponsee, the actions of the Kankakee Torrent, along with the development of the ancient and current Kankakee River Flood Plain.

Bedrock Deposits

The project area is underlain by Silurian Dolomite. The poor rating of the bedrock may be tied to the erosional and depositional environment produced by the Kankakee Torrent and subsequent drainage basin development. The bedrock is very jointed and secondarily weathered within the top eight feet. Any concrete estimates on rock may need to be increased due to potential loss of material through joints and fractures.

Soil Deposits

The Tallmadge Sandy Loam is the primary soil present within the project area, even though both the Tallmadge and the Rockton Silt Loam are present in the immediate area of the bridge.

The Tallmadge series consists of deep, poorly drained soils formed in glacial drift that is underlain by limestone or dolomite bedrock on ground moraines, outwash plains, and stream terraces. This soil is poorly drained, has a negligible potential for surface runoff, a moderately high or high saturated hydraulic conductivity and a moderate permeability.

The A horizon ranges in thickness from 10 to 20 inches thick and is composed of black, friable, Sandy Clay Loam. The B horizon ranges in thickness from 10 to 20 inches thick and is composed of a dark gray to dark grayish brown, friable, Sandy Clay Loam. A sub-B horizon ranges in thickness from 0 to 15 inches thick and is composed of a 70% grayish brown and 30% very dark gray, friable, stratified Loam to Loam Sand with decomposing limestone over a white, partially fracture in the upper one foot, Dolomite. This description is consistent to the soil encountered in the borings.

Subsurface Profile

Four borings were taken for this structure, one boring at each abutment, and two at the proposed center pier. Hollow stem augers, a 24" Split Spoon and an automatic hammer were used to retrieve strength and moisture samples.

Boring #1 (north of center pier), with a ground surface elevation of 638.69 feet, encountered 4.0 feet of clay loam over a tan dolomite formation. This boring was ended at 5.5 feet.

Boring #2 (east abutment), with a ground surface elevation of 657.79 feet, encountered a very stiff gray/black clay loam to silty clay loam fill material to an elevation of 636.29. At this elevation, the material switched to a very stiff gray to brown silty clay loam. At 633.79 we encountered the tan dolomite formation. The boring ended at 632.29, 24.5 feet down from the surface of the boring.

Boring #3 (west abutment), with a surface elevation of 657.80 feet, was very similar to boring #2 but the top of rock was encountered at 635.80. This is approximately two feet above the rock elevation at the east abutment. This is a relatively minor change in rock surface elevation for this area.

Boring #4 (south of center pier), with a ground surface elevation of 638.59 feet, encountered the same material as boring one but a rock core was taken to determine the strength and quality of the rock. The rock surface elevation is 633.59 feet.

For a more detailed description of the soils encountered, please look at the attached profile and boring logs.

Groundwater

Groundwater was not encountered in any of the four borings.

Scour Potential

This structure does not cross a waterway. Therefore scour is not a concern. A scour table is not provided in this report as it does not benefit the designer in any way.

Abandoned Coal Mines

There are no records that indicate any mining activity at the project location.

Geotechnical Evaluation

Slope Stability

The soil profile at the east abutment was used for the slope stability evaluation, since the east abutment boring had the weakest soils and provided the worst scenario of the two borings. A drained and undrained FOS of 1.5 and 3.9 respectively, were obtained provided the following information does not change.

End Slope – 2H:1V
Height of Embankment – 22.0 feet

Settlement

The new structure will be constructed to the same grade as the existing structure. The areas of concern are the areas new embankment where the roadway is being widened. Given the moisture contents are relatively low and the soil strengths are relatively high, settlement is not a concern at this structure and the pile have not been designed to handle additional loads such as down drag.

Seismic Considerations

The probability of a seismic event, large enough to cause damage to the structure or embankment, is not high enough to warrant any undo concern. Therefore, seismic effects were not considered in the foundation design of this project. The Geotechnical Manual shows the peak horizontal ground acceleration to be 0.042g. This bridge is considered to have an Importance Category of "Other Bridge". With this information entered into Table 3.4, AASHTO, Standard Specifications for Highway Bridges the Seismic Performance Category (SPB) is A. This project has a site coefficient of 1.0 (Table 3.5.1 Site Coefficient, AASHTO, Standard Specifications).

The soils at this location are not granular; therefore, liquefaction was not considered in the foundation design.

Foundation Recommendations

The proposed bridge is approximately 213 feet long from back to back of the abutment. A spread footing is an option for the pier substructure. The bottom of footing elevation should be 633.00. The top of rock elevation at the pier from the north side of the bridge to the south side differs by approximately one foot. In efforts to have a level foundation bottom, approximately six inches of rock will be removed near the north side of the pier and 1.5 feet will be removed near the south side. The top of rock is weathered and fractured. Removal of this material should not be difficult for the contractor. The existing footing is nine feet wide. Using that width and a 64 foot length to accommodate the widening of the structure, we estimate Q_{all} to be 85 ksf. The table below summarizes the Q_{all} for different widths assuming an N value of 150 blows/foot and a phi angle of 47º.

Sliding or horizontal movement of the footing is not a concern due to the balance of material on both sides being equal.

Width	Depth	Length	Bearing Pressure(ksf)	Q_{all}(ksf)
7	5.5	64	4.6	75
8	5.5	64	4.0	79
9	5.5	64	3.6	83
10	5.5	64	3.2	87
11	5.5	64	2.9	91

A previous design utilized vaulted abutments with pile socketed in rock. The current design utilizes integral abutments and may not need the rock socket. We have chosen to leave this information in so the designer may better decide if they need a pile socketed in rock or simply drive the pile to the proper resistance. The tables below show the allowable resistance for various depths and diameters of rock sockets for the abutments.

Rock Socket Chart for West Abutment
With Estimated Top of Rock at 635.8

Depth of Socket	**Diameter of Socket**	**Allowable Resistance of Socket**
3	18	100
3	24	200
4	18	130
4	24	245
5	18	150
5	24	265
6	18	150
6	24	265
7	18	150
7	24	400
8	18	250
8	24	530

Rock Socket Chart for East Abutment With Estimated Top of Rock at 633.79

Depth of Socket	Diameter of Socket	Allowable Resistance of Socket
3	18"	100
3	24"	200
4	18"	130
4	24"	245
5	18"	150
5	24"	265
6	18"	150
6	24"	265
7	18"	150
7	24"	400
8	18"	250
8	24"	530

The following tables show the resistance and estimated length for various sizes of driven H-pile.

Pile Design Table for West Abutment utilizing Boring B-3

Nominal Required Bearing (Kips)	Allowable Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 12 X 53		
86	29	13
108	36	15
126	42	17
248	83	19
309	103	19
Steel HP 12 X 63		
66	22	10
88	29	13
110	37	15
128	43	17
270	90	19
332	111	19
Steel HP 12 X 74		
67	22	10
89	30	13
112	37	15
130	43	17
296	99	19
358	119	19
Steel HP 12 X 84		
68	23	10
91	30	13
113	38	15
132	44	17
318	106	19
380	127	19
385	128	21

Nominal Required Bearing (Kips)	Allowable Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 14 X 73		
51	17	8
77	26	10
103	34	13
129	43	15
150	50	17
316	105	19
388	129	17
Steel HP 14 X 89		
53	18	8
79	26	10
105	35	13
131	44	15
153	51	17
351	117	19
Steel HP 14 X 102		
54	18	8
80	27	10
107	36	13
133	44	15
155	52	17
381	127	19
Steel HP 14 X 117		
55	18	8
82	27	10
109	36	13
135	45	15
158	53	17
414	138	19

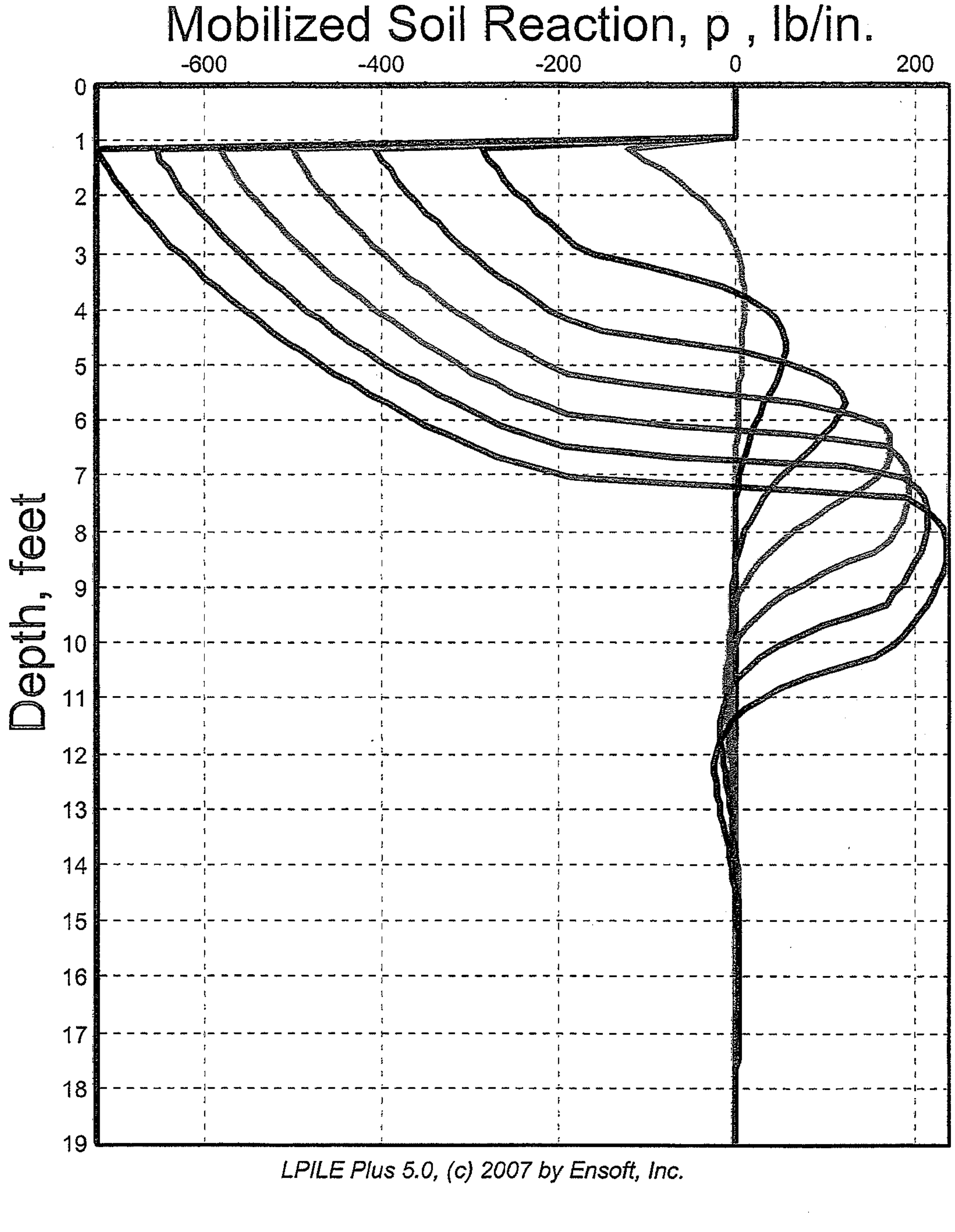
Pile Design Table for East Abutment Utilizing Boring #B-2

Nominal Required Bearing (Kips)	Allowable Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 10 X 57		
78	26	14
94	31	16
106	35	18
247	82	21
344	115	21
Steel HP 12 X 53		
92	31	14
111	37	16
125	42	18
258	86	21
362	121	21
Steel HP 12 X 63		
93	31	14
112	37	16
126	42	18
282	94	21
393	131	21
Steel HP 12 X 74		
78	26	11
95	32	14
114	38	16
128	43	18
309	103	21
430	143	21

Nominal Required Bearing (Kips)	Allowable Resistance Available (Kips)	Estimated Pile Length (Ft.)
Steel HP 12 X 84		
79	26	11
96	32	14
115	38	16
130	43	18
332	111	21
460	153	21
Steel HP 14 X 73		
66	22	9
90	30	11
109	36	14
131	44	16
148	49	18
329	110	21
959	153	21
Steel HP 14 X 89		
68	23	9
92	31	11
111	37	14
134	45	16
151	50	18
366	122	21
Steel HP 14 X 102		
69	23	9
93	31	11
113	38	14
135	45	16
153	51	18
397	132	21
Steel HP 14 X 117		
71	24	9
94	31	11
115	38	14
137	46	16
155	52	18
432	144	21

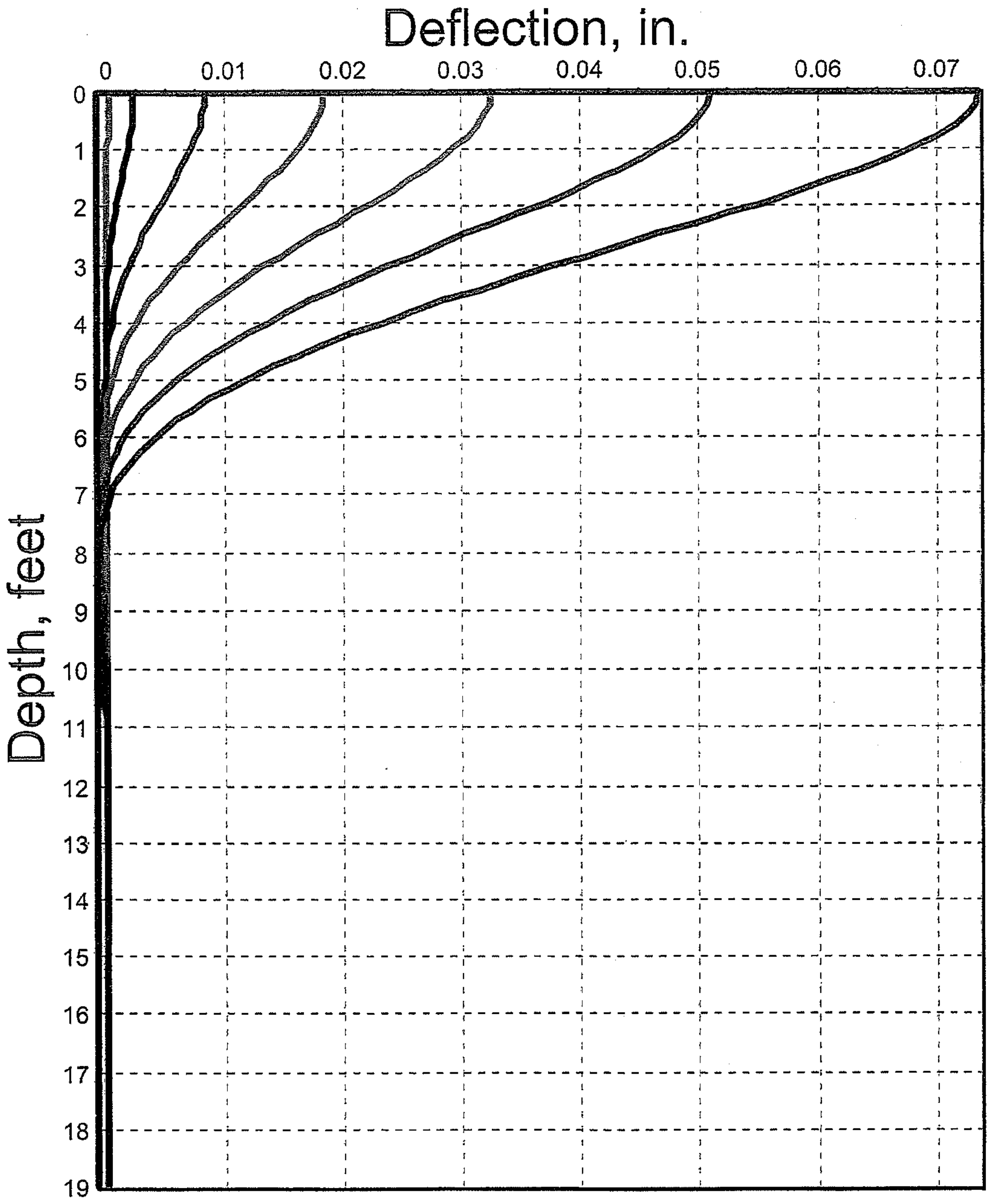
Based on the preliminary TSL drawing, a single row of vertical piles is planned for the abutments. A range of lateral loads from 1.0 kips to 20 kips were used for analysis on the east abutments. These loads were evaluated with the Reese. The following graphs summarize our findings for the range of lateral loads that may become evident as the actual design of the structure begins. Boring #2 showed the worse scenario, thus only the east abutment was analyzed. The piles were modeled as a fixed connection. Because we are not expecting any settlement, the piles were not designed to accommodate negative skin friction.

Mobilized Soil Reaction vs. Depth
HP 10 x 57
046-0139



LPILE Plus 5.0, (c) 2007 by Ensoft, Inc.

Lateral Deflection vs. Depth
HP 10 x 57
046-0139



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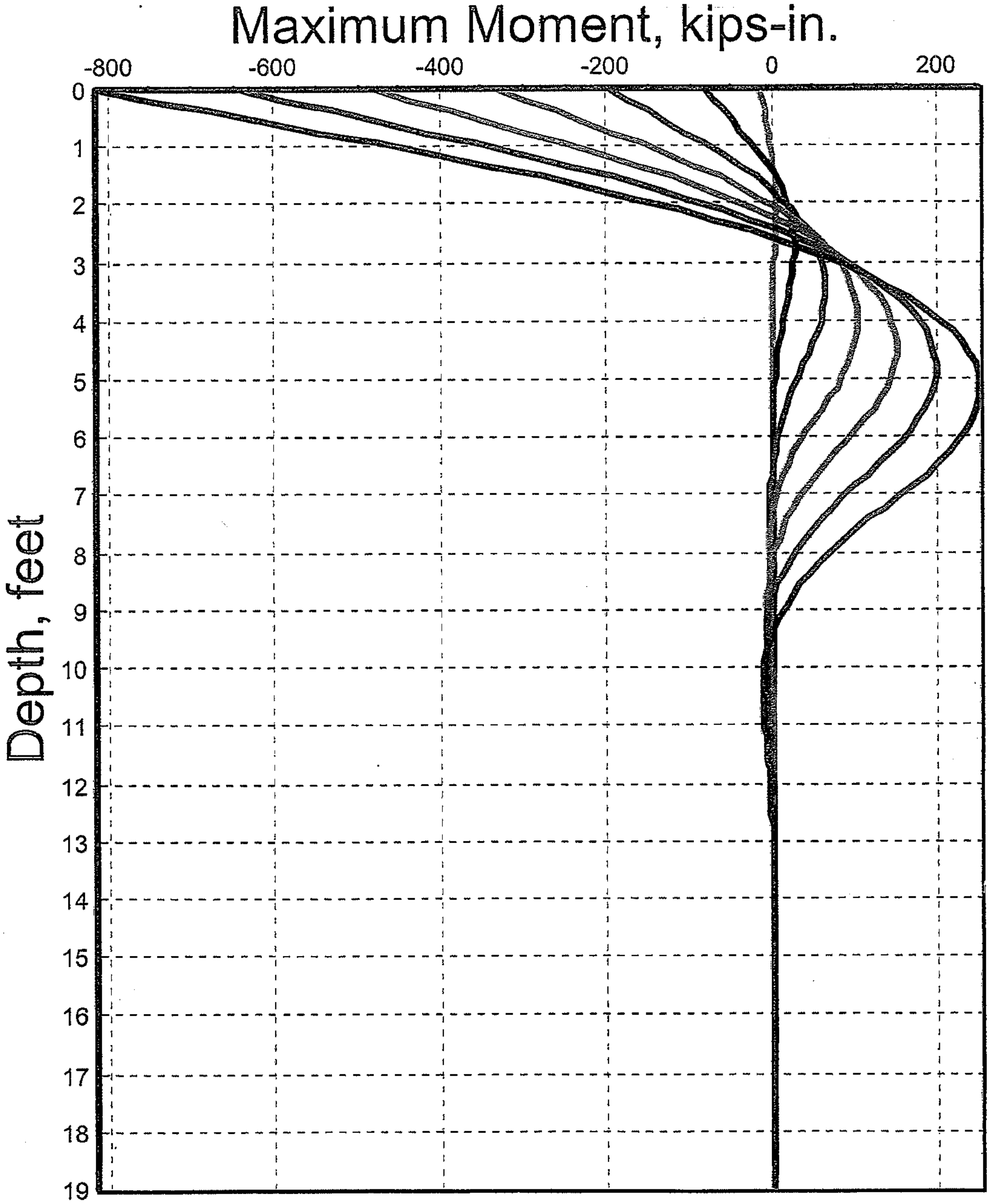
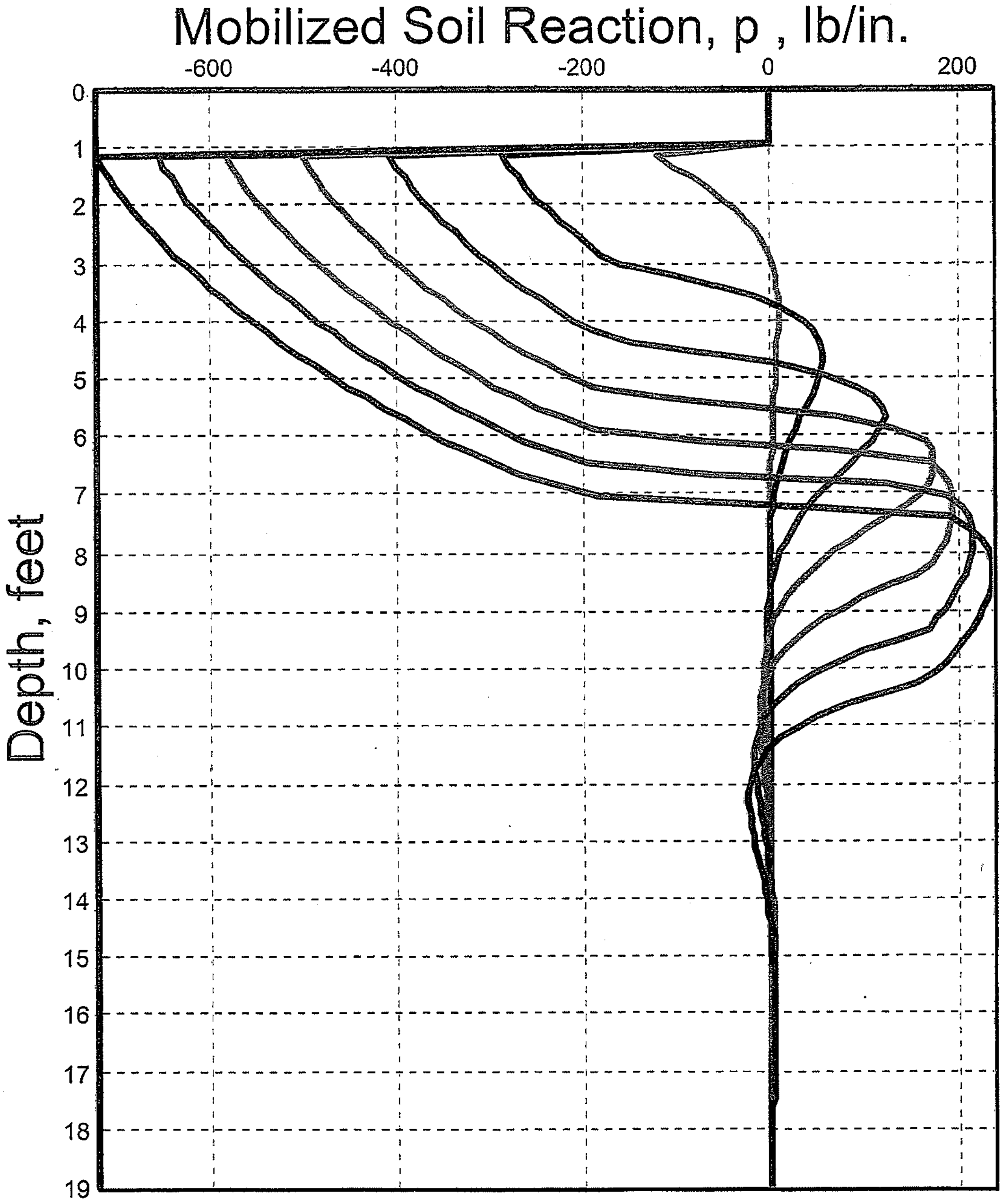
Bending Moment vs. Depth
HP 10 x 57
046-0139



LPILE Plus 5.0, (c) 2007 by Ensoft, Inc.

Mobilized Soil Reaction vs. Depth
HP 12 x 74
046-0139



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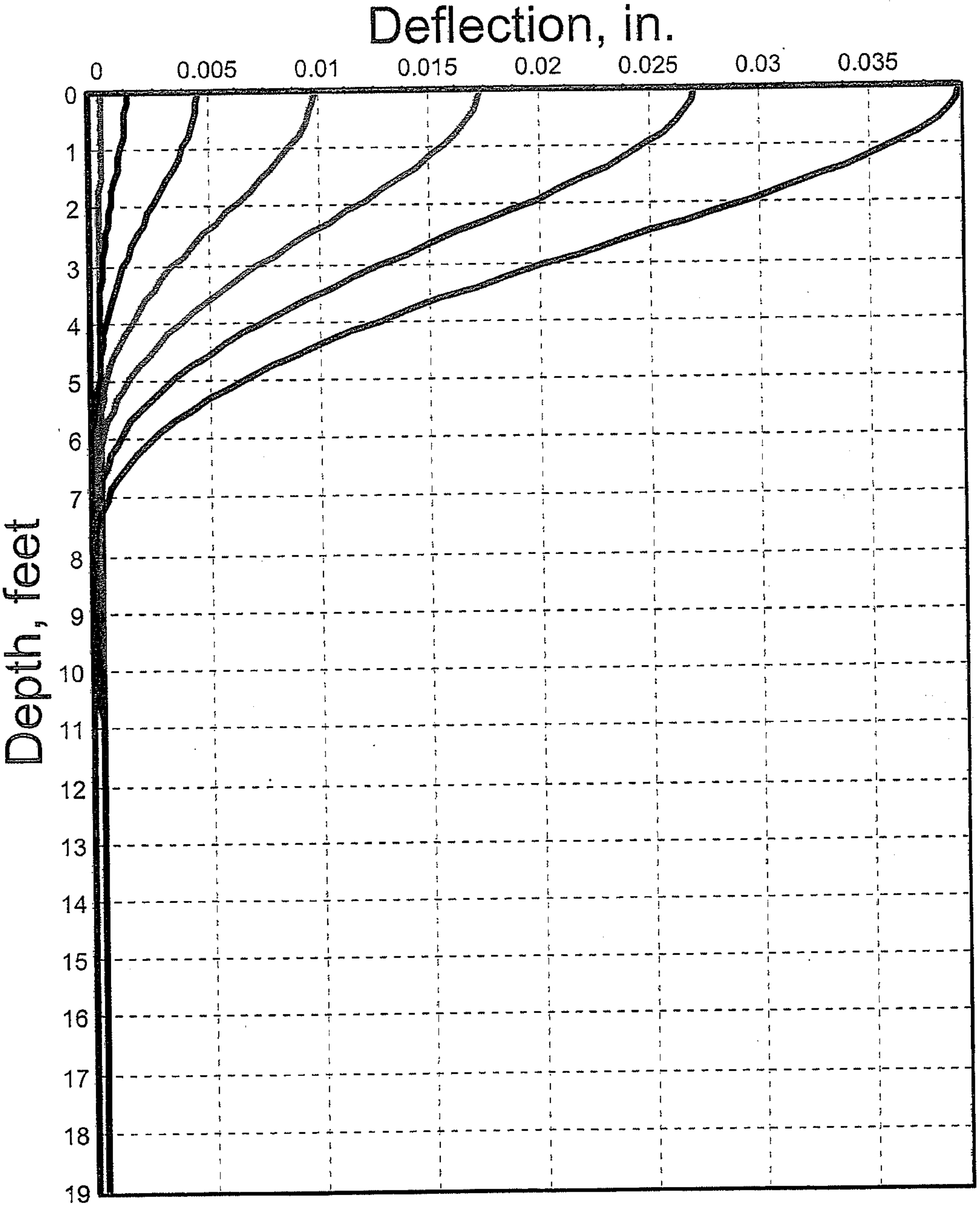
Lateral Deflection vs. Depth
HP 12 x 74
046-0138



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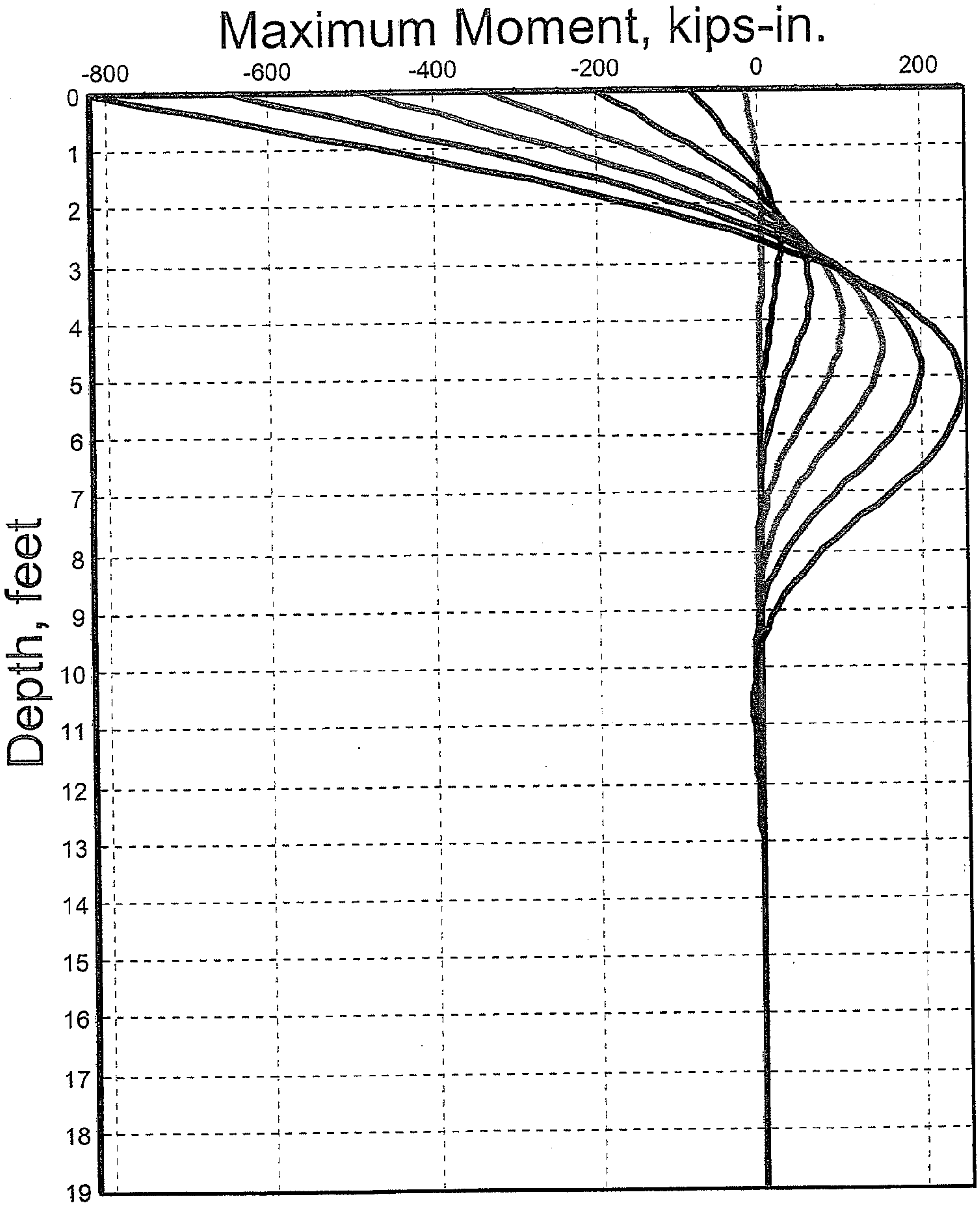
Bending Moment vs. Depth
HP 12 x 74
046-0139



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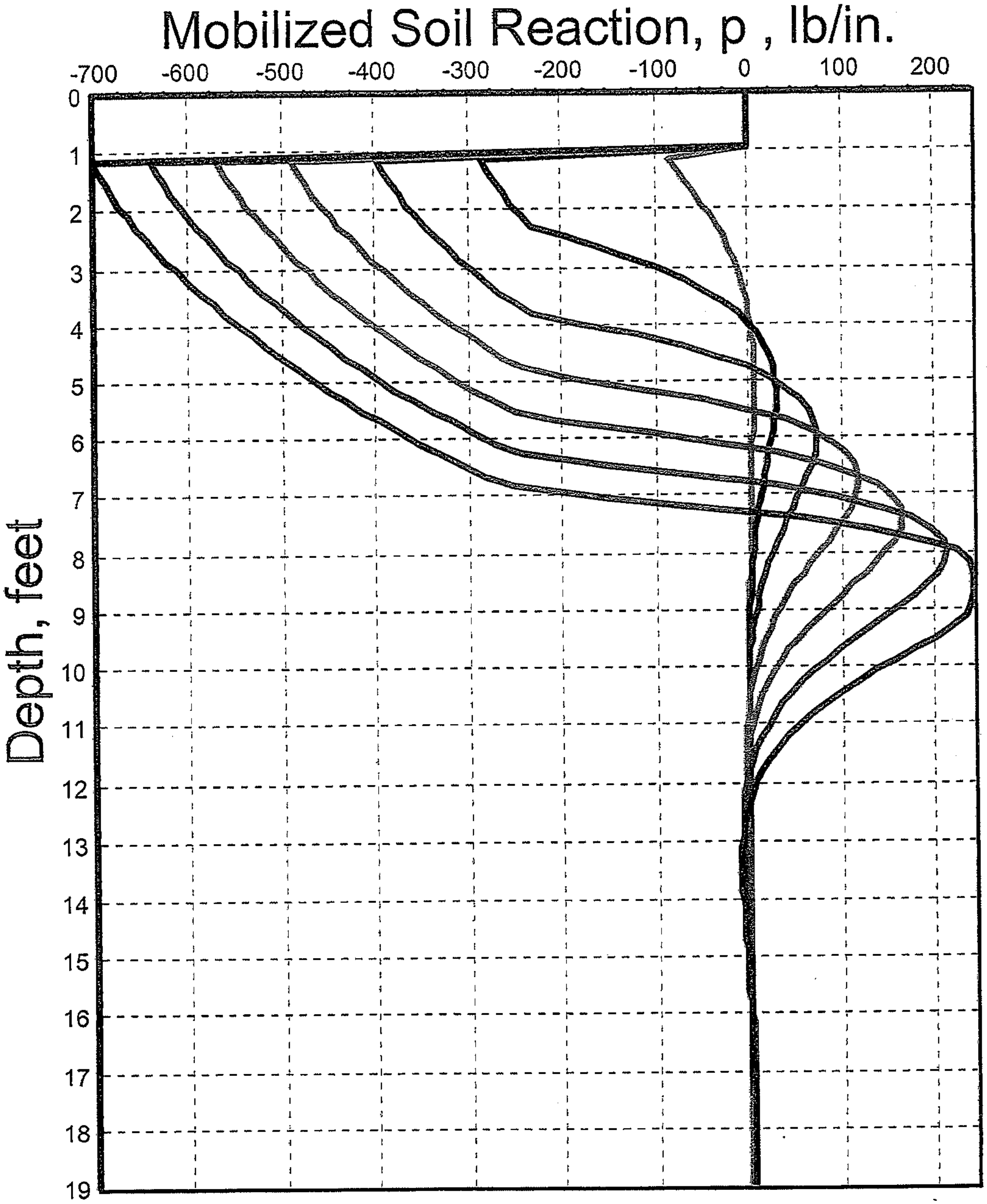
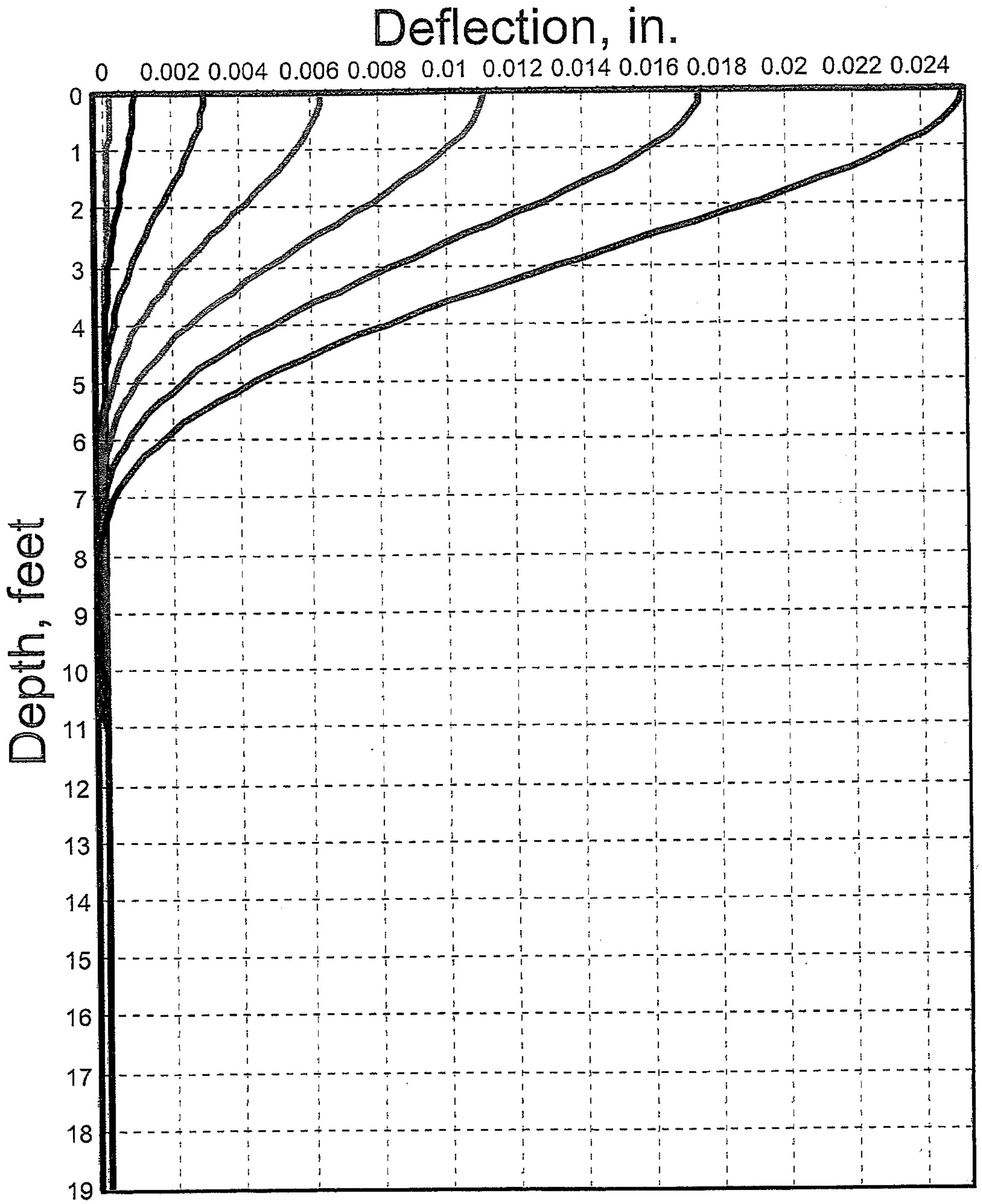
Mobilized Soil Reaction vs. Depth
HP 14 x 89
046-0139



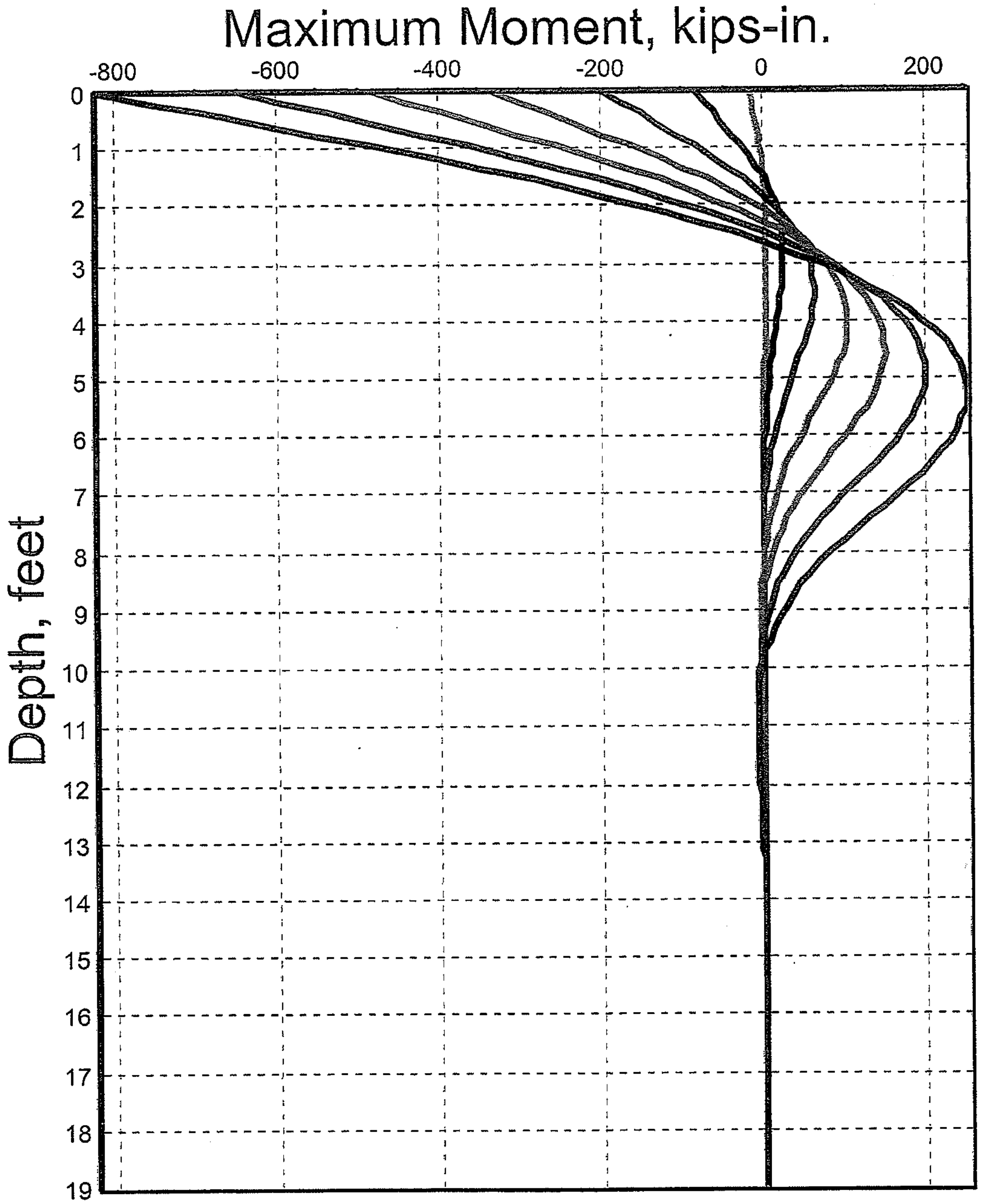
LPILE Plus 5.0, (c) 2007 by Ensoft, Inc.

Lateral Deflection vs. Depth
HP 14 x 89
046-0139



LPILE Plus 5.0, (c) 2007 by Ensoft, Inc.

Bending Moment vs. Depth
HP 14 x 89
046-0139



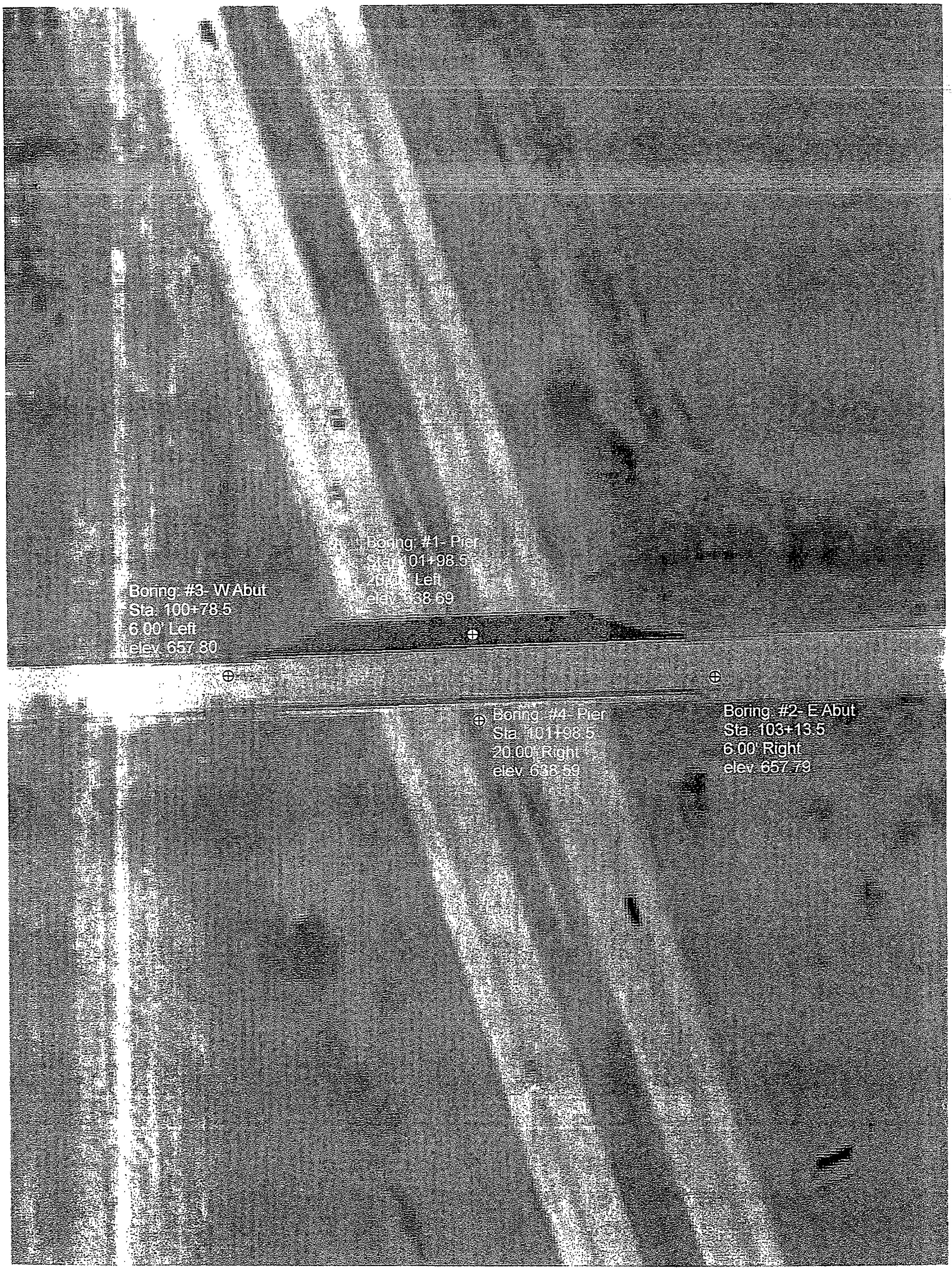
LPILE Plus 5.0, (c) 2007 by Ensoft, Inc.

Construction Considerations

At this time, it is assumed this structure will be built utilizing closed road construction methods. Test piles may be useful for the abutment with one test pile in foundation unit. The rock surface appears to have little variation with only a one foot rise to the east between borings.

The soil boring logs indicate medium to very stiff soils with Qu's less than 4.0 tsf.

The soil encountered at the pier is wet, 26.6% moisture, and may have difficulty standing vertical for long periods of time. An earth retaining system should be used at this location if there is not enough room to slope the sides of the excavation back. The soil should hold at a 1:1 slope. All excavations should meet the applicable OSHA standards.


Boring: #1- Pier
Sta. 101+98.5
20.00' Left
elev. 638.69
Boring: #3- W Abut
Sta. 100+78.5
6.00' Left
elev. 657.80
Boring: #4- Pier
Sta. 101+98.5
20.00' Right
elev. 638.59
Boring: #2- E Abut
Sta. 103+13.5
6.00' Right
elev. 657.79

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

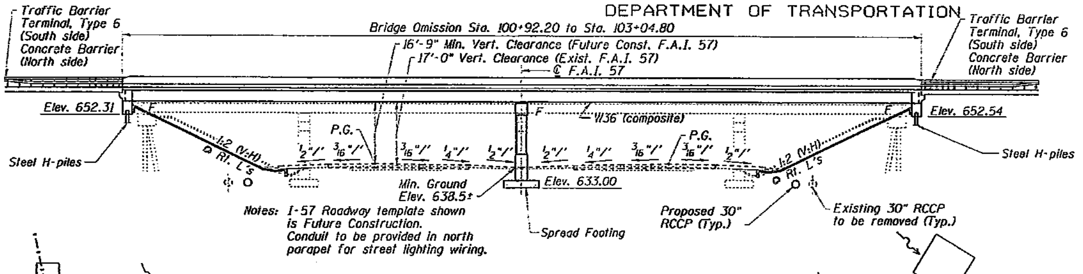
FAI 57	(46-3) HBR	KANKAKEE	2	1

Contract =

BENCHMARK: Railroad Spike in north face of power pole. Sta. 110+56.84, 38.12' Lt. Elev. 635.60 (NAVD 88)

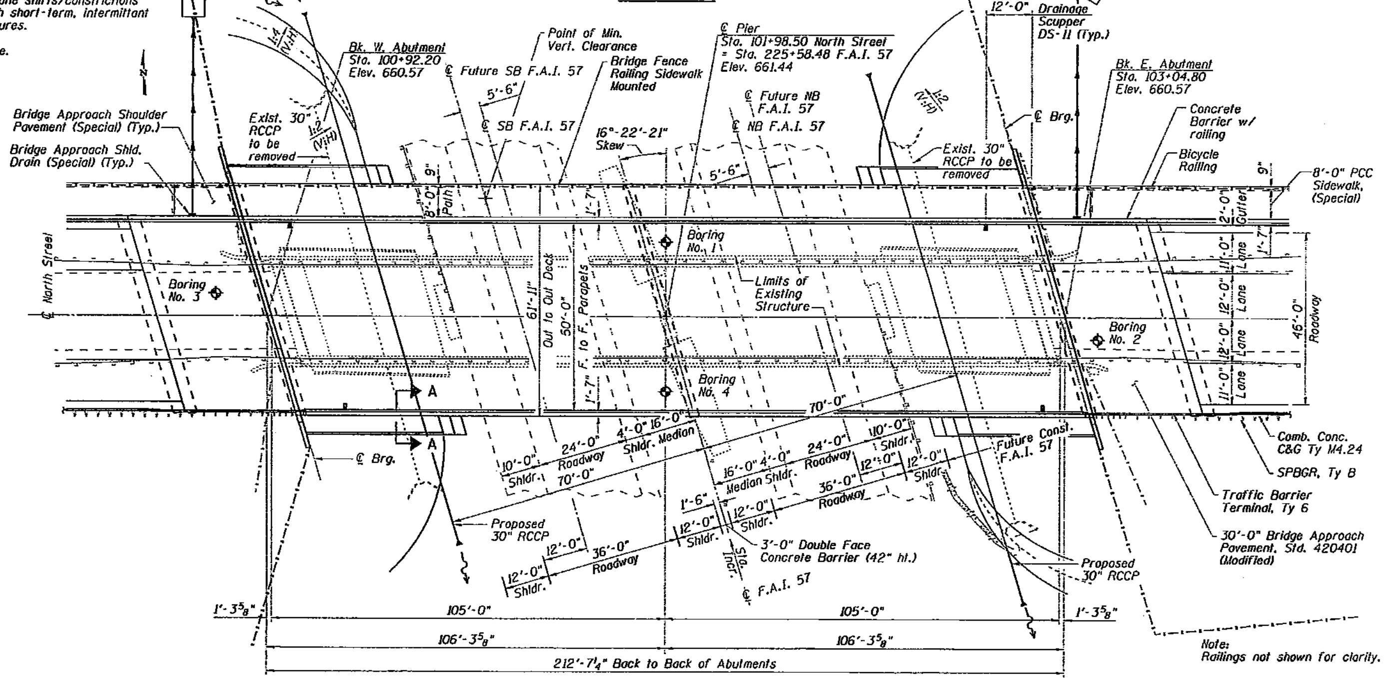
EXISTING STRUCTURE: SN 046-0088 was originally built in 1960 as F.A.I. 57, Section 46-2(1)HB. It is a four span structure consisting of a 6½" concrete deck on 30" deep continuous wide flange steel beams supported by Hammerhead piers on footings and Stub abutments on piles. The clear width is 24'-0" between curbs and the out-to-out deck width is 29'-8". The length is 204'-3½" back-to-back of abutments. North Street will be closed during construction and traffic detoured on local routes. I-57 traffic will be maintained utilizing lane shifts/constrictions along with short-term, intermittant total closures.

No salvage.



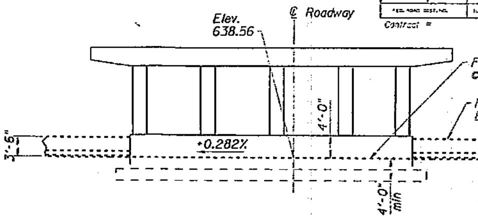
Notes: I-57 Roadway template shown is Future Construction.
Conduit to be provided in north parapet for street lighting wiring.

ELEVATION

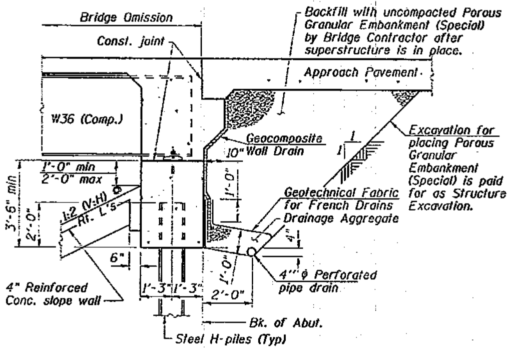


Note:
Railings not shown for clarity.

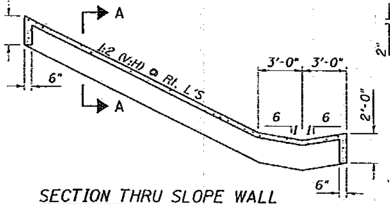
PLAN



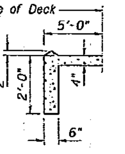
PIER SKETCH



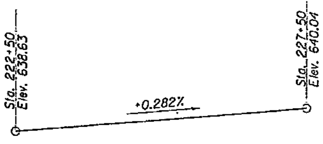
SECTION THRU INTEGRAL ABUTMENT
(Horiz. dim. @ Rt. L's)



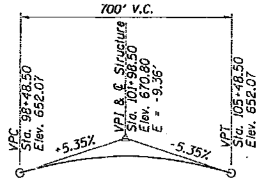
SECTION THRU SLOPE WALL



SECTION A-A



FUTURE PROFILE GRADE - I-57
(Along ℄ Future Roadway's)



PROFILE GRADE - NORTH STREET
(Along ℄ Roadway)

HIGHWAY CLASSIFICATION

FAU Route 6177 (North Street)
Functional Class: Urban Collector
ADT: 6,300 (2008); 11,300 (2028)
DHV: 1,243 (2028)
ADTT: 4.0%
Design Speed: 30 mph
Posted Speed: 30 mph

FAI Route 57 (I-57)
Functional Class: Urban Interstate
ADT: 30,100 (2008); 51,100 (2028)
DHV: 4,599 (2028)
ADTT: 26.2%
Design Speed: 70 mph
Posted Speed: 65 mph

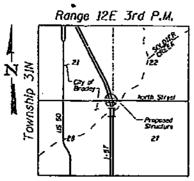
DESIGN SPECIFICATIONS
2002 AASHTO

LOADING HS20-44
Allow 50 psf for future wearing surface.

SEISMIC DATA
Seismic Performance Category (SPC) = A
Bedrock Acceleration Coefficient (A) = 0.042g
Site Coefficient (S) = 1.0

DESIGN STRESSES

FIELD UNITS
f'c = 3,500 psi
fy = 60,000 psi (Reinf.)
fy = 50,000 psi (M270, Grade 50)



LOCATION SKETCH

GENERAL PLAN
FAU 6177 (NORTH STREET)
OVER F.A.I. ROUTE 57
F.A.I. 57 SECTION (46-3)HBR
KANKAKEE COUNTY
STATION 101+98.50
STRUCTURE NO. 046-0139

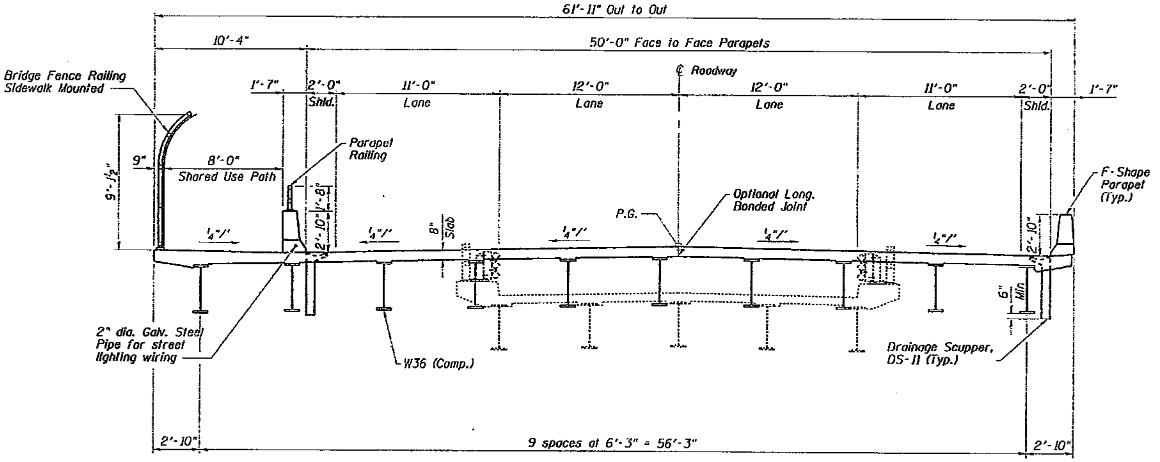
ESCA
CONSULTANTS, INC.

DESIGNED BY:	DAJ	06/08
DRAWN BY:	CJG/HAS	06/08
CHECKED BY:	MTD	06/08
APPROVED BY:	RDP	07/08

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

ROUTE NO.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
FAI 57	(46-3) HBR	KANKAKEE	2	2
FED. ROAD DIST. NO.	ILLINOIS	FED. AID PROJECT		

Contract =

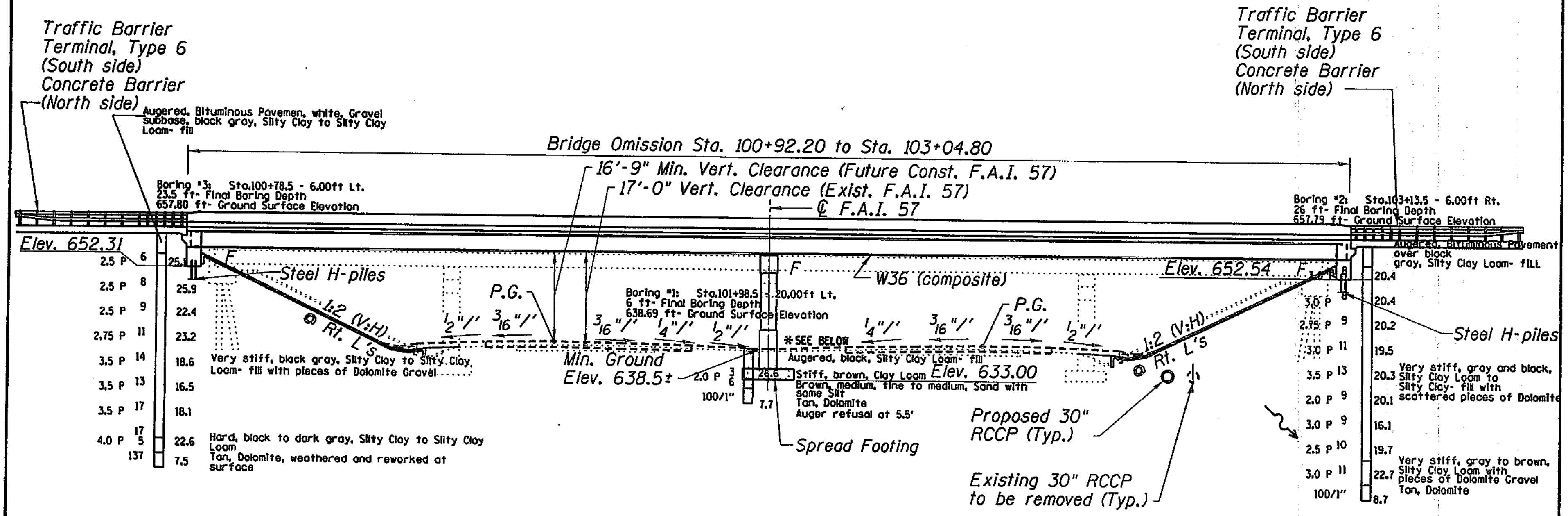


CROSS SECTION THRU BRIDGE DECK

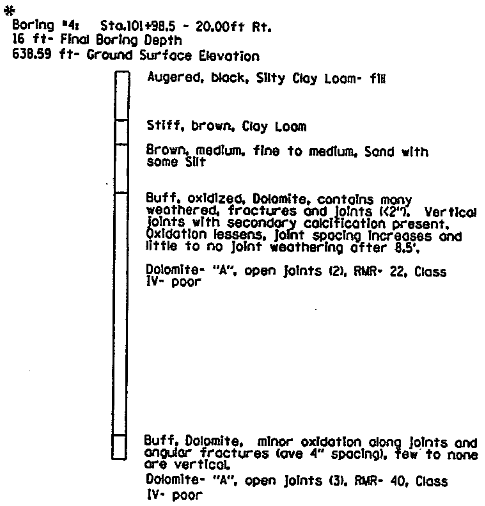
ESCA
CONSULTANTS, INC.

DESIGNED BY:	DAJ	06/08
DRAWN BY:	CJG/HAS	06/08
CHECKED BY:	MTD	06/08
APPROVED BY:	RDP	07/08

DETAILS
FAU 6177 (NORTH STREET)
OVER F.A.I. ROUTE 57
F.A.I. 57 SECTION (46-3)HBR
KANKAKEE COUNTY
STATION 101+98.50
STRUCTURE NO. 046-0139



Notes: I-57 Roadway template shown is Future Construction.
Conduit to be provided in north parapet for street lighting wiring.



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		DRAWN -	REVISED -	
	PLOT SCALE = $SCALE$	CHECKED -	REVISED -	
		DATE -	REVISED -	

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

SOIL BORE LOGS

SCALE: | SHEET NO. OF SHEETS | STA. 100+78.5 TO STA. 103+13.5

F.A.I RTE.	SECTION	COUNTY	TOTAL SHEETS	SHEET NO.
57	146-3HBR	KANKAKEE		
		CONTRACT NO.		
FED. ROAD DIST. NO. 4	ILLINOIS	FED. AID PROJECT		

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Illinois Department of Transportation
Division of Highways
District #3, Ottawa

SOIL BORING LOG

Page 1 of 1

Date 6/29/07

ROUTE FAU 6177 (North Street) **DESCRIPTION** North Street over I-57 **LOGGED BY** Larry Myers

SECTION 46-2(1)HB **LOCATION** SE 1/4, SEC. 21, TWP. 31N, RNG. 12E

COUNTY Kankakee **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** CME Automatic

STRUCT. NO. 046-0088
Station 225+59.91

BORING NO. #1: Pier
Station 101+98.5
Offset 20.00ft Lt.
Ground Surface Elev. 638.69 ft

Surface Water Elev. ______ ft
Stream Bed Elev. ______ ft

Groundwater Elev.:
First Encounter ______ ft
Upon Completion Dry ft
After ______ **Hrs.** ______ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Augered, black, Silty Clay Loam-fill 636.69				
Stiff, brown, Clay Loam		3		
635.69		3	2.0	26.6
Brown, medium, fine to medium, Sand with some Silt 634.69		6	P	
Tan, Dolomite	-5	51		
Auger refusal at 5.5' 633.19		100/1"		7.7
End of Boring				
	-10			
	-15			
	-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

Illinois Department of Transportation
Division of Highways
District #3, Ottawa

SOIL BORING LOG

Page 1 of 1

Date 7/12/07

ROUTE FAU 6177 (North Street) **DESCRIPTION** North Street over I-57 **LOGGED BY** Larry Myers

SECTION 46-2(1)HB **LOCATION** SE 1/4, SEC. 21, TWP. 31N, RNG. 12E

COUNTY Kankakee **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** CME Automatic

STRUCT. NO. 046-0088
Station 225+59.91

BORING NO. #2: E Abut
Station 103+13.5
Offset 6.00ft Rt.
Ground Surface Elev. 657.79 ft

Surface Water Elev. ______ ft
Stream Bed Elev. ______ ft

Groundwater Elev.:
First Encounter ______ ft
Upon Completion Dry ft
After ____ **Hrs.** ______ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Augered, Bituminous Pavement over black gray, Silty Clay Loam- fILL				
655.79				
Very stiff, gray and black, Silty Clay Loam to Silty Clay- fill with scattered pieces of Dolomite		4		
		4	3.0	20.4
		4	P	
	-5	3		
652.54		4	3.0	20.4
		4	P	
		2		
		5	2.8	20.2
		4	P	
	-10	3		
		7	3.0	19.5
		4	P	
		3		
		7	3.5	20.3
		6	P	
	-15	2		
		4	2.0	20.1
		5	P	
		5		
		4	3.0	16.1
		5	P	
	-20	2		

641.57
- 632.29
9.28
+ 1
10.28

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Very stiff, gray and black, Silty Clay Loam to Silty Clay- fill with scattered pieces of Dolomite *(continued)*		5	2.5	19.7
		5	P	
636.29				
Very stiff, gray to brown, Silty Clay Loam with pieces of Dolomite Gravel		4		
		5	3.0	22.7
		6	P	
633.79				
Tan, Dolomite	-25	35		
632.29		100/1"		8.7
End of Boring				
	-30			
	-35			
	-40			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
District #3, Ottawa

SOIL BORING LOG

Page 1 of 1

Date 7/12/07

ROUTE FAU 6177 (North Street) **DESCRIPTION** North Street over I-57 **LOGGED BY** Larry Myers

SECTION 46-2(1)HB **LOCATION** SE 1/4, SEC. 21, TWP. 31N, RNG. 12E

COUNTY Kankakee **DRILLING METHOD** Hollow Stem Auger **HAMMER TYPE** CME Automatic

STRUCT. NO. 046-0088
Station 225+59.91

BORING NO. #3: W Abut
Station 100+78.5
Offset 6.00ft Lt.
Ground Surface Elev. 657.80 ft

Surface Water Elev. ______ ft
Stream Bed Elev. ______ ft

Groundwater Elev.:
First Encounter ______ ft
Upon Completion Dry ft
After ___ **Hrs.** ______ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Augered, Bituminous Pavemen, white, Gravel subbase, black gray, Silty Clay to Silty Clay Loam- fill				
655.80				
Very stiff, black gray, Silty Clay to Silty Clay Loam- fill with pieces of Dolomite Gravel		3		
		3	2.5	25.1
	654.31	3	P	
	-5	2		
	652.31	3	2.5	25.9
		5	P	
		2		
		4	2.5	22.4
		5	P	
	-10	2		
		5	2.8	23.2
		6	P	
		2		
		6	3.5	18.6
		8	P	
	-15	3		
		5	3.5	16.5
		8	P	
		5		
		7	3.5	18.1
		10	P	
	-20	14		

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
637.30		17		
Hard, black to dark gray, Silty Clay to Silty Clay Loam		5	4.0 P	22.6
635.80				
Tan, Dolomite, weathered and reworked at surface		14		
		37		7.5
634.30		100		
End of Boring				
	-25			
	-30			
	-35			
	-40			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
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District #3, Ottawa

SOIL BORING LOG

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Date 8/8/07

ROUTE FAU 6177 (North Street) DESCRIPTION North Street over I-57 LOGGED BY Larry Myers

SECTION 46-2(1)HB LOCATION SE 1/4, SEC. 21, TWP. 31N, RNG. 12E

COUNTY Kankakee DRILLING METHOD Hollow Stem Auger HAMMER TYPE CME Automatic

STRUCT. NO. 046-0088
Station 225+59.91

BORING NO. #4: Pier
Station 101+98.5
Offset 20.00ft Rt.
Ground Surface Elev. 638.59 ft

Surface Water Elev. _____ ft
Stream Bed Elev. _____ ft

Groundwater Elev.:
First Encounter _____ ft
Upon Completion Dry ft
After _____ Hrs. _____ ft

	DEPTH (ft)	BLOWS (/6")	UCS Qu (tsf)	MOIST (%)
Augered, black, Silty Clay Loam-fill 636.59				
Stiff, brown, Clay Loam 635.59				
Brown, medium, fine to medium, Sand with some Silt 633.59	-5			
Borehole continued with rock coring.				
	-10			
	-15			
	-20			

The Unconfined Compressive Strength (UCS) Failure Mode is indicated by (B-Bulge, S-Shear, P-Penetrometer)
The SPT (N value) is the sum of the last two blow values in each sampling zone (AASHTO T206)

BBS, from 137 (Rev. 8-99)

Illinois Department of Transportation
Division of Highways
District #3, Ottawa

ROCK CORE LOG

Page 1 of 1

Date 8/8/07

ROUTE FAU 6177 (North Street) **DESCRIPTION** North Street over I-57 **LOGGED BY** Larry Myers

SECTION 46-2(1)HB **LOCATION** SE 1/4, SEC. 21, TWP. 31N, RNG. 12E

COUNTY Kankakee **CORING METHOD** Water Rotary

STRUCT. NO. 046-0088
Station 225+59.91

BORING NO. #4: Pier
Station 101+98.5
Offset 20.00ft Rt.
Ground Surface Elev. 638.59 ft

CORING BARREL TYPE & SIZE 5'- Dbl Barrel
Core Diameter 2 in
Top of Rock Elev. 633.59 ft
Begin Core Elev. 633.59 ft

		DEPTH (ft)	CORE (#)	RECOVERY (%)	R.Q.D. (%)	CORE TIME (min/ft)	STRENGTH (tsf)
Buff, oxidized, Dolomite, contains many weathered, fractures and joints (<2"). Vertical joints with secondary calcification present. Oxidation lessens, joint spacing increases and little to no joint weathering after 8.5'. Dolomite- "A", open joints (2), RMR- 22, Class IV- poor	633.59	-10	1	100	0	0.8	
	623.59	-15	2	100	0	1.8	
Buff, Dolomite, minor oxidation along joints and angular fractures (ave 4" spacing), few to none are vertical. Dolomite- "A", open joints (3), RMR- 40, Class IV- poor	618.59	-20	3	100	9	2.6	429.8
End of Boring		-25					

Color pictures of the cores Yes
Cores will be stored for examination until Completion
The "Strength" column represents the uniaxial compressive strength of the core sample (ASTM D-2938)

Compressive Strength Test for Cores

Structure # or Location: North Street Bridge
Description: Silurian Dolomite Rock Core
Date Cored: 8/8/2007
Date Tested: 8/28/2007
Diameter of Core Barrel: 2"

Core Location Description: Boring #4. I-57 median, S side of bridge.

Specimen Description: Samples were taken from a depth of 19.2-20'. Two cores were tested.

Specimen

Diameter (in)	Surface Area (in2)	Height (in)	Length to Diameter Ratio (L/D)	Dial Reading at Failure (x 1000 lbs)	Surface Area Corrected Load (psi)	L/D Correction Factor	L/D Corrected Load (psi)	**Final Strength (psi)**
2.04	3.26851	2.2	1.078431373	21	6424.940033	0.89	5718.197	**5720**
2.04	3.26851	4	1.960784314	19.5	5966.015745	1	5966.016	**5970**

Type of Fracture: 1- Columnar, 2- Shear

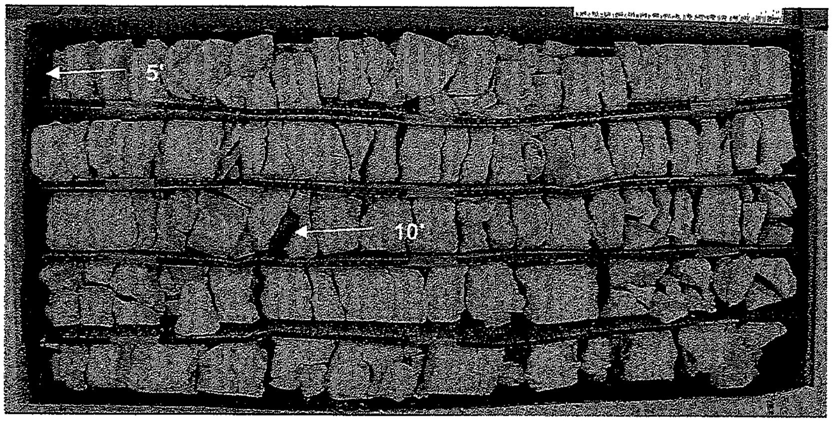
$$5970\ \text{lbs}/\text{in}^2 \times 144\ \text{in}^2/\text{ft}^2 = 859{,}680\ \text{lbs}/\text{ft}^2 \Big/ 2000\ \text{lbs}/\text{ton}$$

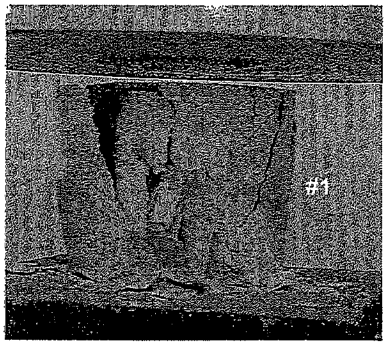
$$= 429.84\ \text{tons}/\text{ft}^2$$

L/D Correction Factors

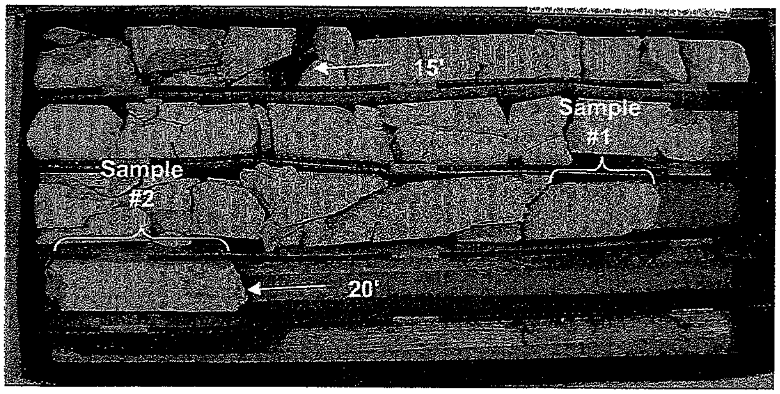
L/D	1.75	1.50	1.25	1.00
Factors	0.98	0.96	0.93	0.87

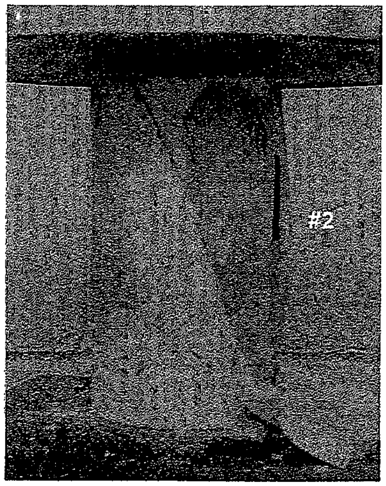
Use interpolation to determine correction factors for L/D values between those given in the table.



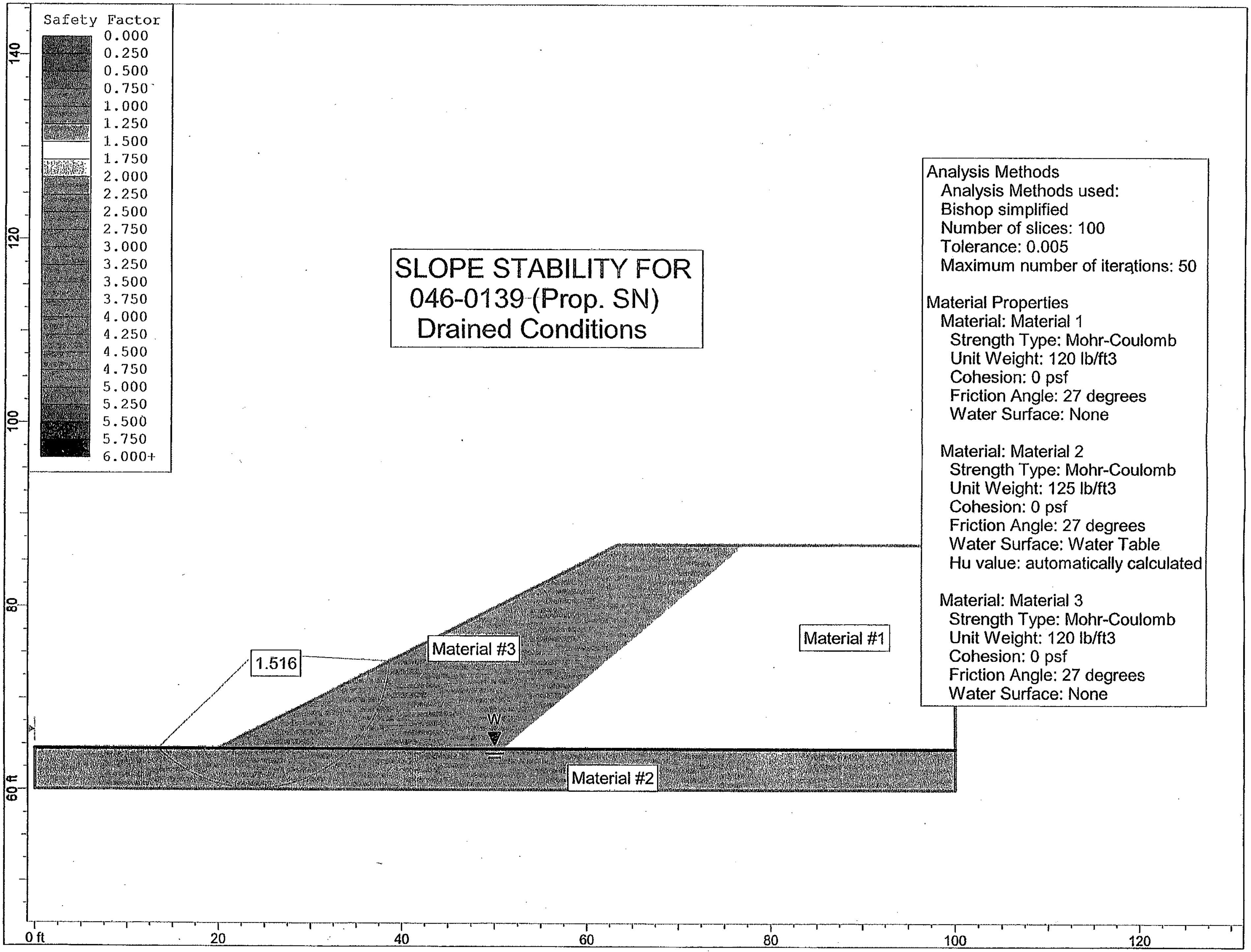


Type - A
Joint Space ≈ 2
RMR = 22





Type - A
Joints ≈ 3
RMR = 40



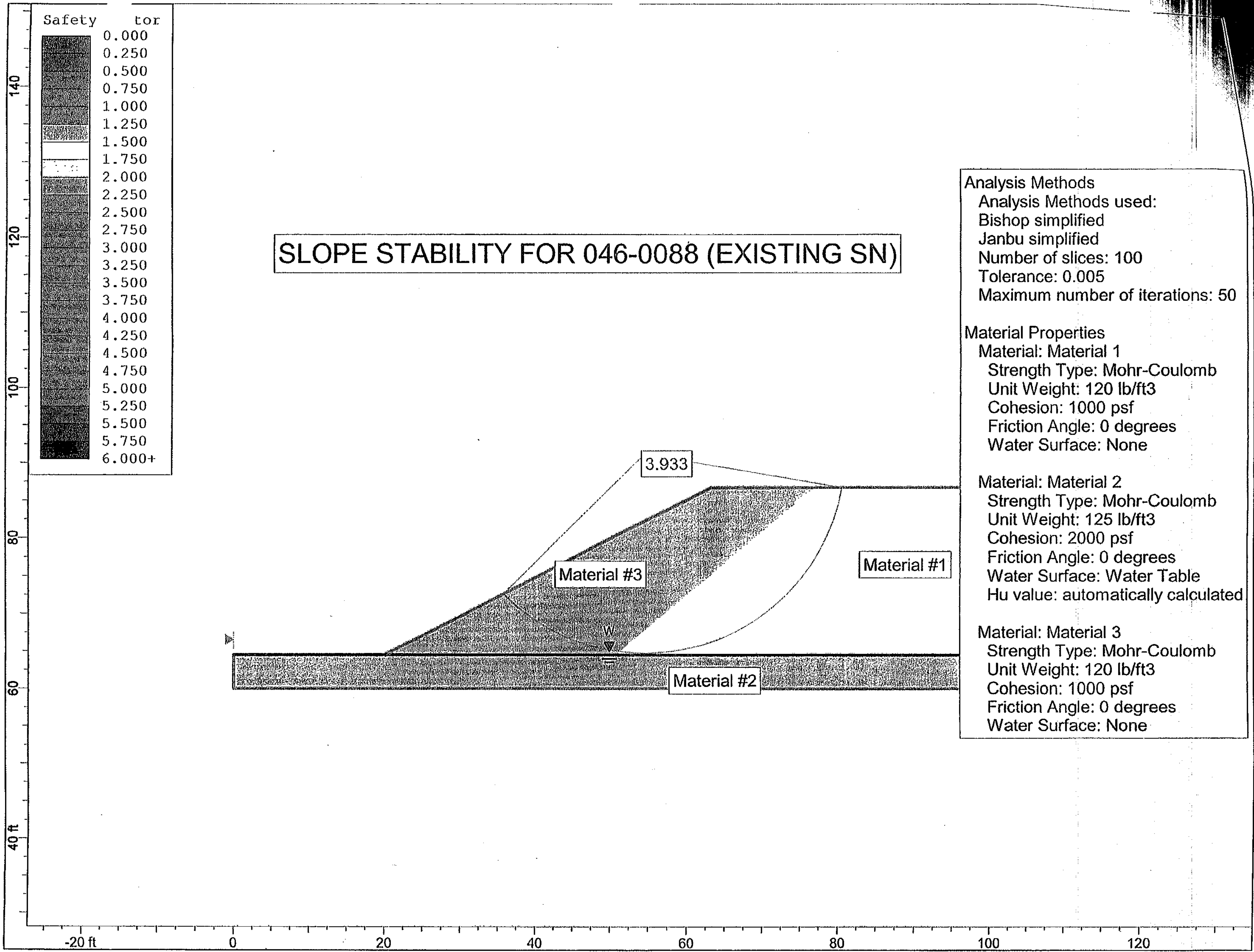
SLOPE STABILITY FOR 046-0139 (Prop. SN) Drained Conditions

Analysis Methods
  Analysis Methods used:
  Bishop simplified
  Number of slices: 100
  Tolerance: 0.005
  Maximum number of iterations: 50

Material Properties
  Material: Material 1
    Strength Type: Mohr-Coulomb
    Unit Weight: 120 lb/ft3
    Cohesion: 0 psf
    Friction Angle: 27 degrees
    Water Surface: None

  Material: Material 2
    Strength Type: Mohr-Coulomb
    Unit Weight: 125 lb/ft3
    Cohesion: 0 psf
    Friction Angle: 27 degrees
    Water Surface: Water Table
    Hu value: automatically calculated

  Material: Material 3
    Strength Type: Mohr-Coulomb
    Unit Weight: 120 lb/ft3
    Cohesion: 0 psf
    Friction Angle: 27 degrees
    Water Surface: None



SLOPE STABILITY FOR 046-0088 (EXISTING SN)

Analysis Methods
  Analysis Methods used:
  Bishop simplified
  Janbu simplified
  Number of slices: 100
  Tolerance: 0.005
  Maximum number of iterations: 50

Material Properties
  Material: Material 1
    Strength Type: Mohr-Coulomb
    Unit Weight: 120 lb/ft3
    Cohesion: 1000 psf
    Friction Angle: 0 degrees
    Water Surface: None

  Material: Material 2
    Strength Type: Mohr-Coulomb
    Unit Weight: 125 lb/ft3
    Cohesion: 2000 psf
    Friction Angle: 0 degrees
    Water Surface: Water Table
    Hu value: automatically calculated

  Material: Material 3
    Strength Type: Mohr-Coulomb
    Unit Weight: 120 lb/ft3
    Cohesion: 1000 psf
    Friction Angle: 0 degrees
    Water Surface: None