NUMBERS — RIGHT JUSTIFIED FIELDS
LETTERS — LEFT JUSTIFIED FIELDS

PR-1 REV 07/1/76

OHIO DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAM FORM

DISTRICT 1 07
PF NO. 3 _____ REV 9 __

DATE OF ORIGINAL PF 3/21/79
DATE OF LATEST PF 10 79/03/21 (YY MM DD)

PROJECT LENGTH (MI-KM)

	COUNTY	ROUTE	SECTION	MUNIC	RURAL		TOTAL		UNITS
16	LOG	19 CR 39	25 4.98		0.00	= 29	0.00	33	
34		37	43			= 47			
51		54	60			= 64			
68		71	77			= 98			
102		105	111			= 132			
		TOTALS			0.00	=	0.00		

CENTRAL OFFICE USE

	JOB NO. 1	JOB NO. 2
PHASE OF WORK		
PRELIM. ENG'G 136		
RIGHT-OF-WAY 148		
CONSTR. ENG'G 160		

JOB NO. ID. _____

HIGHWAY SYSTEM

	STATE FUNCTIONAL RURAL	STATE FUNCTIONAL URBAN	FEDERAL (1)	FEDERAL (2)	OTHER (1)	OTHER (2)
	173 Minor Collector	174	175 Non-Federal Aid	176	177 County	178
	180	181	182	183	184	185
	187	188	189	190	191	192
	194	195	196	197	198	199
	201	202	203	204	205	206

PROJECT TERMINI AND LOCATION

↓ PICA ↓ ELITE

207 2.1 Mi South of Belle Center over Branch of South Fork Miami River
287
367
47
127

EXISTING CONDITIONS

PAVEMENT WIDTH 20' ROADWAY WIDTH 25'
TRAFFIC-PASSENGER CAR & "A" 370 "B" & "C" 30 TOTAL 400 YEAR 77
CAPAC. RTG. _____ SER. & SAF. RTG. _____ STR. RTG. _____ SUFF. RTG. 207 _____ 210 _____
ACCIDENT DATA _____
RR CROSSING NAME & NUMBER _____
AIRPORTS — (WITHIN 2 MI) NAME _____ (SHOW LOCATION ON MAP)
STRUCTURE FILE NO. 4633539
BRIDGES >20' SPAN-WIDTH _____
BRIDGES >20' SPAN-LENGTH _____
GENERAL APPRAISAL (RTG.) _____

PURPOSE AND DESCRIPTION OF WORK

Replacement of existing structurally deficient truss bridge with a three span continuous reinforced concrete slab bridge.

Work length = 1200'±

213 PE REPORT BY: Logan County
250 DESIGN REPORT BY: Logan County
287 ROADWAY PLANS BY: Logan County
324 EIS/4 (f) BY: Logan County

PARTICIPATING AGENCIES

AGENCY	ORD. NO.	CONSENT /%/ LUMP SUM

RR AGREEMENT _____

PROGRAM STATUS YEAR	PROGRAM STATUS CODE	MAP NUMBER	MAP LETTER	COMPLEXITY	LOCAL COOPERATION	NUMBER OF LANES	WIDEN/RESURFACE	RECONSTRUCTION	NEW LOCATION	RR GRADE SEP.	OTHER BRIDGES	LIMITED ACCESS	MISCELLANEOUS	TYPE OF WORK
361	63	364	67	68		370	72	73	74	75	376	78	79	380 382

FEDERAL PROJECT NUMBER

383 _____
3 _____
23 _____
43 _____
63 _____
83 _____

REMARKS 123 _____

RECOMMENDED BY _____ DATE _____
RECOMMENDED BY _____ ENG'R. DATE _____ PF NO. _____
RECOMMENDED BY _____ DISTRICT ENG'R. DATE _____ C-R-S
REVIEWED BY _____ DATE _____

SUPPLEMENTAL PROJECT INFORMATION SHEET Date 3/21/79

County, Route, Section LOG CR 39-4.98 PP

Funding Off-System Project Length Est. Cost 120,000

Termini Work length = 1200'±

Type Improvement Replacement of existing truss bridge with a three span continuous reinforced concrete slab bridge

Est. Traffic Data	Year	ADT	% Trucks	Operating Speed
Present Day	1979	450	5%	50
Opening Day (Build)	1980	475	8%	50
Opening Day (No Build)				
Design Year (Build)	2000	775	8%	50
Design Year (No Build)				

Exist. Facility: Pav't Width 20' No. Lanes 2 R/W Width 50'

	No	Possible	Comment
Other Modal Alternatives	X		
Alternatives Outside Existing Corridor	X		
Work Extends Beyond Exist. R/W Limits		X	
Significant Effect on Adjacent Properties	X		
Major Change in Access Points	X		
Major Change in Traffic Volumes	X		
Major Change in Traffic Flow (Oper. Speed)	X		
Major Change in Vehicle Mix	X		
Major Change in Travel Patterns	X		
Live Stream Involvement		X	May be some channel work
Intermittent Stream-Significant Pools	X		
Intermittent Stream-No Significant Pools	X		
Historical Sites & Parks	X		
Wetland Involvement	X		
Flood Plain Involvement	X		

Exist. Bridge Involvement: Yes X No

*Bridge Category & Code ( )( )

*Work Category

*Historic Coordination Required

12/78

NUMBERS — RIGHT JUSTIFIED FIELDS
LETTERS — LEFT JUSTIFIED FIELDS

PR-1 REV 07/1/76

OHIO DEPARTMENT OF TRANSPORTATION

PROJECT PROGRAM FORM

DISTRICT [1] 07
PF NO. [3] _____ REV [9] __

DATE OF ORIGINAL PF 3/21/79
DATE OF LATEST PF [10] 79/03/21 (YY MM DD)

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RR CROSSING NAME & NUMBER _____
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FEDERAL PROJECT NUMBER

383 _____
3 _____
23 _____
43 _____
63 _____
83 _____

REMARKS [123]

RECOMMENDED BY Chester R. Kautz, Logan Co. Engineer DATE 3-21-79
RECOMMENDED BY _____ ENG'R. DATE
RECOMMENDED BY _____ DISTRICT ENG'R. DATE
REVIEWED BY _____ DATE

PF NO. _____
C-R-S

SUPPLEMENTAL PROJECT INFORMATION SHEET Date 3/21/79

County, Route, Section LOG CR 39-4.98 PF

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	No	Possible	Comment
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Work Extends Beyond Exist. R/W Limits		X	
Significant Effect on Adjacent Properties	X		
Major Change in Access Points	X		
Major Change in Traffic Volumes	X		
Major Change in Traffic Flow (Oper. Speed)	X		
Major Change in Vehicle Mix	X		
Major Change in Travel Patterns	X		
Live Stream Involvement		X	May be some channel work
Intermittent Stream-Significant Pools	X		
Intermittent Stream-No Significant Pools	X		
Historical Sites & Parks	X		
Wetland Involvement	X		
Flood Plain Involvement	X		

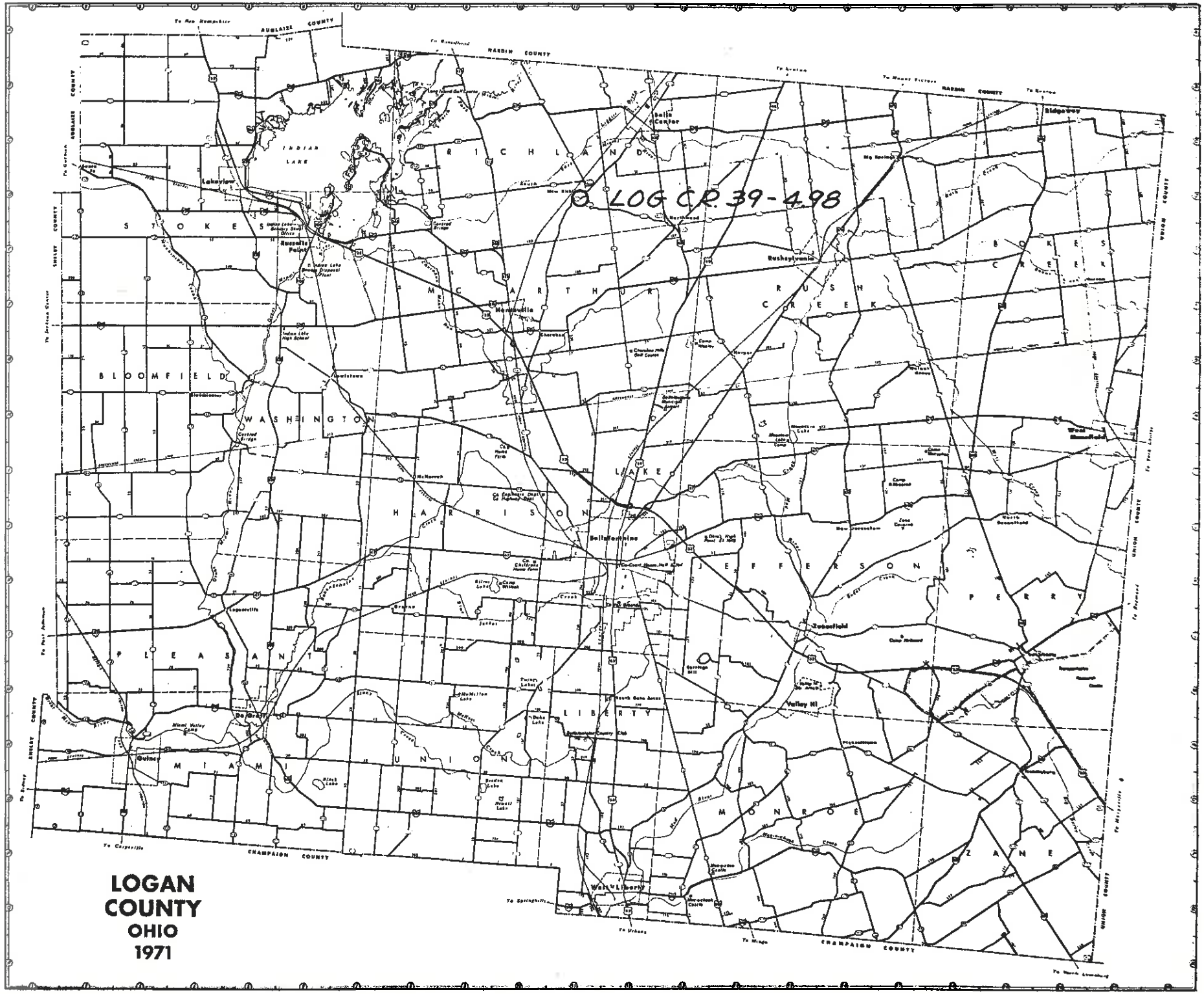
Exist. Bridge Involvement: Yes X No

*Bridge Category & Code ( )( )

*Work Category

*Historic Coordination Required

12/78


O. LOG C.R. 39-498
LOGAN
COUNTY
OHIO
1971

CS-4A Rev. 2/1/75

RESOLUTION NO. 114-79

RESOLUTION OF COUNTY COMMISSIONERS PROPOSING
TO COOPERATE WITH THE DIRECTOR OF TRANSPORTATION

Mr. G. Parker Kennedy moved the adoption of the following resolution:

WHEREAS, the public interest demands the improvement hereinafter described.

NOW THEREFORE, BE IT RESOLVED, by the Board of Commissioners of Logan County, Ohio, hereinafter referred to as the County, that:

SECTION I. - The public interest demands the improvement, under the provisions of Section 5531.02 and related sections of the Ohio Revised Code, of that part of County Road No. 39, situated in the County of Logan, State of Ohio, and described as follows:

Replacing the bridge on County Road No. 39 located approximately 2.1 miles south of Belle Center.

SECTION II. - The County does hereby propose to cooperate with the Director of Transportation in the improvement of ~~Federal Aid Secondary Route No.~~ County Road No. 39 under the provisions of Public Law 521 - 78th Congress, as amended and supplemented, by assuming and contributing the entire cost and expense of the improvement less the amount of Federal-Aid ~~Secondary~~ funds set aside by the Director of Transportation for the financing of this improvement from funds allocated by the Federal Highway Administration, U.S. Department of Transportation, and further, the County agrees to bear one hundred percent (100%) of the cost of the following items which shall not be a part of the State's Estimate.

(1) Preliminary Engineering
(2) Construction Engineering
(3) Rights-of-way
(4) All costs for added construction items generating extra work contracts under Ohio Laws, unless performance is approved by the State of Ohio and Federal Highway Administration before work is authorized.

SECTION III. - The County agrees to arrange for the relocation, rearrangement or alteration of all utilities of any nature whatsoever whether privately, publicly or cooperatively owned, which will be affected by or interfer with said improvement and said rearrangements will be done at such time as requested by the Director of Transportation. The cost of the relocation, rearrangement and alteration of such utilities affected and payment therefor shall be in accordance with Ohio Department of Transportation Directive 28-A.

SECTION IV. - The Board of County Commissioners agrees that all rights of way required for the improvement will be acquired in accordance with all applicable State and Federal regulations in force and effect.

SECTION V. - Upon completion of said improvement the County will thereafter keep said highway open to traffic at all times, and

(a) Maintain the improvement and make ample financial and other provisions for such maintenance, and

(b) Maintain the right of way and keep it free of obstructions, and hold said right of way inviolate for public highway purposes, and permit no signs, posters, billboards, roadside stands or other private installations within the right of way limits; and

(c) Will place and maintain all traffic control devices conforming to the Ohio Manual of Uniform Traffic Control Devices on the improvement in compliance with the provisions of Section 4511.11 and related sections of the Ohio Revised Code; and

(d) Regular parking in the following manner;

Prohibit parking on the bridge and allow emergency parking only on the berms approaching the bridge.

SECTION VI. - The County Engineer is hereby empowered and directed on behalf of the County to enter into agreements with the Director of Transportation necessary to complete the planning and construction of this improvement.

The State of Ohio, County of Logan, Office of the Board of County Commissioners.

This is to certify that the foregoing is a true and correct copy of the resolution passed by said Board of County Commissioners on the 2nd day of April, 19 79 and recorded in the Journal of said Board of County Commissioners in Vol. 2X at page 738, and under date of April 2, 19 79.

IN WITNESS WHEREOF, I have hereunto set my hand this 2nd day of April, 19 79.

Judith L. Grove
CLERK, BOARD OF COMMISSIONERS OF

Logan COUNTY, OHIO.

****

The aforegoing is accepted as a basis for proceeding with the improvement herein described.

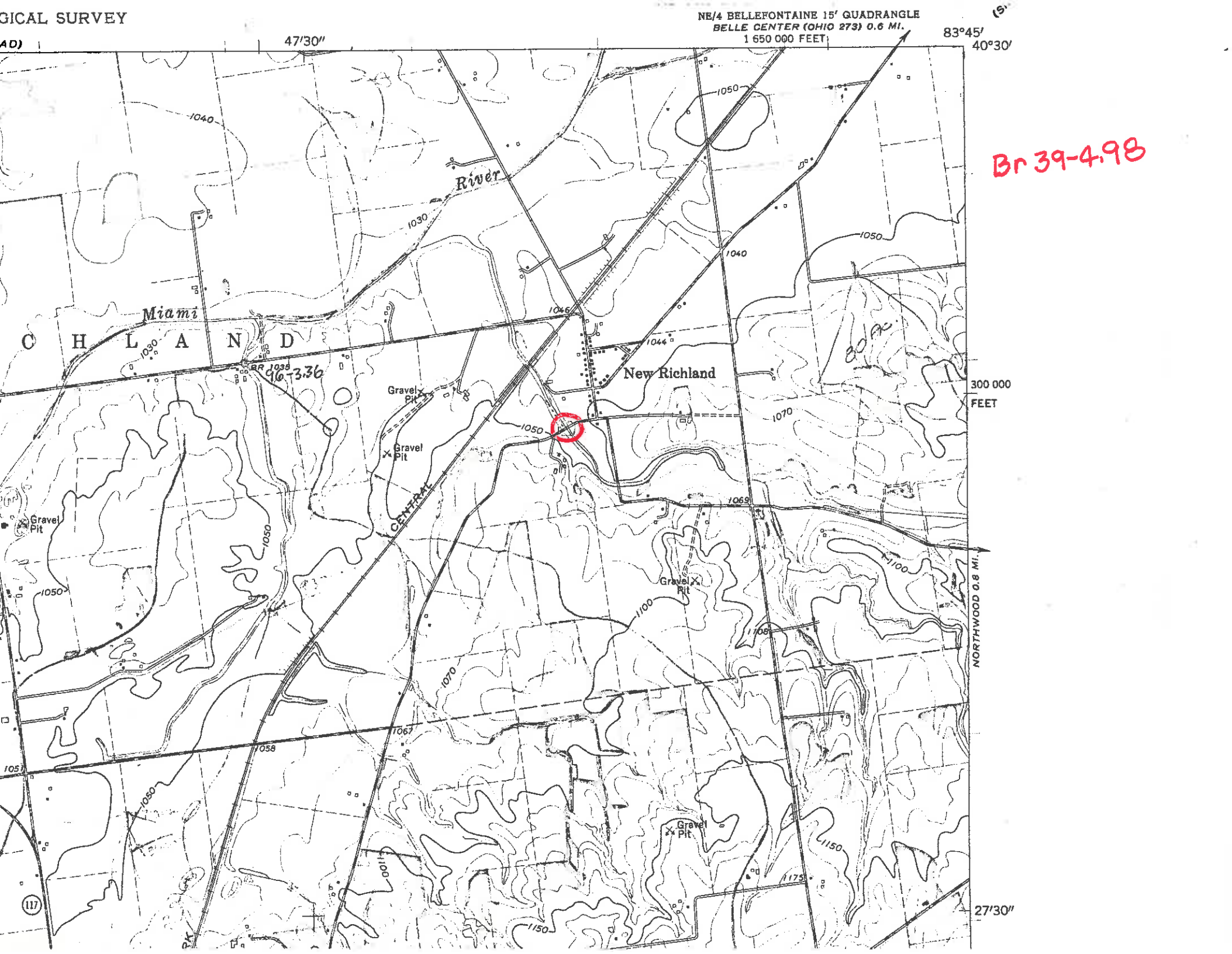
ATTEST:_____ _____ DATE _____
DIRECTOR OF TRANSPORTATION

Appendix A.—TABLES

Table 1.—Manning roughness coefficients, n [1]

	Manning's n range [2]
I. Closed conduits:	
A. Concrete pipe	0.011–0.013
B. Corrugated-metal pipe or pipe-arch:	
1. 2⅔ by ½-in. corrugation (riveted pipe): [3]	
a. Plain or fully coated	0.024
b. Paved invert (range values are for 25 and 50 percent of circumference paved):	
(1) Flow full depth	0.021–0.018
(2) Flow 0.8 depth	0.021–0.016
(3) Flow 0.6 depth	0.019–0.013
2. 6 by 2-in. corrugation (field bolted)	0.03
C. Vitrified clay pipe	0.012–0.014
D. Cast-iron pipe, uncoated	0.013
E. Steel pipe	0.009–0.011
F. Brick	0.014–0.017
G. Monolithic concrete:	
1. Wood forms, rough	0.015–0.017
2. Wood forms, smooth	0.012–0.014
3. Steel forms	0.012–0.013
H. Cemented rubble masonry walls:	
1. Concrete floor and top	0.017–0.022
2. Natural floor	0.019–0.025
I. Laminated treated wood	0.015–0.017
J. Vitrified clay liner plates	0.015
II. Open channels, lined [4] (straight alinement): [5]	
A. Concrete, with surfaces as indicated:	
1. Formed, no finish	0.013–0.017
2. Trowel finish	0.012–0.014
3. Float finish	0.013–0.015
4. Float finish, some gravel on bottom	0.015–0.017
5. Gunite, good section	0.016–0.019
6. Gunite, wavy section	0.018–0.022
B. Concrete, bottom float finished, sides as indicated:	
1. Dressed stone in mortar	0.015–0.017
2. Random stone in mortar	0.017–0.020
3. Cement rubble masonry	0.020–0.025
4. Cement rubble masonry, plastered	0.016–0.020
5. Dry rubble (riprap)	0.020–0.030
C. Gravel bottom, sides as indicated:	
1. Formed concrete	0.017–0.020
2. Random stone in mortar	0.020–0.023
3. Dry rubble (riprap)	0.023–0.033
D. Brick	0.014–0.017
E. Asphalt:	
1. Smooth	0.013
2. Rough	0.016
F. Wood, planed, clean	0.011–0.013
G. Concrete-lined excavated rock:	
1. Good section	0.017–0.020
2. Irregular section	0.022–0.027
III. Open channels, excavated [4] (straight alinement,[5] natural lining):	
A. Earth, uniform section:	
1. Clean, recently completed	0.016–0.018
2. Clean, after weathering	0.018–0.020
3. With short grass, few weeds	0.022–0.027
4. In gravelly soil, uniform section, clean	0.022–0.025
B. Earth, fairly uniform section:	
1. No vegetation	0.022–0.025
2. Grass, some weeds	0.025–0.030
3. Dense weeds or aquatic plants in deep channels	0.030–0.035
4. Sides clean, gravel bottom	0.025–0.030
5. Sides clean, cobble bottom	0.030–0.040
C. Dragline excavated or dredged:	
1. No vegetation	0.028–0.033
2. Light brush on banks	0.035–0.050
D. Rock:	
1. Based on design section	0.035
2. Based on actual mean section:	
a. Smooth and uniform	0.035–0.040
b. Jagged and irregular	0.040–0.045
E. Channels not maintained, weeds and brush uncut:	
1. Dense weeds, high as flow depth	0.08–0.12
2. Clean bottom, brush on sides	0.05–0.08
3. Clean bottom, brush on sides, highest stage of flow	0.07–0.11
4. Dense brush, high stage	0.10–0.14
IV. Highway channels and swales with maintained vegetation [6 7] (values shown are for velocities of 2 and 6 f.p.s.):	
A. Depth of flow up to 0.7 foot:	
1. Bermudagrass, Kentucky bluegrass, buffalograss:	
a. Mowed to 2 inches	0.07–0.045
b. Length 4–6 inches	0.09–0.05
2. Good stand, any grass:	
a. Length about 12 inches	0.18–0.09
b. Length about 24 inches	0.30–0.15
3. Fair stand, any grass:	
a. Length about 12 inches	0.14–0.08
b. Length about 24 inches	0.25–0.13
B. Depth of flow 0.7–1.5 feet:	
1. Bermudagrass, Kentucky bluegrass, buffalograss:	
a. Mowed to 2 inches	0.05–0.035
b. Length 4 to 6 inches	0.06–0.04
2. Good stand, any grass:	
a. Length about 12 inches	0.12–0.07
b. Length about 24 inches	0.20–0.10
3. Fair stand, any grass:	
a. Length about 12 inches	0.10–0.06
b. Length about 24 inches	0.17–0.09
V. Street and expressway gutters:	
A. Concrete gutter, troweled finish	0.012
B. Asphalt pavement:	
1. Smooth texture	0.013
2. Rough texture	0.016
C. Concrete gutter with asphalt pavement:	
1. Smooth	0.013
2. Rough	0.015
D. Concrete pavement:	
1. Float finish	0.014
2. Broom finish	0.016
E. For gutters with small slope, where sediment may accumulate, increase above values of n by	*0.002*
VI. Natural stream channels:[5]	
A. Minor streams [9] (surface width at flood stage less than 100 ft.):	
1. Fairly regular section:	
a. Some grass and weeds, little or no brush	0.030–0.035
b. Dense growth of weeds, depth of flow materially greater than weed height	0.035–0.05
c. Some weeds, light brush on banks	0.035–0.05
d. Some weeds, heavy brush on banks	0.05–0.07
e. Some weeds, dense willows on banks	0.06–0.08
f. For trees within channel, with branches submerged at high stage, increase all above values by	*0.01–0.02*
2. Irregular sections, with pools, slight channel meander; increase values given in 1a–e about	*0.01–0.02*
3. Mountain streams, no vegetation in channel, banks usually steep, trees and brush along banks submerged at high stage:	
a. Bottom of gravel, cobbles, and few boulders	0.04–0.05
b. Bottom of cobbles, with large boulders	0.05–0.07
B. Flood plains (adjacent to natural streams):	
1. Pasture, no brush:	
a. Short grass	0.030–0.035
b. High grass	0.035–0.05
2. Cultivated areas:	
a. No crop	0.03–0.04
b. Mature row crops	0.035–0.045
c. Mature field crops	0.04–0.05
3. Heavy weeds, scattered brush	0.05–0.07
4. Light brush and trees: [10]	
a. Winter	0.05–0.06
b. Summer	0.06–0.08
5. Medium to dense brush: [10]	
a. Winter	0.07–0.11
b. Summer	0.10–0.16
6. Dense willows, summer, not bent over by current	0.15–0.20
7. Cleared land with tree stumps, 100–150 per acre:	
a. No sprouts	0.04–0.05
b. With heavy growth of sprouts	0.06–0.08
8. Heavy stand of timber, a few down trees, little undergrowth:	
a. Flood depth below branches	0.10–0.12
b. Flood depth reaches branches	0.12–0.16
C. Major streams (surface width at flood stage more than 100 ft.): Roughness coefficient is usually less than for minor streams of similar description on account of less effective resistance offered by irregular banks or vegetation on banks. Values of n may be somewhat reduced. Follow recommendation in publication cited [8] if possible. The value of n for larger streams of most regular section, with no boulders or brush, may be in the range of	0.028–0.033

Footnotes to table 1 appear at the top of page 101.


GICAL SURVEY
AD)
47'30"
NE/4 BELLEFONTAINE 15' QUADRANGLE
BELLE CENTER (OHIO 273) 0.6 MI.
1 650 000 FEET
83°45'
40°30'
Br 39-4.98
River
Miami
C H L A N D
BR 1038
96-3.36
Gravel Pit
New Richland
80 Ac
300 000 FEET
CENTRAL
NORTHWOOD 0.8 MI.
27'30"
117

Br 39-4.98

Design Criteria

Loading: HS 20-44

Skew: 0°

Wearing Surface: 1" monolithic

Span: 24'-30'-24'

Roadway Width: 32' ~~with tubular backup, 33.33' without~~

Guard Rail: Use buried ends

Piling: 14" cast in place reinforced concrete

Slab Thickness: ODOT calls for 15 3/4", ~~use 16~~"

Commissioners Journal for 1876

Richland Twp south fork of Miami on Richland

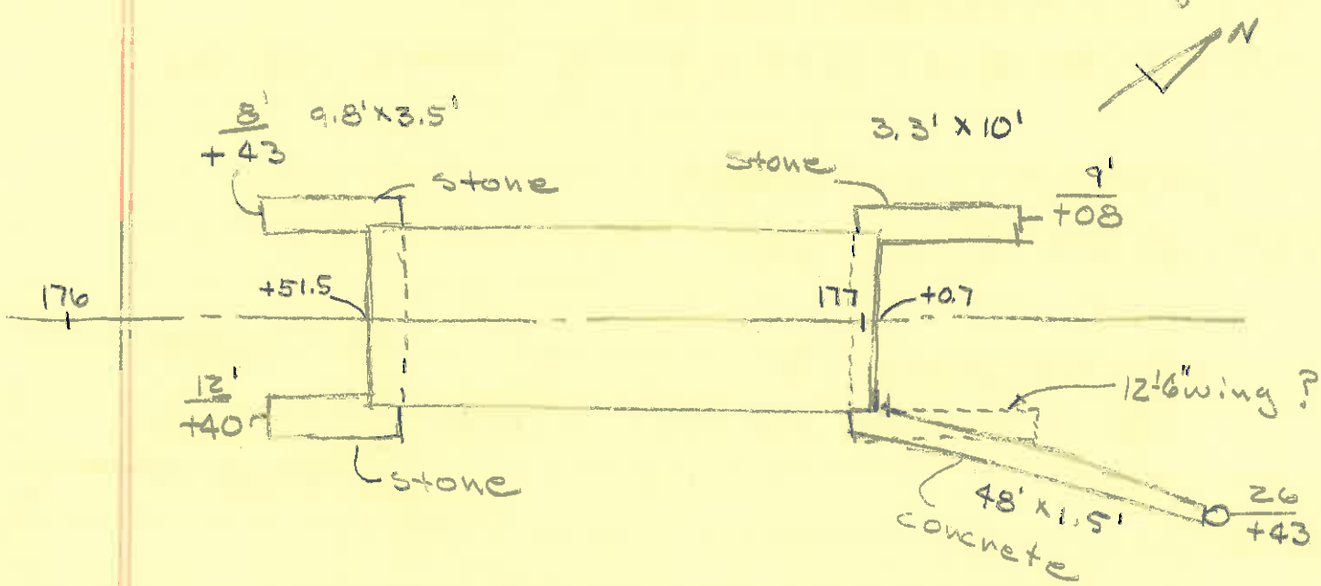
← McGraw Chapel Road, span 55', width 14'

H = 10½' from bottom of wall to bottom of chord,

stone abutments, (wood super) May 6th 1876

July 7, 1876 span = 55' width = 16' iron or wood super

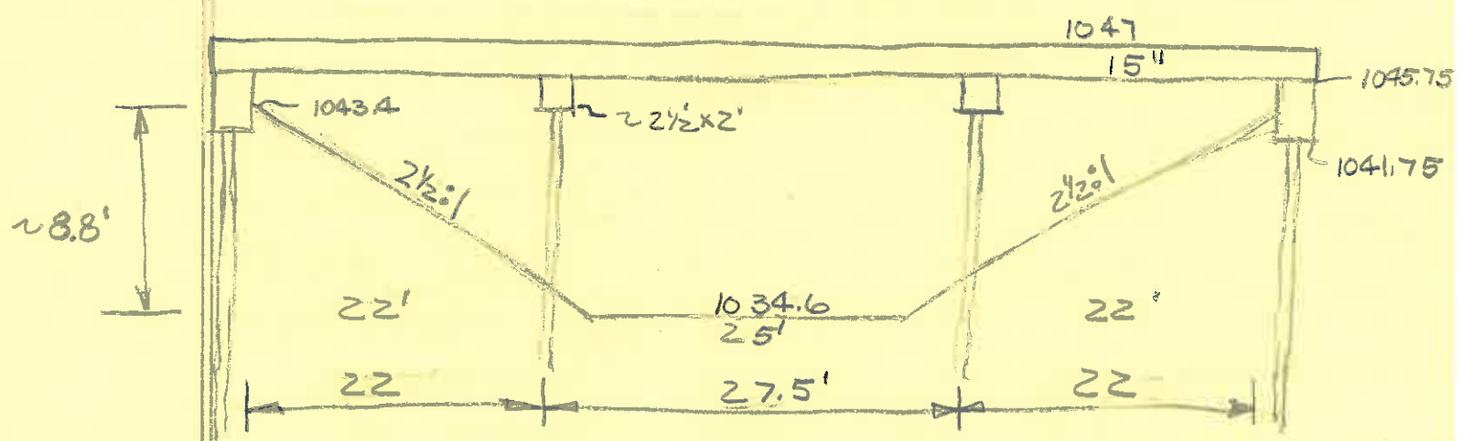
awarded to Canton Br. Co., Canton Oh., wrought iron



Approx. Elev of Bottom of wall = 1045.5 - 10.5 = 1035.0

Clear Span Required to avoid stone wings

S = 177+08 − 176+40 = 68'



Clear Span = 71.5' ℄ = 73.5' ℗ = 75.5'

~~$A_w = 11.15(25) + 2(\frac{1}{2})(2.35+11.15)(22) - 2(2.5)(2) - 2(1.17)(9) = 545$~~ ft²

K501 lap F bars — 32 bars — length = (15'-10") + 9" = 16'-7"
mid span (top)

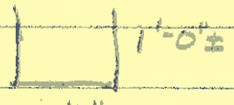
M601 No. = 75 bars — length = (33'-4") - 6" = 32'-10"
bottom (transverse)

$(82') - (9") - (3'\text{-}1\tfrac{1}{2}")2 = (75')' \div 15" = 60$ spaces (6.25)

61 bars + 4 + 10 = 75 bars

M402 No. = 130 bars
edge bars

length = $(15\tfrac{3}{4}") - (4\tfrac{1}{2}") + 2' - (3") = 2'\text{-}8\tfrac{1}{4}"$



$82' - (2(4\tfrac{1}{2}")) - 15" = 80' + 1.25' = 64$ spaces (9" 1'-3")

⇒ 65 bars/side

N401 No. = 83 bars
top transverse
length = (33'-4") - 6" = 32'-10"

Elev 1043.5

$A_0 = \frac{1}{2}(1)27.5 = 13.8$ $P_0 = 27.5$ $R = .5$ $R^{2/3} = .63$ $n = 0.035$

$A_1 = \frac{1}{2}(1+6.5)12 = 45$ $P_1 = 13.2$ $R = 3.41$ $R^{2/3} = 2.27$ $n = 0.035$

$A_2 = \frac{1}{2}(6.5+7)10 = 67.5$ $P_2 = 10.1$ $R = 6.68$ $R^{2/3} = 3.55$ $n = 0.035$

$A_3 = \frac{1}{2}(7+9.7)13 = 108.6$ $P_3 = 13.3$ $R = 8.16$ $R^{2/3} = 4.05$ $n = 0.035$

$A_4 = 9.7(20) = 194$ $P_4 = 20$ $R = 9.7$ $R^{2/3} = 4.55$ $n = 0.030$

$A_5 = \frac{1}{2}(9.7+6)12 = 94.2$ $P_5 = 12.6$ $R = 7.48$ $R^{2/3} = 3.82$ $n = 0.035$

$A_6 = \frac{1}{2}(6+5)11 = 60.5$ $P_6 = 11$ $R = 5.5$ $R^{2/3} = 3.12$ $n = 0.035$

$A_7 = \frac{1}{2}(5)17.5 = 43.8$ $P_7 = 18.2$ $R = 2.41$ $R^{2/3} = 1.80$ $n = 0.035$

$Q = 1.486(0.02)(248 + 2919 + 6846 + 12567 + 29423 + 10281 + 5393 + 2253)$

$Q = 2078$ cfs $V_{AV} = 3.3$ (3.3)

Elev 1044

$A_0 = \frac{1}{2}(1.5)(41.3) = 30.9$ $P_0 = 41.3$ $R = .75$ $R^{2/3} = .82$ $n = 0.035$

$A_1 = \frac{1}{2}(1.5+7)12 = 51$ $P_1 = 13.2$ $R = 3.86$ $R^{2/3} = 2.46$ $n = 0.035$

$A_2 = \frac{1}{2}(7+7.5)10 = 72.5$ $P_2 = 10.1$ $R = 7.18$ $R^{2/3} = 3.72$ $n = 0.035$

$A_3 = \frac{1}{2}(7.5+10.2)13 = 115.1$ $P_3 = 13.3$ $R = 8.65$ $R^{2/3} = 4.21$ $n = 0.035$

$A_4 = 10.2(20) = 204$ $P_4 = 20$ $R = 10.2$ $R^{2/3} = 4.70$ $n = 0.030$

$A_5 = \frac{1}{2}(10.2+6.5)12 = 100.2$ $P_5 = 12.6$ $R = 7.95$ $R^{2/3} = 3.98$ $n = 0.035$

$A_6 = \frac{1}{2}(6.5+5.5)11 = 66$ $P_6 = 11$ $R = 6.0$ $R^{2/3} = 3.30$ $n = 0.035$

$A_7 = \frac{1}{2}(5.5)19.25 = 52.9$ $P_7 = 20.0$ $R = 2.65$ $R^{2/3} = 1.91$ $n = 0.035$

$Q = 1.486(0.02)(724 + 3584 + 7705 + 13845 + 31960 + 11394 + 6223 + 2887)$

$Q = 2328$ cfs $V_{AV} = 3.4$ fps (3.4)

Elev 1045

$A_0 = \frac{1}{2}(2.5)(68.8) = 85.9$ $P_0 = 68.8$ $R = 1.25$ $R^{2/3} = 1.16$ $n = 0.035$

$A_1 = \frac{1}{2}(2.5+8)12 = 63$ $P_1 = 13.2$ $R = 4.77$ $R^{2/3} = 2.83$ $n = 0.035$

$A_2 = \frac{1}{2}(8+8.5)10 = 82.5$ $P_2 = 10.1$ $R = 8.17$ $R^{2/3} = 4.06$ $n = 0.035$

$A_3 = \frac{1}{2}(8.5+11.2)13 = 128.1$ $P_3 = 13.3$ $R = 9.63$ $R^{2/3} = 4.53$ $n = 0.035$ ($V = 3.9$)

$A_4 = 11.2(20) = 224$ $P_4 = 20$ $R = 11.2$ $R^{2/3} = 5.01$ $n = 0.030$ (4.3 $V = 5.0$)

$A_5 = \frac{1}{2}(11.2+7.5)12 = 112.2$ $P_5 = 12.6$ $R = 8.9$ $R^{2/3} = 4.30$ $n = 0.035$ ($V = 3.6$)

$A_6 = \frac{1}{2}(7.5+6.5)11 = 77$ $P_6 = 11$ $R = 7$ $R^{2/3} = 3.66$ $n = 0.035$

$A_7 = \frac{1}{2}(6.5)(22.75) = 73.9$ $P_7 = 23.7$ $R = 3.12$ $R^{2/3} = 2.13$ $n = 0.035$

$Q = 1.486(0.02)(2847 + 5094 + 9570 + 16580 + 37408 + 13785 + 8052 + 4497)$

$Q = 2908$ cfs $V_{AV} = 3.4$ fps

Elev 1043 with $S = 0.0004$ $S^{1/2} = 0.02$

$A_0 = \frac{1}{2}(1.5)(117) = 87.8$ $P_0 = 117$ $R = .75$ $R^{2/3} = .83$ $n = 0.035$

$A_1 = \frac{1}{2}(1.5+9.2)23 = 123.1$ $P_1 = 24.3$ $R = 5.06$ $R^{2/3} = 2.95$ $n = 0.035$

$A_2 = 9.2(20) = 184$ $P_2 = 20$ $R = 9.2$ $R^{2/3} = 4.39$ $n = 0.030$

$A_3 = \frac{1}{2}(9.2+6.5)5.5 = 43.2$ $P_3 = 6.1$ $R = 7.08$ $R^{2/3} = 3.69$ $n = 0.035$

$A_4 = \frac{1}{2}(6.5)45.5 = 148$ $P_4 = 46$ $R = 3.22$ $R^{2/3} = 2.18$ $n = 0.035$

$Q = 1.486(0.02)(2082 + 10376 + 26925 + 4555 + 9218)$

$Q = 1580$ cfs $V_{AV} = 2.70$

Elev 1043.5

$A_0 = \frac{1}{2}(2)156 = 156$ $P_0 = 156$ $R = 1.0$ $R^{2/3} = 1.0$ $n = 0.035$

$A_1 = \frac{1}{2}(2+9.7)23 = 134.6$ $P_1 = 24.3$ $R = 5.54$ $R^{2/3} = 3.13$ $n = 0.035$

$A_2 = 9.7(20) = 194$ $P_2 = 20$ $R = 9.7$ $R^{2/3} = 4.55$ $n = 0.030$

$A_3 = \frac{1}{2}(9.7+7)5.5 = 45.9$ $P_3 = 6.1$ $R = 7.53$ $R^{2/3} = 3.84$ $n = 0.035$

$A_4 = \frac{1}{2}(6.5+5)45.5 = 159.3$ $P_4 = 46$ $R = 3.46$ $R^{2/3} = 2.29$ $n = 0.035$

$A_5 = \frac{1}{2}(.5)(25) = 6.3$ $P_5 = 25$ $R = .25$ $R^{2/3} = .40$ $n = 0.035$

$Q = 1.486(0.02)(4457 + 12037 + 29423 + 5036 + 10423 + 72)$

$Q = 1826$ cfs $V_{AV} = 2.62$ fps

Elev 1044

$A_0 = \frac{1}{2}(2.5)195 = 243.8$ $P_0 = 195$ $R = 1.25$ $R^{2/3} = 1.16$ $n = 0.035$

$A_1 = \frac{1}{2}(2.5+10.2)23 = 146.1$ $P_1 = 24.3$ $R = 6.01$ $R^{2/3} = 3.31$ $n = 0.035$

$A_2 = 10.2(20) = 204$ $P_2 = 20$ $R = 10.2$ $R^{2/3} = 4.70$ $n = 0.030$

$A_3 = \frac{1}{2}(10.2+7.5)5.5 = 48.7$ $P_3 = 6.1$ $R = 7.98$ $R^{2/3} = 4.0$ $n = 0.035$

$A_4 = \frac{1}{2}(7+1)45.5 = 182$ $P_4 = 46$ $R = 3.96$ $R^{2/3} = 2.5$ $n = 0.035$

$A_5 = \frac{1}{2}(1)50 = 25$ $P_5 = 50$ $R = .5$ $R^{2/3} = .63$ $n = 0.035$

$Q = 1.486(0.02)(8080 + 13817 + 31960 + 5566 + 13000 + 450)$

$Q = 2166$ cfs $V_{AV} = 2.55$ fps

Elev 1045

$A_0 = \frac{1}{2}(3.5)273 = 477.8$ $P_0 = 273$ $R = 1.75$ $R^{2/3} = 1.45$ $n = 0.035$

$V = 3.1$

$A_1 = \frac{1}{2}(3.5+11.2)23 = 169.1$ $P_1 = 24.3$ $R = 6.96$ $R^{2/3} = 3.64$ $n = 0.035$

4.05 $V = 5.0$

$A_2 = 11.2(20) = 224$ $P_2 = 20$ $R = 11.2$ $R^{2/3} = 5.01$ $n = 0.030$

$V = 3.6$

$A_3 = \frac{1}{2}(11.2+8.5)5.5 = 54.2$ $P_3 = 6.1$ $R = 8.88$ $R^{2/3} = 4.29$ $n = 0.035$

$A_4 = \frac{1}{2}(8+2)45.5 = 227.5$ $P = 46$ $R = 4.95$ $R^{2/3} = 2.90$ $n = 0.035$

$A_5 = \frac{1}{2}(2)100 = 100$ $P = 100$ $R = 1.0$ $R^{2/3} = 1.0$ $n = 0.035$

$Q = 1.486(0.02)(19795 + 17586 + 37408 + 6644 + 18850 + 2857) = 3065$ cfs $V = 2.45$ fps

Elev 1042 @ Sta 5+00

$A_1 = \frac{1}{2}(5)(10.9) = 27.3$ $P_1 = 12.0$ $R = 2.28$ $R^{2/3} = 1.73$ $n = 0.035$

$A_2 = \frac{1}{2}(5+5.5)10 = 52.5$ $P_2 = 10.1$ $R = 5.2$ $R^{2/3} = 3.00$ $n = 0.035$

$A_3 = \frac{1}{2}(5.5+8.2)13 = 89.1$ $P_3 = 13.3$ $R = 6.70$ $R^{2/3} = 3.55$ $n = 0.035$

7.6 (6.6, 8.8, 6.2)

$A_4 = 8.2(20) = 164$ $P_4 = 20$ $R = 8.2$ $R^{2/3} = 4.07$ $n = 0.030$

$A_5 = \frac{1}{2}(8.2+4.5)12 = 76.2$ $P_5 = 12.6$ $R = 6.05$ $R^{2/3} = 3.32$ $n = 0.035$

$A_6 = \frac{1}{2}(4.5+3.5)11 = 44$ $P_6 = 11.0$ $R = 4.0$ $R^{2/3} = 2.52$ $n = 0.035$

$A_7 = \frac{1}{2}(3.5)(12.3) = 21.4$ $P_7 = 12.7$ $R = 1.68$ $R^{2/3} = 1.41$ $n = 0.035$

$Q = 1.486(0.04346)(1349 + 4500 + 9037 + 22249 + 7228 + 3168 + 862)$

$Q = 31266$ cfs $\quad V_{AV} = 6.59$

RATIONAL

$A = 6885$

$L = 33,600$

$H = 1300 - 1035 = 265'$

$S = \frac{265}{33,600} = 0.0079 \quad \sqrt{S} = 0.089$

$K = \frac{33,600}{0.089} = 378,343$

$t_c = 150$ min.

$i_{10} = 1.0 \quad i_{25} = 1.1 \quad i_{50} = 1.3 \quad i_{100} = 1.5$

$C_{10} = .15 \quad C_{25} = .15 \quad C_{50} = .17 \quad C_{100} = .18$

$Q_{10} = 1033$ cfs $Q_{25} = 1136$ cfs $Q_{50} = 1522$ cfs $Q_{100} = 1860$ cfs

High Water 2/24/75 6.0' Below Top of Wood Floor
1040.7

RAB 11/28/77

SUGGESTED WORK SHEET FOR ESTIMATING PEAK RATE OF RUNOFF OF SMALL WATERSHEDS

STEP A Identification of watershed Br 39-4.98

Location: Topographic map quadrangle _____ Principal stream _____

A-1 Location of crossing: Latitude _____ Longitude _____

A-2 Area of watershed, A (planimetered) = 6.89 1,000 acres.

A-3 Principal stream length: L = 6.34 miles; 0.3L = 1.9 miles; 0.7L = 4.44 miles.

Elevations on principal stream:

a, at headwater 1250 ft.; b, at 0.7L above crossing 1150 ft.; c, at crossing 1035 ft.

S_1 = (el. a - el. b) ÷ 0.3L = (1250 - 1150) ÷ 1.9 = 100 ÷ 1.9 = 52.6 ft./mi.; $\sqrt{S_1}$ = 7.25

S_2 = (el. b - el. c) ÷ 0.7L = (1150 - 1035) ÷ 4.44 = 115 ÷ 4.44 = 25.9 ft./mi.; $\sqrt{S_2}$ = 5.09

$T = (0.3L \div \sqrt{S_1}) + (0.7L \div \sqrt{S_2})$ = (1.9 ÷ 7.25) + (4.44 ÷ 5.09) = .26 + .87 = 1.13

STEP B From step A-1: Lat. ____ Long. ____

B-1 From figure B-1a, b, c, or d: Zone II B-2 From figure B-2a, b, c, or d: P = 1.8 in.

STEP C From steps A & B: Zone II A = 6.89 P = 1.8 T = 1.13

From figure C-1a, b, c, or d: $\hat{Q}_{10(ATP)}$ = .96 1,000 c.f.s.

STEP D From steps A & B: Zone II A = 6.89 P = 1.8 T = 1.13

From figure D-1a or b: $\hat{T}_{AP}$ = .79

Error = $\left[(\hat{T}_{AP} - T) \div \hat{T}_{AP}\right] \times 100$ = (.79 - 1.13) ÷ .79 x 100 = ____ ÷ ____ = 43 %

STEP E From step D: Error = 43 %.

E-1 & 2 Use only if error is equal to or greater than 30%.

From steps A, B, C, & D: Zone II T = 1.13 $\hat{T}_{AP}$ = .79 $\hat{Q}_{10(ATP)}$ = 0.96

$T \div \hat{T}_{AP}$ = 1.13 ÷ .79 = 1.43 From figure E-1: Coefficient C = 1.65

$\hat{Q}_{10(C)} = \hat{Q}_{10(ATP)} \times C$ = 0.96 x 1.65 = 1.58 1,000 c.f.s.

E-3 From steps C, D, & E-2: $\hat{Q}_{10(ATP)}$ = ____ $\hat{Q}_{10(C)}$ = ____ Error = ____ %

When error is less than 30% . . . . . $\hat{Q}_{10} = \hat{Q}_{10(ATP)}$ = ____

When error is equal to or greater than 30%, $\hat{Q}_{10} = \hat{Q}_{10(C)}$ = ____

From figure E-3, $\hat{Q}_{50}$ = 2.4

STEP F From step E-3: $\hat{Q}_{10}$ = ____ $\hat{Q}_{50}$ = ____

Plot $\hat{Q}_{10}$ and $\hat{Q}_{50}$ on extremal probability paper; connect points;

read from extended curve: $\hat{Q}_{25}$ = ____ $\hat{Q}_{100}$ = ____ $\hat{Q}_{200}$ = ____ $\hat{Q}_{500}$ = ____

Q_{10} = 1580 cfs

Q_{25} = 2000 cfs

Q_{50} = 2400 cfs

Q_{100} = 2900 cfs

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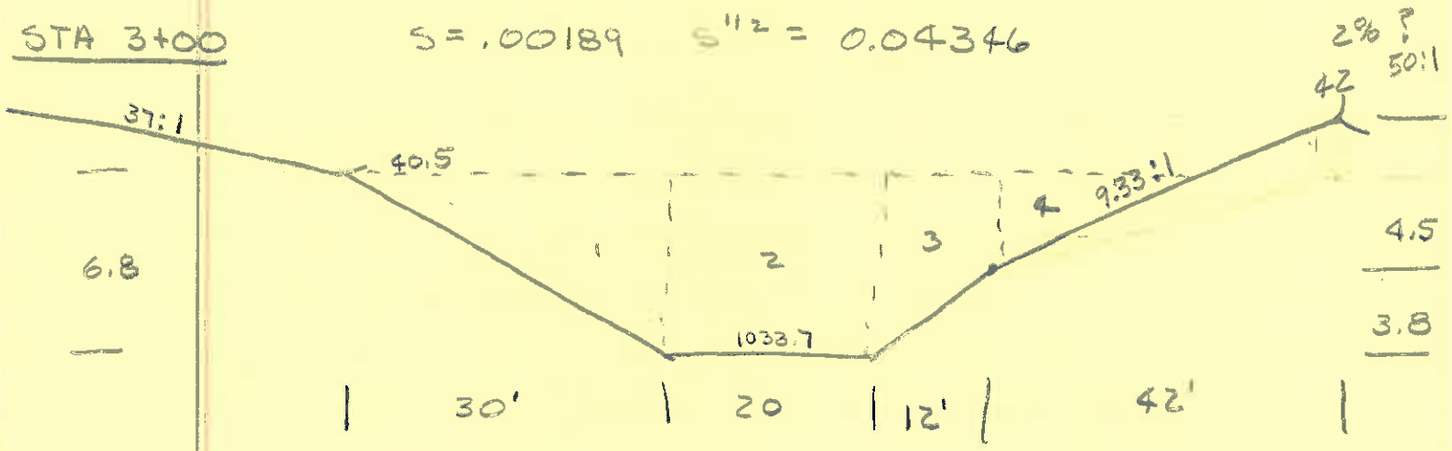
STA 3+00 $S = .00189$ $S^{1/2} = 0.04346$



Elev 1040.5

$A_1 = \frac{1}{2}(30)(6.8) = 102$ $P_1 = 30.8$ $R = 3.32$ $R^{2/3} = 2.22$ $n = 0.035$

$A_2 = 6.8(20) = 136$ $P_2 = 20$ $R = 6.8$ $R^{2/3} = 3.59$ $n = 0.030$

$A_3 = \frac{1}{2}(6.8+3)12 = 58.8$ $P_3 = 12.6$ $R = 4.67$ $R^{2/3} = 2.79$ $n = 0.035$

$A_4 = \frac{1}{2}(3)(28) = 42$ $P_4 = 28.2$ $R = 1.49$ $R^{2/3} = 1.31$ $n = 0.035$

$Q = 1.486(0.043)(6470 + 16275 + 4687 + 1572)$

$Q = 1853$ cfs $V_{AV} = 5.47$ fps

Elev 1042

$A_0 = \frac{1}{2}(1.5)(55.5) = 41.6$ $P_0 = 55.5$ $R = .75$ $R^{2/3} = .83$ $n = 0.035$

$A_1 = \frac{1}{2}(1.5+8.3)30 = 147$ $P_1 = 30.8$ $R = 4.77$ $R^{2/3} = 2.83$ $n = 0.035$

$A_2 = 8.3(20) = 166$ $P_2 = 20$ $R = 8.3$ $R^{2/3} = 4.10$ $n = 0.030$

$A_3 = \frac{1}{2}(8.3+4.5)12 = 76.8$ $P_3 = 12.6$ $R = 6.1$ $R^{2/3} = 3.34$ $n = 0.035$

$A_4 = \frac{1}{2}(4.5)(42) = 94.5$ $P_4 = 42.2$ $R = 2.24$ $R^{2/3} = 1.71$ $n = 0.035$

$Q = 1.486(.04346)(987 + 11886 + 22687 + 7330 + 4617)$

$Q = 3036$ cfs $V_{AV} = 5.77$ fps

Elev 1044 with $S = 0.0004$ $S^{1/2} = 0.02$

$A_0 = \frac{1}{2}(3.5)(129.5) = 226.6$ $P_0 = 129.5$ $R = 1.75$ $R^{2/3} = 1.45$ $n = 0.035$

$V = 3.0$ $A_1 = \frac{1}{2}(3.5+10.3)30 = 207$ $P_1 = 30.8$ $R = 6.72$ $R^{2/3} = 3.56$ $n = 0.035$

$V = 4.7$ $A_2 = 10.3(20) = 206$ $P_2 = 20$ $R = 10.3$ $R^{2/3} = 4.73$ $n = 0.030$

$V = 3.4$ $A_3 = \frac{1}{2}(10.3+6.5)12 = 100.8$ $P_3 = 12.6$ $R = 8.0$ $R^{2/3} = 4.00$ $n = 0.035$

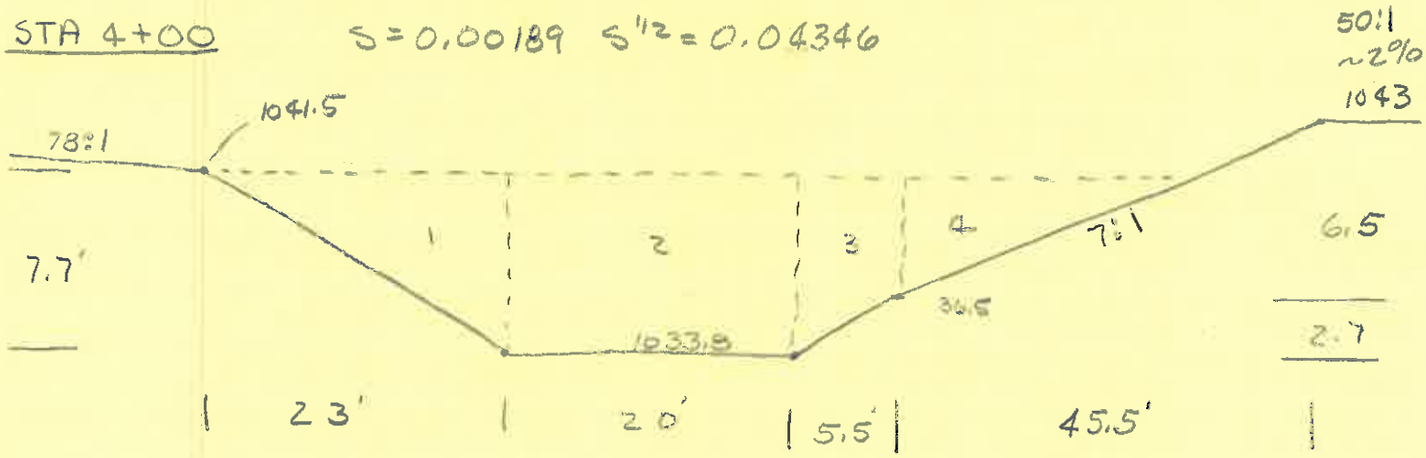
$A_4 = \frac{1}{2}(6.5+2)42 = 178.5$ $P_4 = 42.2$ $R = 4.23$ $R^{2/3} = 2.62$ $n = 0.035$

$A_5 = \frac{1}{2}(2)(100) = 100$ $P_5 = 100$ $R = 1.0$ $R^{2/3} = 1.0$ $n = 0.035$

$Q = 1.486(0.02)(9388 + 21055 + 32480 + 11520 + 13362 + 2857)$

$Q = 2695$ cfs $V_{AV} = 2.64$ fps

STA 4+00 $S = 0.00189$ $S^{1/2} = 0.04346$



Elev 1041.5

$A_1 = \frac{1}{2}(7.7)23 = 88.6$ $P_1 = 24.3$ $R = 3.65$ $R^{2/3} = 2.37$ $n = 0.035$

$A_2 = 20(7.7) = 154$ $P_2 = 20$ $R = 7.7$ $R^{2/3} = 3.90$ $n = 0.030$

$A_3 = \frac{1}{2}(7.7 + 5)(5.5) = 34.9$ $P_3 = 6.1$ $R = 5.70$ $R^{2/3} = 3.19$ $n = 0.035$

$A_4 = \frac{1}{2}(5)(35) = 87.5$ $P_4 = 35.4$ $R = 2.47$ $R^{2/3} = 1.83$ $n = 0.035$

$Q = 1.486(.04346)(6000 + 20020 + 3181 + 4575)$

$Q = 2181$ cfs $V_{AV} = 5.98$ fps

Elev 1042

$A_0 = \frac{1}{2}(.5)39 = 9.8$ $P_0 = 39$ $R = .25$ $R^{2/3} = .40$ $n = 0.035$

$A_1 = \frac{1}{2}(.5 + 8.2)23 = 100.1$ $P_1 = 24.3$ $R = 4.12$ $R^{2/3} = 2.57$ $n = 0.035$

$A_2 = 20(8.2) = 164$ $P_2 = 20$ $R = 8.2$ $R^{2/3} = 4.07$ $n = 0.030$

$A_3 = \frac{1}{2}(8.2 + 5.5)5.5 = 37.7$ $P_3 = 6.1$ $R = 6.17$ $R^{2/3} = 3.37$ $n = 0.035$

$A_4 = \frac{1}{2}(5.5)(38.5) = 105.9$ $P_4 = 38.9$ $R = 2.72$ $R^{2/3} = 1.95$ $n = 0.035$

$Q = 1.486(.04346)(112 + 7350 + 22250 + 3630 + 5900)$

$Q = 2533$ cfs $V_{AV} = 6.07$ fps

Elev 1042.5

$A_0 = \frac{1}{2}(1)78 = 39$ $P_0 = 78$ $R = .50$ $R^{2/3} = .63$ $n = 0.035$

$A_1 = \frac{1}{2}(1 + 8.7)23 = 111.6$ $P_1 = 24.3$ $R = 4.59$ $R^{2/3} = 2.76$ $n = 0.035$

$A_2 = 8.7(20) = 174$ $P_2 = 20$ $R = 8.7$ $R^{2/3} = 4.23$ $n = 0.030$

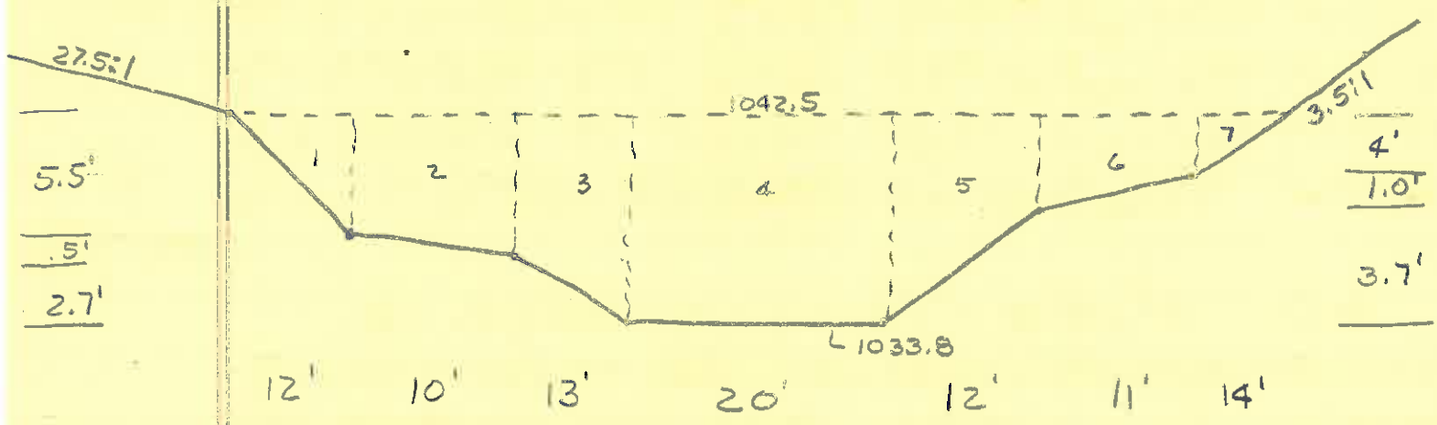
$A_3 = \frac{1}{2}(8.7 + 6.0)5.5 = 40.4$ $P_3 = 6.1$ $R = 6.63$ $R^{2/3} = 3.53$ $n = 0.035$

$A_4 = \frac{1}{2}(6)(42) = 126$ $P_4 = 42.4$ $R = 2.97$ $R^{2/3} = 2.07$ $n = 0.035$

$Q = 1.486(.04346)(702 + 8800 + 24534 + 4075 + 7452)$

$Q = 2942$ cfs $V_{AV} = 6.00$ fps

STA 5+00 $S = 0.00189$ $S^{1/2} = 0.04346$



Elev 1042.5

$A_1 = \frac{1}{2}(5.5)12 = 33^{\square'}$ $P_1 = 13.2$ $R = 2.5$ $R^{2/3} = 1.84$ $n = 0.035$

$A_2 = \frac{1}{2}(5.5+6)(10) = 57.5^{\square'}$ $P_2 = 10.1$ $R = 5.69$ $R^{2/3} = 3.19$ $n = 0.035$

$A_3 = \frac{1}{2}(6+8.7)(13) = 95.6$ $P_3 = 13.3$ $R = 7.18$ $R^{2/3} = 3.72$ $n = 0.035$

$A_4 = 8.7(20) = 174^{\square'}$ $P_4 = 20$ $R = 8.7$ $R^{2/3} = 4.23$ $n = 0.030$

$A_5 = \frac{1}{2}(8.7+5)(12) = 82.2^{\square'}$ $P_5 = 12.6$ $R = 6.52$ $R^{2/3} = 3.49$ $n = 0.035$

$A_6 = \frac{1}{2}(5+4)11 = 49.5$ $P_6 = 11.0$ $R = 4.5$ $R^{2/3} = 2.72$ $n = 0.035$

$A_7 = \frac{1}{2}(14)(4) = 28$ $P_7 = 14.6$ $R = 1.92$ $R^{2/3} = 1.54$ $n = 0.035$

$Q = (1.486)(.04346)(1735 + 5241 + 10161 + 24534 + 8197 + 3847 + 1232)$

$Q = 3549$ cfs $V_{AV} = 6.83$ fps (3.1)

Elev 1043 with $S = 0.0004$ $S^{1/2} = 0.02$

$A_0 = \frac{1}{2}(.5)(13.8) = 3.45^{\square'}$ $P_0 = 13.8$ $R = .25$ $R^{2/3} = .40$ $n = 0.035$

$A_1 = \frac{1}{2}(.5+6)12 = 39^{\square'}$ $P_1 = 13.2$ $R = 2.95$ $R^{2/3} = 2.06$ $n = 0.035$

$A_2 = \frac{1}{2}(6+6.5)10 = 62.5^{\square'}$ $P_2 = 10.1$ $R = 6.19$ $R^{2/3} = 3.37$ $n = 0.035$

$A_3 = \frac{1}{2}(6.5+9.2)13 = 102.1$ $P_3 = 13.3$ $R = 7.67$ $R^{2/3} = 3.89$ $n = 0.035$

$A_4 = 9.2(20) = 184$ $P_4 = 20$ $R = 9.2$ $R^{2/3} = 4.39$ $n = 0.030$

$A_5 = \frac{1}{2}(9.2+5.5)(12) = 88.2$ $P_5 = 12.6$ $R = 7.0$ $R^{2/3} = 3.66$ $n = 0.035$

$A_6 = \frac{1}{2}(5.5+4.5)11 = 55$ $P_6 = 11.0$ $R = 5.0$ $R^{2/3} = 2.92$ $n = 0.035$

$A_7 = \frac{1}{2}(4.5)15.8 = 35.4$ $P_7 = 16.4$ $R = 2.16$ $R^{2/3} = 1.67$ $n = 0.035$

$Q = 1.486(0.02)(39 + 2295 + 6018 + 11348 + 26925 + 9223 + 4589 + 1689)$

$Q = 1846$ cfs $V_{AV} = 3.2$ fps (3.2)

BR 39-4,98 3-23-79 R.A.B.

Slab width = 33'-4"

A924 $w = (33'-4") - (6" + 4" + 4" + 12")2 = (33'-4") - (4'-4") = 29'-0"$

All three spans (bottom) spc = 14½" spaces = 24 spaces = 25 bars

Total A bars = 25 + 6 = 31 per span

overlap @ piers = 3' (30d = 34")

$L = 29'-2"$ $3 = x + (25'-9") = 30(2x)$ $x = 5"$ $L = 30 - 10" = 29'-2"$

B924

end spans (bottom) 13 bars/span length $(21'-3") + 9" = 22'-0"$

dim b = 20'-9"

C924 13 bars/span length = $(19'-8") + 9" = 20'-5"$

end spans (bottom) dim c = 19'-2"

D924 13 bars length = 18'-11"

midspan (bottom)

E924 13 bars length = 15'-7"

midspan (bottom)

F924 $w = (33'-4") - 23" = (31'-5") \div 13" = 29$ spaces

over piers (top) $\Rightarrow 30$ bars + 2 = 32 bars/pier

length = 18'-4"

G924 14 bars/pier length = 9'-9"

over piers (top)

H924 15 bars/pier length = 6'-11"

over piers (top)

J501 lap F bars 32 bars/span length = $(17'-6") + 9" = 18'-3"$

end spans (top)

3-7-78 RAB

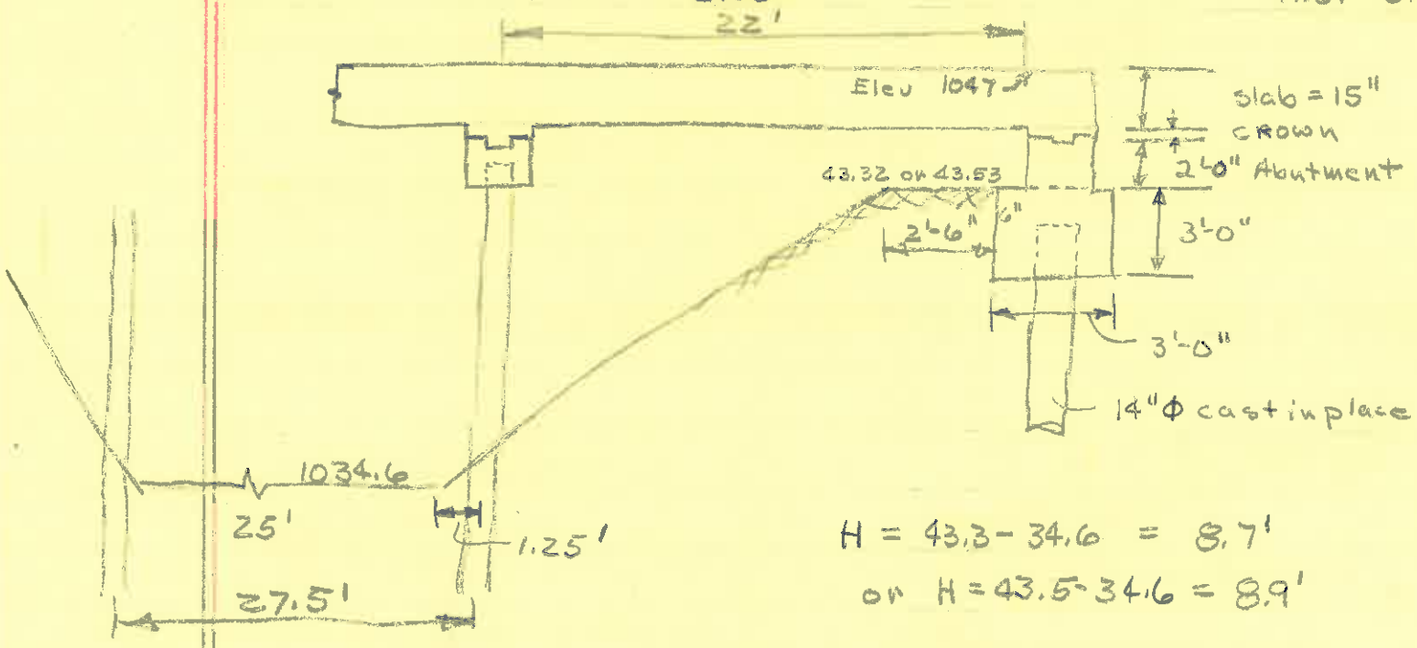
CS - 2-73

CPA - 2-73

Asphalt	2½"
Slab	15"
Crown	2.64"
Abutment	24"
	44.14" = 3.68'

CS - 1-71

Slab	15"
Crown	2.64"
Abutment	24"
	41.64" = 3.47'



H = 43.3 - 34.6 = 8.7'

or H = 43.5 - 34.6 = 8.9'

D = 22 - 2.5 - .5 + 1.25 = 20.25'

Slope = 2.33:1 or 2.28:1

For 2:1 Slope, Bench = 22 + 1.25 - 8.7(2) - .5 = 5.35'

or = 22 + 1.25 - 8.9(2) - .5 = 4.95'

Approximate Waterway Area @ Bench

A_w = 8.7(25) + (8.7)(2)(8.7) = 369 □'

or A_w = 8.9(25) + 8.9(2)(8.9) = 381 □'

Piling Area = 2(14/12)(8.7) = 20 □'

A_w above Bench = 2 × 71.5 - 2(2)(2.5) = 133 □'

Total Waterway Area = 369 + 133 - 20 = 482 □'

or A_w = 381 + 133 - 20 = 494 □'

.0025

.00667

.00137

BR 39-4.98

Waterway opening should pass 2900cfs @ ~Elev 1043

V_{AV} ~ 7.6 fps $A = \frac{2900}{7.6} = 382$ □'

Ohio Spec. 1957 Book 10.8 Sq Miles

Waterway = .5 to .7 of 702 Sq ft

⇒ 351 □' to 492 □'

TALBOT FORMULA $A = C\sqrt[4]{M^3} = CM^{.75}$

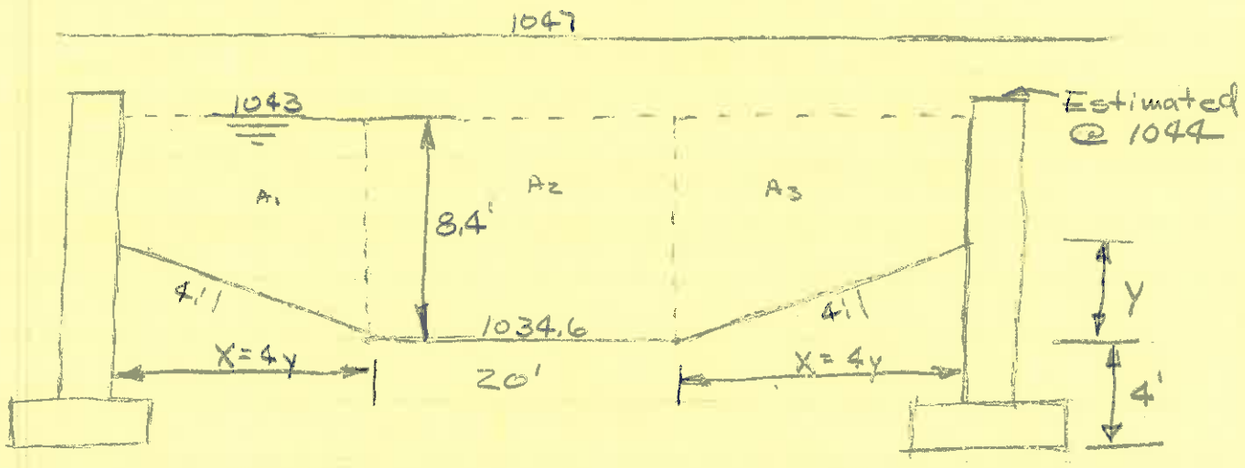
$M = 6890\,Ac$ $C = 1/3$ $M^{3/4} = (6890)^{.75} = 756$

2"/hr ⇒ $A = 1/3 \times 1/2 \times 756 = 125$ □'

3"/hr ⇒ $A = 1/3 \times 3/4 \times 756 = 189$ □'

4"/hr ⇒ $A = 1/3 \times 756 = 252$ □'

5"/hr ⇒ $A = 1/3 \times 5/4 \times 756 = 315$ □'



Clear Span = 50' then x = 15' + y = 3.75'

$A_{1043} = (2)1/2(8.4+4.65)(15) + 20(8.4) = 364$ □'

Clear Span = 55' then x = 17.5 + y = 4.38

$A_{1043} = 2(1/2)(8.4+4.03)(17.5) + 20(8.4) = 385.5$ □'

$A_T = 440$ □'

Clear Span = 60' then x = 20 + y = 5

$A_{1043} = 2(1/2)(8.4+3.4)(20) + 20(8.4) = 404$ □'

$A_T = 2(1/2)(9.4+4.4)(20) + 20(9.4) = 464$ □'

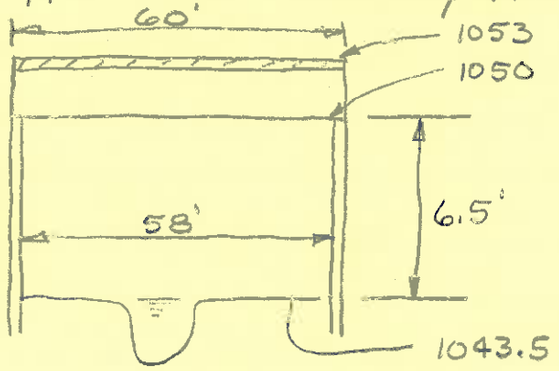
39-4.98

BR 105-0.24

H.W. 2/24/75 8.0' Below Top of 6" Wood Deck
Elev. = 1045.0

Floor Elev. 1053.0

Approximate Waterway Area (see 1935 Bridge Plan)



$A = 6.5(58) = 377\ \square'$

Analysis + inspection ⇒ % = 64' ℄ clearspan = 61.7'
℄ height from grade to stream bed = 10.5'
∴ $A = 61.7'(7') \Rightarrow A = 432\ \square'$

BR 49-4.25

H.W. 2/24/75 6.1' Below Top of Wood Deck

Clear Span = 49.0'

Water to floor grade = 7.5' Floor to bridge seat = 1.0'

Approximate waterway Area = $6.0(49) = 294\ \square'$

39-4.98

Existing waterway Area

Clear Span = 43.0'

$A = 9.5 \times 43 = 408\ \square'$

H.W. 2/24/75 6' Below Top of Wood Floor Elev. 1040.5

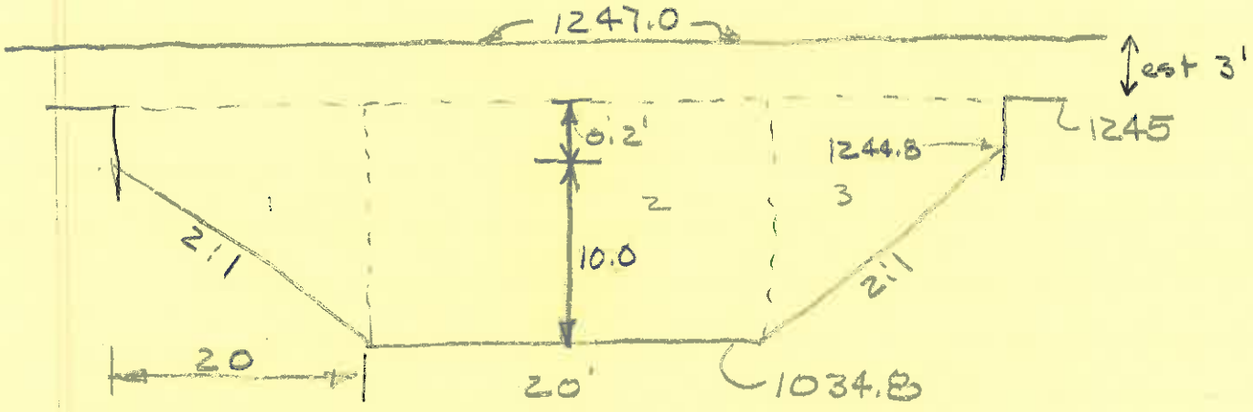
Q_{10} = 1580 cfs H/W 3/14/78 Elev. 1042.1

Q_{25} = 2000 cfs

Q_{50} = 2400 cfs

Q_{100} = 2900 cfs

Waterway Area @ Elev 1043 = $355\ \square'$



Clear Span = 60'

$A = 20(10) + 60(.2) + \frac{1}{2}(10)(20) = 312.0\square'$

Clear Span = 65'

$A = 20(10) + 65(.2) + \frac{1}{2}(10)(20) = 313.0\square'$

Q passable (assuming no backwater)

$A = 312\square'$ W.P. $= 2(22.4) + .4 + 20 = 65.2'$

$R = 4.79$ $R^{2/3} = 2.84$

$n = 0.029$ $S = .0034$ $S^{1/2} = .0583$

$$Q = \frac{1.486}{0.029} \times 312 \times 2.84 \times 0.0583 = 2647 \text{ cfs}$$

if $S = 0.0004$ $S^{1/2} = .02$

$$Q = \frac{.02}{.0583} \times 2647 = 908 \text{ cfs}$$

$A_1 + A_3 = \frac{1}{2}(.2 + 10.2)(20) = 102\square'$ $P = .2 + 22.4$ $R = 4.51$ $R^{2/3} = 2.73$

$n = 0.04$

$A_2 = 10.2(20) = 204\square'$ $P = 20$ $R = 10.2$ $R^{2/3} = 4.70$ $n = 0.020$

$Q = 1.486(0.0583)(2 \times 6962 + 47940)$

$Q = 5359$ cfs

September 10, 1981

Delbert L. Leistner, District Deputy Director

Robert B. Pfeifer, Engineer of Bridges

Proj. No.405(81), Bridge No. LOG-C.R. 39-4.98

Jack R. Siler

J. D. Jones, Structural Steel Engineer

We are forwarding two (2) prints of The Whitaker-Merrell Company's approved shop drawing, 1 of 1 covering details of bridge post with tubular backup.

One print is intended for your file and one print is for the Project Engineer.

RBP:JDJ:PKI:sh15

cc: Bureau of Construction
Frantz Brothers, Inc.
Logan Co. Engineer (1 print)
B. Toma (with prints)
File

2/27/75 M.W.R. 2ND DAY AFTER 2.93 in Rain in 36 hrs.
ALL THESE ARE HIGH WATER MARKS

✓	BR 96 - 2.73	6.0' TO TOP WOOD DECK
✓	BR 96 - 3.36	6.0' TO TOP WOOD DECK
✓	BR 96 - 4.26	4.2' TO " " "
* ✓	BR 39 - 4.98	6.0' To " " "
✓	BR 105 - 0.29 upstream	8.0' TO TOP 6' WOOD DECK
✓	BR 105 - 0.81	6.3' TO TOP 6" WOOD DECK
✓	BR 99 - 4.25 upstream	6.1' TO TOP WOOD DECK
✓	BR 99 - 5.69	4.5' TO TOP WOOD DECK
✓	BR 99 5.99	2.5' Above top Wood Deck
✓	BR 39 - 6.86	3.0' Below bottom of stringers
✓	BR 242 - 0.12	1.3' TO TOP WOOD DECK
✓	BR 51 - 1.68	6.2' To TOP WOOD DECK
✓	BR 107 - 0.95	5.8' TO TOP WOOD DECK
✓	BR 107 - 1.63	4.1' TO TOP WOOD DECK
✓	BR 107 - 0.51	4.3' TO " " "

SHICK'S INDUSTRIALS
1265 HANTHORN RD. • LIMA, OHIO 45804
PHONE: 419/228-2526
SALES • RENTAL • SERVICE

STA 173+00 to Sta 174+00

Plan (incorrect) Cut = 84
Fill = 368

Field (now) Cut = 242
Fill = 368

Plan (correct) Cut = 158
Fill = 356

Additional Cut = 242 - 84 = 158

Needed Fill = (242+158) + (368-356)
= 72

JOHN DEERE

SHICK'S INDUSTRIALS

1265 HANTHORN RD. • LIMA, OHIO 45804
PHONE: 419/228-2526
SALES • RENTAL • SERVICE

STA 173+00 to Sta 174+00

Plan (incorrect) Cut = 84
Fill = 368

Field (now) Cut = 242
Fill = 368

Plan (correct) Cut = 158
Fill = 356

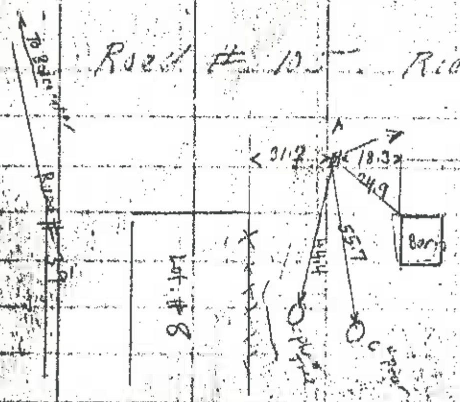
Additional Cut = 242 - 84 = 158

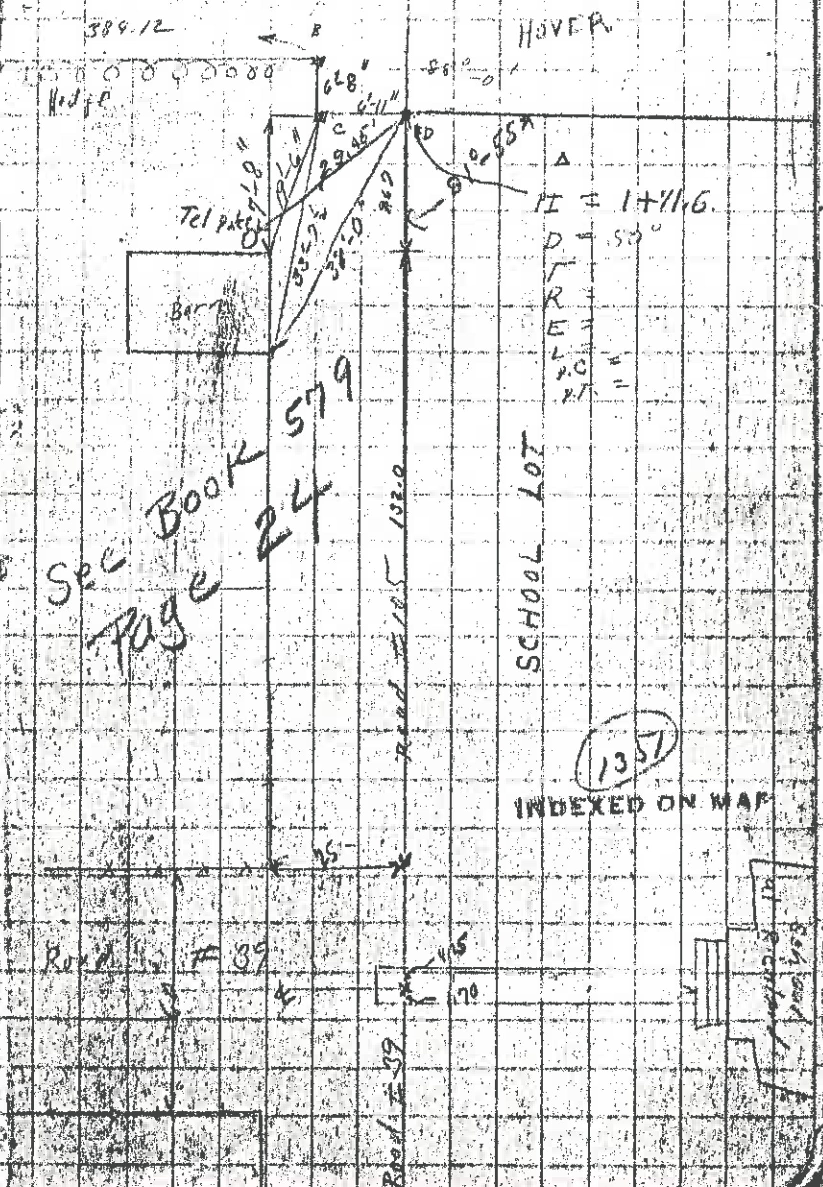
Needed Fill = (242+158) - (368-356)
= 72

F. B. #511

Sept. 12, 1929
Cloudy
Wright
McKinnon
Antrim
Wickersham

Road # 10 T. Richland Twp.





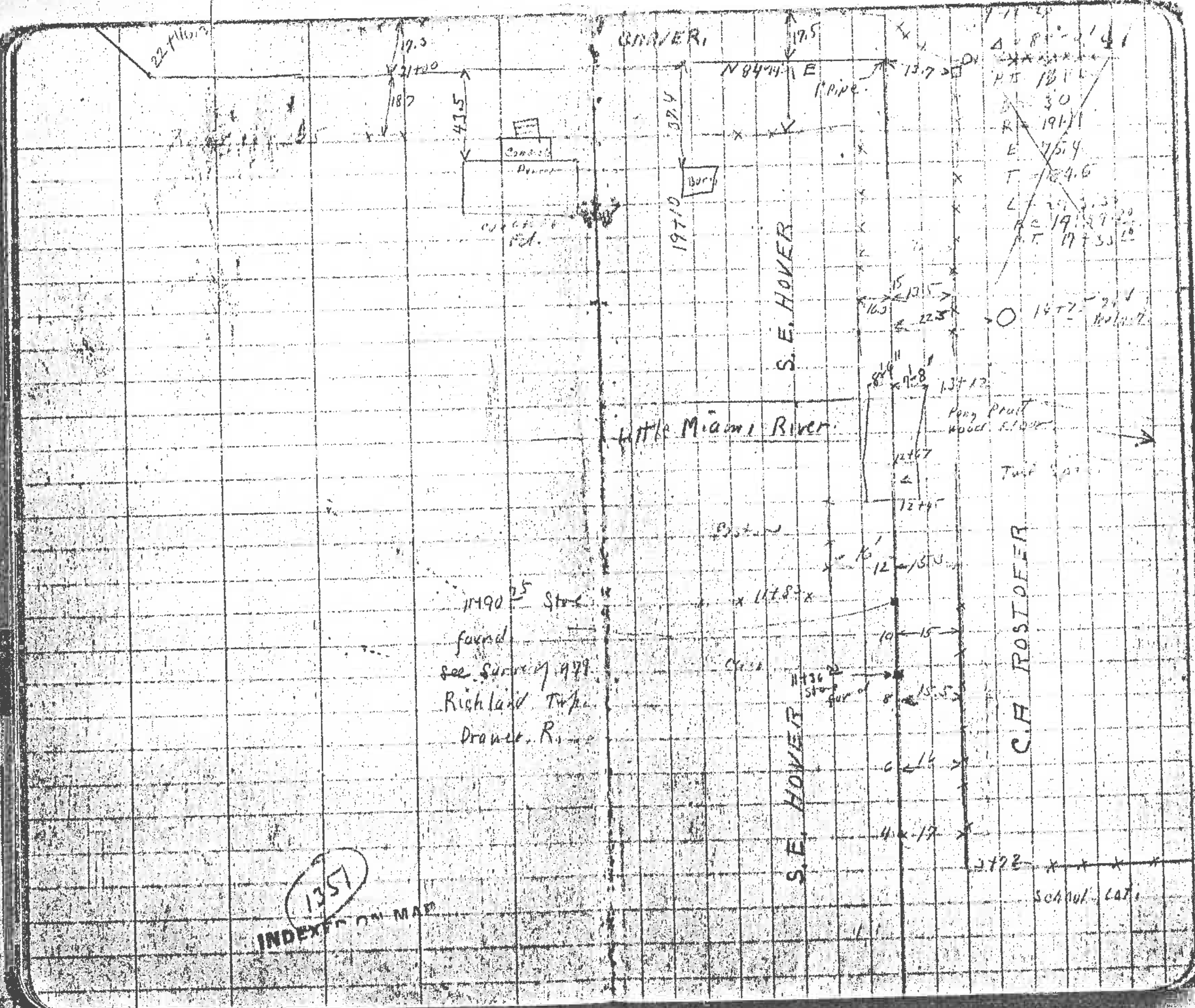
Stakes placed 25' from ℄

A Harrow Tooth found
B " "
C " "
D L. Iron Placed.

Sec Book 579
Page 24

(1357)
INDEXED ON MAP

Anna Hoover Deed Vol. 106 Page 330
Hoover Vol. 106 Page 251
Hoover Vol. 95 Page 604
Rostow Vol. 122 Page 13



GRAVER
N 84½ E
Pipe
Barn
S.E. HOVER
Little Miami River
Pony Pratt Wood Floor
1490 75 Stone
found
see Survey 979
Richland Twp.
Drawer R
S.E. HOVER
C.A. ROSTOFER
School Lot
1357
INDEXED ON MAP

OHIO Department of TRANSPORTATION

James A. Rhodes/Governor
David L. Weir/Director
25 South Front Street
P. O. Box 899
Columbus, Ohio 43216

District Seven
Sidney, OH 45365
July 14, 1981

Mr. Chester R. Kurtz
Logan County Engineer
P O Box 427
Bellefontaine, OH 43311

RE: Project NO. 405-81
Logan County
County Road 39-4.98
BRZ-4604(1)

Dear Sir:

It is a policy of the Transportation Department to hold a Preconstruction Conference on a Project as soon as practical after the award of the Contract and prior to the actual start of the work.

This procedure has been the result of experience which points out the desirability for reviewing the Contractor's plan of operation with utilities and other affected agencies.

The Preconstruction Conference for subject Project will be held in the District Seven's Conference room Monday, July 27, 1981, at 9:30 A M.

Your Department should be represented at this Conference.

Sincerely,

Delbert L. Leistner
District Deputy Director

Jack R Siler
District Construction Engineer

JRS:hb
cc: Project
File

RECEIVED
JUL 17 1981
LOGAN COUNTY ENGINEER

NAME _____ DATE 7-27-81

REFERENCE _____

BY RAB

SUBJECT C.R.39 Preconstruction Conference @ District 7

9:30 AM

Al Wheeler - Frantz Bros.

(week of August 3)

Plan to start. First week in August.

Check Haul Roads - CR.105 from Northwood, Dump Rock, overburden ect.

Road ? - Concrete from Ohio Ready Mix

FRANTZ BROS. INC. GENERAL CONTRACTORS

FRANTZ BROTHERS, INC.

General Contractors

P. O. BOX 59
SIDNEY, OHIO 45365
PHONE (513) 492-9145

CONCRETE MAINTENANCE, INC.

Dealers For Sinmast Systems

P. O. BOX 742
SIDNEY, OHIO 45365
PHONE (513) 492-7010

District No. 7

OHIO Department of TRANSPORTATION

James A. Rhodes/Governor
David L. Weir/Director
25 South Front Street
P. O. Box 899
Columbus, Ohio 43216

April 21, 1981

Delbert L. Leistner
District Deputy Director
Ohio Department of Transportation
Route 29, St. Mary's Pike
Sidney, Ohio 45365

Re: Logan County - Project No. Not Available
County Road No. 39 - Section 4.98
Federal Aid Project No. BRZ-4604(1)
Letting - June 9, 1981

Attention: Hugh Simpson

Dear Mr. Simpson:

Receipt is hereby acknowledged of the following legislation which has been executed by the County of Logan, relating to the above subject project:

(a) - One (1) copy Approximate Estimate
(b) - One (1) copy Final Resolution
(c) - Duplicate copy of Fiscal Officer's Certificate
(d) - Two (2) copies Contract
(e) - One (1) copy Official Highway Invoice No. 5278 together with Logan County Check No. 058749, in the amount of $48,640.00, which represents the estimated share of said County in the cost and expense of the subject project.

A copy of the Contract will be returned to the County of Logan, when approved by the Attorney General.

Yours very truly,

R. A. Booth

R. A. Booth, Administrator
Bureau of Contract Sales
Ohio Department of Transportation

RAB:RH:asr

cc: Logan County
Richard Henderson
Robert Gallagher
Tom Lunt
File

OFFICE OF THE COUNTY ENGINEER
OF LOGAN COUNTY, OHIO

PURCHASE ORDER

№ 29041

Requisition No. 27158

Bellefontaine, Ohio, April 13, 1981

To Treas. of State of Ohio
Department of Transportation

Chester R. Kurtz County Engineer

APPROPRIATION

Code	Amount
K-30	$48640.00

Bill
At BELLEFONTAINE, OHIO
Deliver to

Quantity	Unit	DESCRIPTION	Price Per Unit	Amount
LUMP		Logan County Share of Matching Funds for Br.39-4.98		$48,640.00

Please Invoice in Duplicate.
All goods must be shipped prepaid.

CARTER PRTG.

By Order of the Board of County Commissioners

Warren W. Smith

Dracy B. [illegible]

Johna Jeffrey

Commissioners.

Chester R. Kurtz

LOGAN COUNTY ENGINEER

By ed

April 13, 1981

COPY

The Honorable Board of
Logan County Commissioners
Court House
Bellefontaine, Ohio 43311

Gentlemen:

Re: Transfer of Funds

Because of the lack of funds in account K-30, we would like your honorable body to make the following transfer:

From Auto & Gas K-26 to Auto & Gas K-30 $48,640.00

Respectfully submitted,

Chester R. Kurtz

Chester R. Kurtz, P.E., P.S.
Logan County Engineer

CRK/ed

cc: County Auditor
File

OHIO Department of TRANSPORTATION

James A. Rhodes/Governor
David L. Weir/Director
25 South Front Street
P. O. Box 899
Columbus, Ohio 43216

DISTRICT SEVEN
P.O. Box 381
Sidney, Ohio
45365

County Copies

'l 9, 1981

Chester R. Kurtz,
Logan County Engin
Tidewater Road
Bellefontaine, Ohio

S - County Road No. 39 - 4.98
gislation

Dear Mr. Kurtz:

We are furnishing to you the following:

1) Copy of a letter from our Central Office to usdated April 6, 1981. This is for your information and file and relates some information concerning the following listed papers.

2) Two copies of Unit Price Contract (Approximate Estimate), which is a listing of all of the quantities for which unit price bids will be requested. These copies should be signed by the designated County official at the lower left on the extension of the last page. One copy should be returned to us, the other copy is for County file.

3) One copy of Certificate of Journalization. This is for your information and file and requires no action.

4) Two copies of Final Resolution. After these copies are completely executed, with special attention to recording information and seals, one copy should be returned to us. The other copy is intended for County file.

5) Two copies of Fiscal Officer's Certificate. After this form is executed and sealed by the designated County official, the original copy should be returned to us. The other copy is intended for County file.

6) Two copies of Contract. After completely executed, both copies should be returned to us. One copy will be furnished to the County after it is signed by the Director of Transportation.

District No. 7

OHIO Department of TRANSPORTATION

James A. Rhodes/Governor
David L. Weir/Director
25 South Front Street
P. O. Box 899
Columbus, Ohio 43216

April 6, 1981

Delbert L. Leistner
District Deputy Director
Ohio Department of Transportation
Route 29, St. Mary's Pike
Sidney, Ohio 45365

Re: Logan County - County Road No. 39
Section 4.98
Federal Aid Project No. BRZ-4604(1)

Attention: Hugh Simpson
Dear Sir:

This office is transmitting herewith the following suggested final legislation for the County of Logan, relating to the subject project:

1 — a - 2 copies Approximate Estimate
1 — b - Certified copy Director's Certificate of Journalization
2 — c - 3 copies FINAL RESOLUTION
2 — *d - 1 original and 1 copy FISCAL OFFICER'S CERTIFICATE
2 — *e - 3 copies CONTRACT
f - 1 original and 3 copies Official Highway Invoice No. 5374
(Plans and a Specification Book have been sent to you for the political sub-division)

Items c, d and e are required to be executed in this chronological order to comply with Section 5705.41 and Chapter 5521, Ohio Revised Code.

When the legislation has been properly executed, one copy each of items a and c, the duplicate copy of item d, two copies of item e and one copy of item f, must be returned to this office, together with the invoiced amount.

One copy of item c, e and f, may be retained by you for the District files.

Since it is contemplated to schedule this project for letting, June 9, 1981, and since the executed legislation must bear the approval of the Attorney General, prior to advertising for bids, these papers and the invoiced amount must reach this office not later than April 30, 1981.

RAB: RH:asr

cc: County of Logan
R. H. Henderson
R. Gallagher
File

Yours very truly,

R. A. Booth

R. A. Booth, Administrator
Bureau of Contract Sales
Ohio Department of Transportation

*The Attorney General will not approve the foregoing contract unless the following official seals are properly affixed:

1. Certificate of funds (Fiscal Officer's Seal)
2. Contract - Certificate of copy (County and/or Corporation Seal) - In the event there is no such seal, a letter to that effect from the proper body is required.

LD-20B
Rev. 5-75

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
APPROXIMATE ESTIMATE

UNIT PRICE CONTRACT

BRZ-4604(1)

TYPE 404 on 301 & Structur

Logan COUN

ROUTE, C.R. No. 39

For improving County Road 39-4.98 in Richland Township, Logan County, Ohio, in accordance with plans and specifications by grading, draining and paving with asphalt concrete on a bituminous aggregate base and by constructing:

Bridge No. LOG-C.R. 39-4.98 consisting of a continuous concrete slab on capped-pile substructure (spans 24'-30'-24', roadway 32' between guard rails), over a Branch of South Fork Miami River.

PAVEMENT WIDTH Various FT.

PROJECT LENGTH 825.00 FT. OR 0.156 MILES
WORK LENGTH 1,150.00 FT. OR 0.217 MILES

REF. NO.	ITEM NO.	APPROXIMATE QUANTITIES		ITEM	UNIT PRICE Dollars	UNIT PRICE Cents	TOTAL Dollars	TOTAL C
				ROADWAY				
1	201	lump		clearing and grubbing				
2	202	64	lin. ft.	pipe removed for storage, 24" and under				
3	203	1,220	cu. yds.	excavation not including embankment construction				
4	203	2,684	cu. yds.	embankment				
5	203	2,163	sq. yds.	subgrade compaction				
6	606	536	lin. ft.	guard rail, Type 5				
7	606	4	each	bridge terminal assembly, Standard Type B				
8	606	4	each	anchor assembly, Standard Type A				
9	410	50	cu. yds.	traffic compacted surface, Type A or B				
10	616	50	M. gals.	water				
11	616	10	tons	calcium chloride				
12				Total Roadway				
				EROSION CONTROL				
13	207	1,100	sq. yds.	temporary seeding and mulching				
14	207	30	each	straw or hay bales				
15	601	24	cu. yds.	rock channel protection, Type B with bedding				
16	601	5	cu. yds.	rock channel protection, Type C without bedding				
17	659	5,435	sq. yds.	seeding and mulching				
18	659	0.55	ton	commercial fertilizer				
19	659	300	sq. yds.	repair seeding and mulching				
20	659	9	M. gals.	water				
21	660	684	sq. yds.	sodding				
22				Total Erosion Control				

Lo COUNTY, SECTION LOC-C.R. 39-4.98

REF. NO.	ITEM NO.	APPROXIMATE QUANTITIES	ITEM	UNIT PRICE Dollars	UNIT PRICE Cents	TOTAL Dollars	TOTAL Ce
			DRAINAGE				
23	603	46	lin. ft. 24" conduit, Type D				
24	603	36	lin. ft. 12" conduit, Type D				
25	603	100	lin. ft. 6" conduit, Type B				
26	605	200	lin. ft. aggregate drains				
27	603	100	lin. ft. 6" conduit, Type E				
28	603	50	lin. ft. 6" conduit, Type F				
29			Total Drainage				
			PAVEMENT				
30	301	379	cu. yds. bituminous aggregate base: AC-20, RT-11 or RT-12				
31	403	75	cu. yds. asphalt concrete, AC-20				
32	404	75	cu. yds. asphalt concrete, AC-20				
33	404	6	cu.yds. asphalt concrete, AC-20 (driveways)				
34	408	42	gals. bituminous prime coat: MC-30, MC-70, Primer 20, RT-2 or RT-3				
35	411	172	cu. yds. stabilized crushed aggregate				
36			Total Pavement				

Logan COUNTY, SECTION LOG-C.R. 39-4.98

REF. NO.	ITEM NO.	APPROXIMATE QUANTITIES		ITEM	UNIT PRICE Dollars	UNIT PRICE Cents	TOTAL Dollars	TOTAL C
				STRUCTURE OVER 20 FOOT SPAN				
				Bridge No. LOG-C.R. 39-4.98				
37	202	lump		structure removed				
38	503	87	cu. yds.	unclassified excavation				
39	Special	10,551	lbs.	epoxy coated reinforcing steel				
40	505	lump		test pile				
41	507	830	lin. ft.	14" cast-in-place reinforced concrete piles				
42	509	23,892	lbs.	reinforcing steel				
43	511	134	cu. yds.	Class "S" concrete, superstructure				
44	511	11	cu. yds.	Class "C" concrete, pier caps				
45	511	37	cu. yds.	Class "C" concrete, abutments				
46	516	7	sq. ft.	1" preformed expansion joint filler				
47	517	164.00	lin. ft.	railing (deep beam rail with steel tubular backup and steel posts and bolts)				
48	518	18	cu. yds.	porous backfill				
49	601	197	cu. yds.	rock channel protection, Type B without bedding				
50				Total, Structure Over 20 Foot Span				
51	624	Lump		Mobilization				
52	619	Lump		Field Office				
53	103.05	Lump		Premium for Contract Performance Bond and for Payment Bond				
54	623	Lump		Construction Layout Stakes				
55	614	Lump		Maintaining Traffic				

56 Total Amount of Above Items $

~~Estimated Cost of Repairs to Detour~~ $

~~Estimated Cost of Right of Way~~ $

Estimated Cost of Engineering, Superintendence and Contingencies $

Estimated Cost of Preliminary Engineering $

Estimated Cost of Force Account for Asphalt Price Escalation

Approximate Total Cost and Expense $

Federal Aid $BRZ

State's Share $

County's Share $48,640.00

Municipality's Share $

OHIO DEPARTMENT OF TRANSPORTATION

CERTIFICATE OF JOURNALIZATION

I hereby certify that the Director of Transportation of Ohio, in compliance with Section 5521.04, Ohio Revised Code, approved legislation enacted on April 2, 19 79, by the legislative authority of Logan County, Ohio, which legislation proposed cooperation with the Director of Transportation of Ohio in the improvement of that portion of County Road No. 39, more particulary described as follows:

Replacement of the bridge on County Road No. 39, approximately 2.1 miles south of Belle Center over branch of South Fork Miami River. Total length of work being approximately 0.217 mile

and that said approval was entered on the Director's official journal in Volume 64, Page 464, under date of May 18, 19 79.

Administrator, Bureau of Contract Sales

RESOLUTION NO.185-81

F I N A L R E S O L U T I O N

~~plans;~~

Proposing to co-operate;

Requesting Director to proceed;

(Chapter 5521, Ohio Revised Code)

Mr. John A. Jeffrey, moved the adoption of the following Resolution:

WHEREAS, At a meeting of the Board of County Commissioners of Logan County, Ohio, held in the office of said Board of County Commissioners, on this 13th day of April, 1981, a quorum being present, the improvement of County Road No. 39 under the provisions of Chapter 5521, Ohio Revised Code, came on for further consideration; said portion of highway, as described in the legislation proposing cooperation with the Director of Transportation enacted on the 2nd day of April, 1979 being as follows:

Replacement of the Bridge on County Road No. 39, approximately 2.1 miles south of Belle Center over branch of South Fork Miami River. Total length of work being approximately 0.217 mile

; and

WHEREAS, In said legislation proposing cooperation, said Board of County Commissioners proposed to cooperate with the Director of Transportation in the improvement of County Road No. 39 by assuming and contributing the entire cost and expense of the improvement, less the amount of Federal Funds set aside by the Director of Transportation for the financing of this project from funds allocated by the Federal Highway Administration, and further, the County agrees to bear one hundred percent (100%) of the cost of the following items which shall not be a part of the State's Estimate.

1. Preliminary Engineering
2. Rights-of-way
3. All costs for added construction items generating extra work contracts under Ohio Laws, unless performance is approved by the State of Ohio and Federal Highway Administration before work is authorized.

The Director of Transportation notwithstanding the percentage basis of contribution may allocate the money contributed in whatever manner he may deem necessary in financing the cost of construction, rights-of-way, engineering and incidental expen The total share of the cost for Logan County is now estimated in the amount of Fort Eight Thousand Six Hundred Forty - - - - - - - - - - - - - 00/100 Dollars, ($48,640.(but said estimated amount is to be adjusted in order that the County's ultimate share of the cost of said improvement shall correspond with said percentages of actual cost when said actual costs are determined

; and

WHEREAS, This Board of County Commissioners desires the Director of Transportation to proceed with the aforesaid highway improvement.

DUPLICATE

FISCAL OFFICER'S CERTIFICATE

(Chapter 5521 and Section 5705.41, Ohio Revised Code)

I hereby certify that the money, to wit: $ 48,640.00 ,

required for the payment of the cost other than that part thereof assumed by the Federal Government for the improvement of that portion of County Road No. 39, more particularly described as follows:

Replacement of the bridge on County Road No. 39, approximately 2.1 miles South of Belle Center over branch of South Fork Miami River. Total length of work being approximately 0.217 mile

has been lawfully appropriated for such purpose and is in the treasury to the credit of, or has been levied, placed on the duplicate and in process of collection for the appropriate fund, and not appropriated for any other purpose; or is being obtained by sale of bonds issued on account of said improvement, which bonds are sold and in process of delivery.

I further certify that this certificate was made, sealed and filed with the legislative authority of Logan County , Ohio, after said legislative authority passed the final resolution in connection with the within described project; and that this certificate was forthwith recorded in the record of proceedings of said legislative authority, namely:

Legislative Authority's Journal, volume 3C , at Page 764 .

IN WITNESS WHEREOF, I have hereunto set my hand and official seal as said fiscal officer, this 15th day of April , 1981 .

(Fiscal Officer's Seal)

Mary G. Slater

Fiscal Officer of Logan County, Ohio

RESOLUTION NO.185-81

F I N A L R E S O L U T I O N

Adopting plans;

Proposing to co-operate;

Requesting Director to proceed;

(Chapter 5521, Ohio Revised Code)

Mr. John A. Jeffrey, moved the adoption of the following Resolution:

WHEREAS, At a meeting of the Board of County Commissioners of Logan County, Ohio, held in the office of said Board of County Commissioners, on this 13th day of April, 1981, a quorum being present, the improvement of County Road No. 39 under the provisions of Chapter 5521, Ohio Revised Code, came on for further consideration; said portion of highway, as described in the legislation proposing cooperation with the Director of Transportation enacted on the 2nd day of April, 1979 being as follows:

> Replacement of the Bridge on County Road No. 39, approximately 2.1 miles south of Belle Center over branch of South Fork Miami River. Total length of work being approximately 0.217 mile

; and

WHEREAS, In said legislation proposing cooperation, said Board of County Commissioners proposed to cooperate with the Director of Transportation in the improvement of County Road No. 39 by assuming and contributing the entire cost and expense of the improvement, less the amount of Federal Funds set aside by the Director of Transportation for the financing of this project from funds allocated by the Federal Highway Administration, and further, the County agrees to bear one hundred percent (100%) of the cost of the following items which shall not be a part of the State's Estimate.

1. Preliminary Engineering
2. Rights-of-way
3. All costs for added construction items generating extra work contracts under Ohio Laws, unless performance is approved by the State of Ohio and Federal Highway Administration before work is authorized.

The Director of Transportation notwithstanding the percentage basis of contribution may allocate the money contributed in whatever manner he may deem necessary in financing the cost of construction, rights-of-way, engineering and incidental expenses. The total share of the cost for Logan County is now estimated in the amount of Forty Eight Thousand Six Hundred Forty - - - - - - - - - - - - 00/100 Dollars, ($48,640.00), but said estimated amount is to be adjusted in order that the County's ultimate share of the cost of said improvement shall correspond with said percentages of actual cost when said actual costs are determined

; and

WHEREAS, This Board of County Commissioners desires the Director of Transportation to proceed with the aforesaid highway improvement.

Now, Therefore, Be It Resolved by the Board of County Commissioners of Logan County, Ohio:

I. That the section of highway above described be improved under the provisions of aforesaid law. That said work be done under the charge, care and superintendence of the Director of Transportation and that said plans, specifications and estimates for this highway improvement as approved by the Director of Transportation are hereby approved and adopted by this Board of County Commissioners.

II. That this Board is still of the opinion the proposed work on the described highway should be constructed, and that the County should cooperate on the basis set forth in their proposal.

III. That the estimated sum of Forty Eight Thousand Six Hundred Forty - - - - - - - - - - - 00/100 Dollars, ($48,640.00), is hereby appropriated for improving the highway described above and the fiscal officer is hereby authorized and directed to issue his order on the treasurer for said sum upon the requisition of the Director of Transportation to pay the cost and expense of said improvement. We hereby agree to assume in the first instance, the share of the cost and expense over and above the amount to be paid by the Federal Government.

IV. That the installation of all utility facilities on the right-of-way shall conform with the requirements of the Federal Highway Administration Policy and Procedure Memorandum 30-4, "Utility Relocations and Adjustments" and the Department of Transportation rules on Utility Accommodation.

V. That the County shall, at its own expense, make all rearrangements of water mains, service lines, fire hydrants, valve boxes, sanitary sewers, and/or any appurtenances thereto, which do not comply with the provisions of Ohio Department of Transportation Directive 28-A, as may be necessary to conform to the said improvement and said rearrangements shall be done at such time as requested by the Department of Transportation Engineer.

VI. That traffic control signals will not be installed on the project without prior approval by the State and the County does hereby agree to place and maintain all traffic control devices conforming to the Ohio Manual of Uniform Traffic Control Devices on the improvement in compliance with the provisions of Section 4511.11 and related sections of the Ohio Revised Code.

VII. That this Board of County Commissioners hereby requests the Director of Transportation to proceed with the aforesaid highway improvement.

VIII. That this Board of County Commissioners of Logan County, Ohio, enter into a contract with the Director of Transportation providing for the payment by said Board the sum of money set forth hereinabove for improving County Road No. 39 in said County.

IX. That the Clerk of this Board be, and he is hereby directed to transmit to the Director of Transportation a certified copy of these Resolutions.

Thereupon, Mr. Donald E. Corwin seconded the said motion; and upon the roll being called, the result of the vote was as follows:

Warren W Smith, Yea.

Donald E Corwin, Yea.

Joshua J Abey, Yea.

Board of County Commissioners,
of Logan County, Ohio.

The State of Ohio)
) Office of the Board of County Commissioners
Logan County, Ohio)

This is to certify that we have compared the foregoing copy of Resolution with the original record thereof, found in the record of the proceedings of the Board of County Commissioners of said County, and which Resolution was duly passed by the Board of County Commissioners of Logan County, Ohio, on the 13th day of April, 1981, and that the same is a true and correct copy of the record of said Resolution and the action of said Board of County Commissioner thereon.

We further certify that said Resolution and the action of said Board of County Commissioners thereon is recorded in the journal of said Board of County Commissioners in volume 3C, at page 757-759, and under date of April 13, 1981.

IN WITNESS WHEREOF, We have hereunto set our hands and seal, this 13th day of April, 1981.

Warren W. Smith
President

*SEAL

Judith L. Grove
Clerk (Secretary Ex-Officio)
Board of County Commissioners of Logan County, Ohio

*Note: If the fiscal officer is secretary ex-officio of the Board of County Commissioners, his seal should be affixed. If there is no seal, this fact should be stated by separate letter and attached hereto.

Office of

COUNTY COMMISSIONERS

Logan County

BELLEFONTAINE, OHIO 43311

April 13, 1981

Re: County Seal

TO WHOM IT MAY CONCERN:

This is to inform you that there is no such County Seal available at this time.

Very truly yours,

Judith L. Grove

LOGAN COUNTY COMMISSIONERS
Judith L. Grove, Clerk

OHIO Department of TRANSPORTATION

James A. Rhodes/Governor
David L. Weir/Director
25 South Front Street
P. O. Box 899
Columbus, Ohio 43216

District Seven
P O Box 381
Sidney, OH 45365
July 2, 1982

Mr. Chester Kurtz
Logan County Engineer
P OBox 427
Bellefontaine, OH 43311

RE: Project No. 405-81
Logan County
County Road No. 39

Dear Sir:

Attached is the complete record of the Piling Report for Bridge LOG-30-0498 over South Branch Miami River on subject Project as requested.

Sincerely,

Delbert L Leistner
District Deputy Director

Jack R Siler
District Construction Engineer

JRS:hb
cc: File
Encl. Piling Report

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

INTER-OFFICE COMMUNICATION

County Dist.

Rte./Sec.

AU-76 Rev. 2-79

Date September 22, 1981

To Robert B. Pfeifer, Engineer of Bridges Attn. John D. Jones, Str Steel Engr

From Delbert L. Leistner, Distr Deputy Director By Jack R Siler, Distr Constr Engr

Subject Project No. 405-81-Logan County-County Road No. 39

Attached is the Piling Record, relative to subject Project, as follows:

Piling Log Summary
Record of the piling length
Test Pile
Service Piles
Piling Layout

for Bridge LOG-30-0498 over South Branch Miami River for your information and records.

JRS:TJR:hb
cc: Project
File

Encl. Piling Report

PILING LOG SUMMARY

Project No. 405-81
Logan County
County Road No. 39
Bridge LOG-39-4.98
over South Branch Miami River

Type of Hammer

McKiernan Terry DE-30
Ram weight 2,750 lb
Average energy per blow 16,500 lbs

Type of Hammer

McKiernan Terry DE-20
Ram weight 2,000 lb
Average energy per blow 12,000 lbs

Pile Capacity Formula: R = 2 WH / S + 0.1 where
W = weight of striking parts of hammer, in pounds
H = Height of fall of striking parts, in feet
R = Bearing capacity, in pounds
S = Penetration, in inches per blow

Used 12" Spiral weld tube piling in Abutments
Used 14" Spiral weld tube piling in Piers
Used McKiernan Terry DE 20 to drive Forward Pier
Drove rest of piling with McKiernan Terry DE-30

PILE SUMMARY:

LOCATION	Req Bearing	Actual Ave Bearing	Est. Pay Length	Req Penetration	Actual Penetration	Act. Ave Pay Length	Total Pay Length
Re Abut	44,000	96,952	25	18.40	19.56	21.56	150.90
Re Pier	72,000	101,230	40	23.10	31.44	32.94	164.71*
Fwd Pier	72,000	145,551	40	23.10	30.69	32.19	193.15
Fwd Abut	44,000	85,129	25	18.40	19.61	21.64	151.54

Total Pay Length	660.30 L F	
To nearest foot	660.00 L F	
Ref No. Plan Quantity	830.00 L F	
Ref No. Change Order	170.00 L F	Nonperformance

*Pile No. 8 in Rear Pier was the Test Pile which was driven and used as Service Pile.

Sheet 1 of 1

Ohio Department of Transportation
Design and Construction

Logan County

Recorder: Ron Weir

Sec.

Date: 8-25-81

Br.No. 39-4.98

Location S. Branch Miami River

PILING RECORD: Re-Abut FOOTING

Type of Pile: Cast-In-Place

Hammer: McKiernan Terry DE-20 WH or F = 12000 Ft.lbs.

Capacity formula: "R" = $\frac{2DF}{S+0.1}$ Required "R" = 44000 Lbs.

Elev. of top of pile (cut-off elev.) 1042.68 -

Elev. of nominal point of zero penetration: 1040.68

(SUBMIT IN DUPLICATE)

Pile No.	Pay Length	Indicated "R" (Pounds)	Remarks	Misc.
1	20.80 -	138 496 -	Near Boring #B-3	
2	31.05 -	101 098 -	Near Boring #B-3	
3	21.00 -	97059 -		
4	22.25 -	84037 -		
5	22.30 -	69 474 -		
6	21.80 -	88 537 -	Near Boring #B-4	
7	21.70 -	99 747 -	Near Boring #B-4	
TOTAL	150.90 -	678668		
Average	21.56 ✓	96 952.57		

MAR 29 1982

BR-5-75

Pile No. 1 a

RE Abut. ~~Pier~~

Date Driven 8-28-81

Type of Pile 12" Cast-In-Place

Hammer: McKiernan Terry DE-30 WH or F = 165000 Ft.lbs.

Capacity formula: "R" = Gwt / S+.1 Required "R" = 44,000 Lbs.

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Logan County

Br.No. 39-4.98

Location S. Branch Miami River

Elev. of top of pile (cut-off elev.) 1042.68

Elev. of nominal point of zero penetration 1040.68

Elev. of pile point at final penetration 1021.88

Length of pile in leads 25'0" Feet

(Explanatory Notes and Instructions on Reverse Side)

1981

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile 25.00
5-6	16	.1750	38824	Cut off 4.20
6-7	14	.1857	34478	Pay 20.80
7-8	13	.1923	32258	
8-9	14	.1857	34478	Near Boring #B-3
9-10	18	.1667	43043	
10-11	15	.1800	34667	
11-12	17	.1616	40949	Logged by Ron Wiese
12-13	20	.1600	47143	
13-14	25	.1480	56897	
14-15	31	.1371	67748	
15-16	37	.1243	77771	
16-17	79	.1119	131005	
17-18	93	.1080	144085	
18-19	87	.1179	138696	

BR-2-75

Pile No. 2

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Logan County

RE Abut. ~~Pier~~

Br. No. 39-4.98

Date Driven 8-28-81

Location S. Branch Miami River

Type of Pile 12" Cast In Place

Hammer: McKiernan Terry DE30 WH or F = 16,500 Ft.lbs.

Capacity formula: "R" = $\frac{12WH}{S+0.1}$ Required "R" = 44000 Lbs.

Elev. of top of pile (cut-off elev.) 1042.68 –

Elev. of nominal point of zero penetration 1040.68

Elev. of pile point at final penetration 1021.63 –

Length of pile in leads 25' 0" Feet

(Explanatory Notes and Instructions on Reverse Side)

1981

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile 25.00
5-6	15	.8000	36667 –	Cut off 3.95
6-7	10	1.200	25358 –	Pay 21.05
7-8	12	1.000	30000 –	
8-9	10	1.200	25358 –	New Boring # B-3
9-10	10	1.200	25358 –	
10-11	10	1.200	25358 –	
11-12	20	.4000	47143 –	Logged by
12-13	20	.4000	47143 –	Ron Wisse
13-14	20	.4000	47143 –	
14-15	23	.5217	53077 –	
15-16	25	.4800	56897 –	
16-17	33	.3636	71167 –	
17-18	61	.1967	111215 –	
18-19	53	.2264	101098 –	

Pile No. 6

RE Abut ~~Pier~~

Date Driven 8-28-81

Type of Pile 12" Cast In Place

Hammer: McKiernan Terry DE30 WH or F = 165000 Ft.lbs.

Capacity formula: "R" = $\frac{2WH}{S+0.1}$ Required "R" = 44000 Lbs.

Elev. of top of pile (cut-off elev.) 1042.68 -

Elev. of nominal point of zero penetration 1040.68 -

Elev. of pile point at final penetration 1020.88 -

Length of pile in leads 25' 0" Feet

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Logan County

Br.No. 39-4.98

Location S. Branch Miami River

(Explanatory Notes and Instructions on Reverse Side)

1981

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 9	Set Pile			Length of Pile 25.00
9 - 10	13	.9231	32256 -	Cut off 3.20
10 - 11	17	.7059	40949 -	Pay 21.80
11 - 12	20	.6000	47143 -	
12 + 13	19	.6316	45108 -	Near Boring ± B-4
13 - 14	19	.6316	45108 -	
14 - 15	22	.5455	51127 -	
15 - 16	21	.5714	49149 -	
16 - 17	21	.5714	49149 -	Logged by Ron Wisse
17 - 18	22	.5455	51127 -	
18 - 19	29	.4138	64228 -	
19 - 19'9"	33	.2727	88537 -	

Pile No. 7.

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Logan County

RE Abut ~~Pier~~

Br.No. 39-488

Date Driven 8-28-81

Location S. Branch Mac Rvr

Type of Pile 12" Cast In Place

Hammer: McKiernan Terry DE30 WH or F = 16500 Ft.lbs.

Capacity formula: "R" = $\frac{2WH}{S+0.1}$ Required "R" = 44000 Lbs.

Elev. of top of pile (cut-off elev.) 1042.68 -

Elev. of nominal point of zero penetration 1040.68 -

Elev. of pile point at final penetration 1020.98 -

Length of pile in leads 25' 0" Feet

(Explanatory Notes and Instructions on Reverse Side)

14BF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-8	Set Pile			Length of Pile 25.00
8-9	35	.3429	74516	Cut off 3.30
9-10	32	.3750	69474	Pay 21.70
10-11	21	.5714	49149	
11-12	14	.8571	34478	Near Boring B-4
12-13	19	.6316	45108	
13-14	15	.8000	36467	
14-15	17	.7059	40949	Logged by
15-16	17	.7059	40949	Tom Wisec
16-17	20	.6000	47143	
17-18	20	.6000	47143	
18-19	31	.3871	67748	
19-19'6"	26	.2308	99767	

Sheet 2 of 4

Ohio Department of Transportation
Design and Construction

Logan County

Recorder: Ron Wise

Sec.

Date:

Br.No. 39-4.98

Location S. Branch Miami River

PILING RECORD: Pc-Pier #1 FOOTING

Type of Pile: 14" Cast-In-Place

Hammer: McKiernan Terry DE-20 WH or F = 12000 Ft.lbs.

Capacity formula: "R" = $\frac{2WH}{S+0.1}$ Required "R" = 92,000 Lbs.

Elev. of top of pile (cut-off elev.) 104.4.82

Elev. of nominal point of zero penetration: 33.70

(SUBMIT IN DUPLICATE)

Pile No.	Pay Length	Indicated "R" (Pounds)	Remarks	Misc.
8	Lump	169,252 -	TEST PILE -	
9	33.34 -	107914 -		
10	32.42 -	94563 -		
11	32.83 -	109091 -		
12	33.42 -	101523 -		
13	32.70 -	93059 -		
TOTAL	164.71 -	~~506150~~	Does not incl Test -	
Average	32.94'	101,230	Does not Incl. Test Pile	
		126,537.50		

MAR 30 1982

BR-5-75

Pile No. 8 — RE NOT Abut. Pier

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Logan County

Br. No. 39-4.98

Location S. Branch Miami River

Date Driven 8-24-81

Type of Pile 14" Cast In Place

Hammer: McKiernan Terry DE-20 WH or F = 12000 Ft.lbs.

Capacity formula: "R" = 2WH / S+0.1 Required "R" = 72000 Lbs.

Log Point 1038.41 Elv. +4.9"

Elev. of top of pile (cut-off elev.) 1044.82 –

Elev. of nominal point of zero penetration 1033.7 –

Elev. of pile point at final penetration 1011.57 –

Length of pile in leads 40 Feet

1045.72 Top Pile
44.22 Bot Pile Cap

(Explanatory Notes and Instructions on Reverse Side) 52 BF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile 40.00
5-6				Cut off 6.75
6-7	7	1.714 –	13230 –	Pay Length 33.25
7-8	9	1.333 –	16748 –	33.14
8-9	11	1.091 –	20151 –	(Test Pile)
9-10	13	1.000 –	21818 –	
10-11	15	.8000 –	24667 –	
11-12	17	.7059 –	29780 –	
12-13	19	.6316 –	32805 –	Recorded by
13-14	24	.5000 –	40000 –	Ron Lehner
14-15	26	.4615 –	42743 –	
15-16	32	.3750 –	50526 –	
16-17	50	.2400 –	66376 –	
17-18	56	.2143 –	76360 –	
18-19	52	.2308 –	72551 –	
19-20	43	.2791 –	63308 –	
20-21	46	.2609 –	66500 –	
21-22	45	.2667 –	65449 –	
22-23	42	.2857 –	62225 –	
23 24	23 54	.2222	74488 –	
24 25	33/6 .92	.1304 –	104,167 –	
25 26'9"	85/6" 170/9"(215)	.0418	169,252 –	
26				

Sheet 3 of 4

Ohio Department of Transportation
Design and Construction

Logan County

Recorder: Ron Weis

Sec.

Date: Aug 26, 1981

Br.No. 39-4.98

Location S. Branch Miami River

PILING RECORD: Fwd Pier #2 FOOTING

Type of Pile: 14" Cast In Place

Hammer: McKiernan Terry DE-30 WH or F = 16500 Ft.lbs.

Capacity formula: "R" = $\frac{2.4H}{S+0.1}$ Required "R" = 72000 Lbs.

Elev. of top of pile (cut-off elev.) 1044.46 -

Elev. of nominal point of zero penetration: 1033.70 -

(SUBMIT IN DUPLICATE)

Pile No.	Pay Length	Indicated "R" (Pounds)	Remarks	Misc.
14	32.60 ✓	183,333 -		
15	32.10 - ✓	121,579 -		
16	32.10 - ✓	119,362 -		
17	33.00 - ✓	119,362 -		
18	32.00 - ✓	105,000 -		
19	31.35 - ✓	224,672 -		
Total	193.15 ✓	873,308		
Average	32.19 ✓	145,551.33 ✓		

MAR 29 1982

BR-5-75

Sheet 4 of 4

Recorder: R. Wiss

Date: 8-28-81

Ohio Department of Transportation
Design and Construction

Logan County

Sec.

Br. No. 59-4.98

Location S. Branch Miami River

PILING RECORD: Fwd Abut FOOTING

Type of Pile: Cast-In-Place

Hammer: McKiernan Terry DE20 WH or F = 12000 Ft.lbs.

Capacity formula: "R" = 12DE / S+0.1 Required "R" = 44000 Lbs.

Elev. of top of pile (cut-off elev.) 1041.71

Elev. of nominal point of zero penetration: [illegible] 71

(SUBMIT IN DUPLICATE)

Pile No.	Pay Length	Indicated "R" (Pounds)	Remarks	Misc.
20	20.82	85556	Near Boring #B-2	
21	22.10	85556	Near Boring #B-2	
22	21.85	94286		
23	20.95	91446		
24	21.80	77771		
25	21.90	66000	Near Boring #B-1	
26	22.12	94286	Near Boring #B-1	
Total	151.54	594901		
Average	21.64⁵ LF	~~85128.71~~ Lbs 84985.86		

MAR 29 1982

BR-5-75

Pile No. 3

RE Abut. ~~Pier~~

Date Driven 8-28-81

Type of Pile 12" Cast In Place

Hammer: McKiernan Terry DE-30

Capacity formula: "R" = $\frac{12WH}{S+0.1}$

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Logan County

Br.No. 39-4.98

Location S. Branch Miami River

WH or F = 16500 Ft.lbs.

Required "R" = 44000 Lbs.

Elev. of top of pile (cut-off elev.) 1042.48 –

Elev. of nominal point of zero penetration 1040.68 –

Elev. of pile point at final penetration 1021.68 –

Length of pile in leads 25.0' Feet 18.4

(Explanatory Notes and Instructions on Reverse Side)

19 BF

Penetration (feet)	Blows 27-20	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile = 25.00
5-6	20	.6000	47143 –	Cut off = 4.00
6-7	18	.6667	43043 –	Pay Length = 21.00 –
7-8	11	1.091	27710 –	
8-9	6	2.000	15714 –	Logged by
9-10	6	2.000	15714 –	Ron Weir
10-11	5	2.400	13200 –	
11-12	8	1.500	20625 –	
12-13	12	1.000	30000 –	
13-14	13	.9231	32256 –	
14-15	15	.8000	36667 –	[illegible]
15-16	13	.9231	32256	8-28-81
16-17	15	.8000	36667 –	
17-18	27	.4444	60662 –	
18-19	50	.2400 –	97059 –	
19-20				
20-21				

BR-2-75

Pile No. 4

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

Logan County

Rc Abut ~~Pier~~

Br.No. 39-4.88

PILE DRIVING LOG

Date Driven 8-28-81

Location S. Branch Mac Kinzie

Type of Pile 12" Cast In Place

Hammer: McKiernan Terry DE-30 WH or F = 16500 Ft.lbs.

Capacity formula: "R" = 2 in Steel Required "R" = 44000 Lbs.

Elev. of top of pile (cut-off elev.) 1042.68 -

Elev. of nominal point of zero penetration 1040.68 -

Elev. of pile point at final penetration 1020.43 -

Length of pile in leads 25.0' Feet 18.4

(Explanatory Notes and Instructions on Reverse Side)

198F

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	SET			Length of Pile = 25.00 =
5-6	29	.4138	64228 -	Cut off = 2.75 -
6-7	39	.3077	80943 -	Pay Length = 22.25 =
7-8	24	.5000	55000 -	
8-9	17	.7059	40949 -	
9-10	13	.9231	32256 -	Logged by
10-11	18	.6667	43043 -	Ron Wood
11-12	18	.6667	43043 -	
12-13	19	.6316	45108 -	
13-14	23	.5217	53077 -	
14-15	20	.6000	47143 -	
15-16	22	.5455	51127 -	
16-17	21	.5714	49149 -	
17-18	26	.4615	54767 -	
18-19	40	.3000	82500 -	
19-20	41	.2927	84037 -	
20-21				

BR-2-75

Pile No. 5

RE Abut ~~Pier~~

Date Driven 8-28-81

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Logan County

Br.No. 39-4.98

Location S. Branch Mad River

Type of Pile 12" Cast In Place

Hammer: McKiernan Terry DE-20 WH or F = 12000 Ft.lbs.

Capacity formula: "R" = 12DF / S+0.1 Required "R" = 44000 Lbs.

Elev. of top of pile (cut-off elev.) 1047.68 —

Elev. of nominal point of zero penetration 1040.68 —

Elev. of pile point at final penetration 1020.38 —

Length of pile in leads 25.0' Feet 18.4

(Explanatory Notes and Instructions on Reverse Side) BF 27

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile = 25.00 —
5-6	15	.8000	36447 —	Cut off = 2.70 —
6-7	15	.8000	36667 —	Pay Length = 22.30 —
7-8	6	2.000	15714 —	
8-9	5	2.400	13200 —	
9-10	12	1.000	30000 —	Logged by
10-11	12	1.000	30000 —	Ron Wise
11-12	11	1.091	27710 —	
12-13	13	.9231	32256 —	
13-14	17	.7059	40949 —	
14-15	17	.7059	40949 —	
15-16	17	.7059	40949 —	
16-17	17	.7059	40949 —	
17-18	20	.6000	47143 —	
18-19	22	.5455	51127 —	
19-20	32	.3750	69474 —	
20-21				

BR-2-75

Pile No. 9

RE ~~Abut.~~ NO 1 Pier

Date Driven 8-24-81

Type of Pile 14" Cast In Place

Hammer: McKiernan Terry DE-20

Capacity formula: "R" = $\frac{2DE}{S+0.1}$

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Logan County

Br.No. 39-4.98

Location S. Branch Miami River

WH or F = 12000 Ft.lbs.

Required "R" = 72000 Lbs.

Point 1038.41 24.9

Elev. of top of pile (cut-off elev.) 1044.82

Elev. of nominal point of zero penetration 1033.7

Elev. of pile point at final penetration 1011.48

Length of pile in leads 40 Feet

5.92 Top Pile
4.22 Bottom Pile Cap

(Explanatory Notes and Instructions on Reverse Side)

52BF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile 40.00
5-6	12	1.000	21818	Cut off 6.66
6-7	12	1.000	21818	Pay Length 33.34
7-8	11	1.091	20151	33.31
8-9	11	1.091	20151	
9-10	12	1.000	21818	
10-11	12	1.000	21818	
11-12	13	.9231	23458	Recorded by
12-13	15	.8000	26667	Tom [illegible]
13-14	16	.7500	28235	
14-15	19	.6316	32805	
15-16	23	.5217	38604	[illegible]
16-17	46	.2609	66500	3-23-8[illegible]
17-18	50	.2400	70588	
18-19	50	.2400	70588	
19-20	47	.2553	67549	
20-21	50	.2400	70588	
21-22	54	.2222	74488	
22-23	58	.2069	78201	
23-24	52	.2308	72551	
24-25	35/6" 80	.1500	96000	
25-26	98	.1224	107914	

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Pile No. 10

RE ~~Abut.~~ 101 Pier

Date Driven 8-24-81

Type of Pile 14" Cast-In-Place

Hammer: McKiernan Terry DE-20

WH or F = 12000 Ft.lbs.

Capacity formula: "R" = $\frac{2WH}{S+0.1}$

Required "R" = 72000 Lbs.

Logan County

Br.No. 39-4.98

Location S. Branch Miami River

log Point 1038.41 24'9"

Elev. of top of pile (cut-off elev.) 1044.82

Elev. of nominal point of zero penetration 1033.7

Elev. of pile point at final penetration 1012.40

45.72 Top Pile
44.22 Bottom Pier Cap

Length of pile in leads 40 Feet

(Explanatory Notes and Instructions on Reverse Side)

52BF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile 40.00
5-6	—			Cut off 7.58
6-7	9	1.333	16748	Pay Length 32.42
7-8	9	1.333	16748	32.31
8-9	13	.9231	23458	
9-10	13	.9231	23458	
10-11	15	.8000	24667	Recorded by
11-12	14	.8571	25078	Ron White
12-13	16	.7500	28235	
13-14	17	.7059	29780	
14-15	21	.5714	35746	
15-16	27	.4444	44085	
16-17	48	.2500	68571	
17-18	58	.2069	78201	
18-19	51	.2353	71578	
19-20	54	.2222	74488	
20-21	57	.2105	77295	
21-22	55	.2182	75424	
22-23	47	.2553	67549	
23-24	58	.2069	78201	
24-25	78	.1538	94563	
25-26				
26-27				

BR-2-75

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Pile No. 11

RE [redacted].Pier No1

Date Driven 8-24-81

Type of Pile 14" Cast-In-Place

Hammer: McKiernan Terry DE20

Capacity formula: "R" = 2WH / S+0.1

Logan County

Br.No. 39-4.98

Location S. Branch Miami River

WH or F = 12000 Ft.lbs.

Required "R" = 72000 Lbs.

29 Point 1038.41 24.9

Elev. of top of pile (cut-off elev.) 1044.82 –

Elev. of nominal point of zero penetration 1034.40 (1033.17) –

Elev. of pile point at final penetration 1011.99 –

Length of pile in leads 40 Feet

245.72 Top Pile

4.22 Bottom Pile Cap

(Explanatory Notes and Instructions on Reverse Side)

52BF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile 40.00 –
5-6	—			Cut off 7.17 –
6-7	8	1.500 –	15000 –	Pay length 32.83 – 32.81
7-8	10	1.200 –	18462 –	
8-9	10	1.200 –	18462 –	
9-10	12	1.000 –	21818 –	
10-11	12	1.000 –	21818 –	
11-12	24	.5000 –	40000 –	Recorded by
12-13	17	.7059 –	29780 –	Ron Weiss
13-14	18	.6667 –	31303 –	
14-15	20	.6000 –	34286 –	
15-16	20	.6000 –	34286 –	
16-17	33	.3636 –	51769 –	
17-18	45	.2667 –	65449 –	[illegible]
18-19	37	.3243 –	56564 –	
19-20	37	.3243 –	56564 –	
20-21	35	.3429 –	54188 –	
21-22	44	.2727 –	64395 –	
22-23	44	.2727 –	64395 –	
23-24	40	.3000 –	60000 –	
24-25	56	.2143 –	76360 –	
25-~~26~~ 6"	50/6" 100	.1200 –	109091 –	

BR-2-75

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Pile No. 12 | Logan County
RE ~~Abut.~~ 101 Pier | Br. No. 39-498
Date Driven 8-21-81 | Location S. Branch Miami River

Type of Pile 14" Cast-In-Place

Hammer: McKiernan Terry DE20 WH or F = 12000 Ft.lbs.

Capacity formula: "R" = 2DF / S+0.1 Required "R" = 72000 Lbs.

09 Point 1038.41

Elev. of top of pile (cut-off elev.) ~~1046.82~~ 1044.82

24'-9"

Elev. of nominal point of zero penetration 1033.7

Elev. of pile point at final penetration ~~1013.40~~ 1011.40

245.72 Top Pile

Length of pile in leads 40 Feet

44.22 Bottom of Pile cap

(Explanatory Notes and Instructions on Reverse Side)

52BF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	SET			Length of Pile 40.00
5-6	4	3.000	7742	Cut off 6.58
6-7	4	3.000	7742	Pay Length 33.42
7-8	6	2.000	11429	33.06
8-9	6	2.000	11429	
9-10	6	2.000	11429	
10-11	8	1.500	15000	
11-12	13	.9231	23458	Recorded by
12-13	16	.7500	28235	Ron White
13-14	18	.6667	31303	
14-15	18	.6667	31303	
15-16	18	.6667	31303	
16-17	19	.6316	32805	
17-18	22	.5455	37180	[illegible]
18-19	33	.3636	51769	[illegible]
19-20	33	.3636	51769	
20-21	37	.3243	56564	
21-22	20/6 38	.3158	57720	
22-23	17/6 32	.3750	50526	
23-24	35	.3429	54188	
24-25	29/6 65	.1846	84329	
25-26	34/6 54/9 83	~~.1364~~ .1446	~~101523~~ 98119	
	This is per 88			

Pile No. 13 — RE ~~Abut.~~ NO1 Pier

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Logan County

Br. No. 39-498

Location S. Branch Miami River

Date Driven 8-24-81

Type of Pile 14" Cast-In-Place

Hammer: McKiernan Terry DE20 WH or F = 120000 Ft.lbs.

Capacity formula: "R" = $\frac{2WH}{S+0.1}$ Required "R" = 72000 Lbs.

Log Point 1038.41 RH 94

Elev. of top of pile (cut-off elev.) 1044.82 —

Elev. of nominal point of zero penetration 1038.7 —

Elev. of pile point at final penetration 1012.12 —

1045.72 Top Pile 44.22 Bottom Pile Cap

Length of pile in leads 40 Feet

(Explanatory Notes and Instructions on Reverse Side) 52 BF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	S.tap			Length of Pile 40.00 —
5-6	—			Cut off 7.30 —
6-7	4	3.000 —	7742 —	Pay length 32.70 —
7-8	6	2.000 —	11429 —	32.31
8-9	14	.8571 —	25078 —	(7 — 2...)
9-10	33	.3636 —	51769 —	
10-11	33	.3636 —	51769 —	Recorded by
11-12	35	.3429 —	54188 —	Ron Lewis
12-13	26	.4615 —	42743 —	
13-14	22	.5455 —	37180 —	
14-15	19	.6316 —	32805 —	
15-16	23	.5217 —	38604 —	
16-17	30	.4000 —	48000 —	
17-18	48	.2500 —	68571 —	
18-19	59	.2043 —	79103 —	
19-20	56	.2143 —	76360 —	
20-21	47	.2553 —	67549 —	
21-22	55	.2182 —	75424 —	
22-23	28½ 57	.2105 —	77295 —	
23-24	58	.2069 —	78201 —	
24-25	76	.1579 —	93059 —	
25-26				

BR-2-75

Pile No. 14

Fwd ~~Abut.~~ NO2 Pier

Date Driven 8-25-81

Type of Pile 14" Cast-In-Place

Hammer: McKiernan Terry DE-30

Capacity formula: "R" = 2WH / (S+0.1)

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Logan County

Br.No. 39-4.98

Location S. Branch Miami River

WH or F = 16,500 ~~12000~~ Ft.lbs.

Required "R" = 72000 Lbs.

Log Elev 1038.21

Elev. of top of pile (cut-off elev.) 1044.46

Elev. of nominal point of zero penetration 1033.7

Elev. of pile point at final penetration 1012.46 (1013.36)

Top of pile 1045.36

Bottom pier cap 1043.86

Length of pile in leads 40 Feet ~~30~~ 24.85

(Explanatory Notes and Instructions on Reverse Side) 34 ~~32~~ BF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile 40.00
5-6	4	3.000	10,645	Cut off 7.40
6-7	5	2.400	13,200	Pay 32.60
7-8	8	1.500	20,625	
8-9	10	1.200	25,385	
9-10	10	1.200	25,385	
10-11	10	1.200	25,385	
11-12	20	.6000	47,143	
12-13	15	.8000	36,667	Recorded by
13-14	18	.6667	43,043	[illegible]
14-15	25	.4800	56,897	
15-16	33	.3636	71,176	
16-17	37	.3243	77,771	
17-18	40	.3000	82,500	Ch. [illegible]
18-19	~~26~~ 43	.2791	87,055	
19-20	36	.3333	76,154	
20-21	34	.3529	72,857	
21-22	39	.3077	80,943	
22-23	42	.2857	85,556	
23-24	45	.2667	90,000	
24-25	70	.1714	121,579	
25-~~26~~ 6"	75/6" (150)	.0800	183,333	

BR-2-75

Pile No. 15

Fwd ~~Abut.~~ 1102 Pier

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Logan County

Br.No. 39-4.98

Date Driven 8-25-81

Location S. Branch Miami River

Type of Pile 14" Cast-In-Place

Hammer: McKiernan Terry DE-30 WH or F = 12500 Ft.lbs.

Capacity formula: "R" = $\frac{2WH}{S+0.1}$ Required "R" = 72000 Lbs.

Elev. of top of pile (cut-off elev.) 1044.46 —

Elev. of nominal point of zero penetration 1033.7 —

Elev. of pile point at final penetration 1012.86 —

Length of pile in leads 40 Feet 24.85

(Explanatory Notes and Instructions on Reverse Side) 34 @ BF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile 40.00 —
5-6	—			Cut off 7.90 —
6-7	—			Pay 32.10 =
7-8	—			
8-9	8	1.500	20,625 —	
9-10	6	2.00	15,714 —	
10-11	11	1.091	27,710 —	
11-12	11	1.091	27,710 —	Recorded By
12-13	17	.7059	40,949 —	Ron Wilson
13-14	19	.6316	45,108 —	
14-15	19	.6316	45,108 —	
15-16	30	.4000	66,000 —	
16-17	45 X	.2667	90,000 —	
17-18	50	.2400	82,059 —	Cut off 3-24-82
18-19	45	.2667	90,000 —	
19-20	38	.3158	79,367 —	
20-21	35	.3429	74,516 —	
21-22	34	.3529	72,857 —	
22-23	41	.2927	84,037 —	
23-24	39	.3077	80,943 —	
24-25 E	70	.1714	121,579 —	

Pile No. 16 — Fwd — Abut. / Pier NO2

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Logan County
Br. No. 39-498
Location SR Lynch Miami River

Date Driven 8-25-81

Type of Pile 14" Cast-In-Place

Hammer: McKiernan Terry DE-30 — WH or F = 16500 Ft.lbs.

Capacity formula: "R" = 2WH / S+0.1 — Required "R" = 72000 Lbs.

Log elev 1038.21

Elev. of top of pile (cut-off elev.) 1044.46 –

Elev. of nominal point of zero penetration 1033.7 –

Elev. of pile point at final penetration 1012.36 –

Top pile 1045.26
Bottom pipe 1043.86

Length of pile in leads 40 Feet 24.85

(Explanatory Notes and Instructions on Reverse Side) 34 S2 B12

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	SET			Lengthed Pile 40.00 –
5-6	—			Cut off 7.90 –
6-7	—			Pay 32.10
7-8	—			
8-9	7	1.714	17,207 (18,189)	
9-10	12	1.000	30,000 –	
10-11	12	1.000	30,000 –	Recorded by
11-12	15	.8000	36,667 –	Ron Wilmie
12-13	17	.7059	40,949 –	
13-14	20	.6000	47,143 –	
14-15	26	.4615	58,767 –	
15-16	26	.4615	58,767 –	8 Blows 3-2-3
16-17	36	.3333	76,154 –	
17-18	45	.2667	90,000 –	
18-19	52	.2308	99,767 –	
19-20	50	.2400	97,059 –	
20-21	52	.2308	99,767 –	
21-22	56	.2143	105,000 –	
22-23	52	.2308	99,767 –	
23-24	52	.2308	99,767 –	
24-25	48	.1745	119,362 –	

Pile No. 17

Fwd ~~Abut~~ NO 2 Pier

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Logan County

Br.No. 3.98-4.98

Date Driven 8-25-81

Location S. Branch Mill. Run

Type of Pile 14" Cast-In-Place

Hammer: McKiernan Terry DE 30 WH or F = ~~30000~~ 16500 Ft.lbs.

Capacity formula: "R" = 2WH / S+0.1 Required "R" = 72000 Lbs.

Log elev 1038.21

Elev. of top of pile (cut-off elev.) 1044.46 —

Elev. of nominal point of zero penetration 1033.7 —

Elev. of pile point at final penetration 1011.46 —

Top Pile 1045.36
Bottom Pile 1043.86

Length of pile in leads 40 Feet 34 ~~30~~ BP

(Explanatory Notes and Instructions on Reverse Side)

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile 40.00 —
5-6	—			Cut off 2.00 —
6-7	—			Pay 33.00 —
7-8	—			
8-9	5	2.400	13,200 —	
9-10	5	2.400	13,200 —	
10-11	7	1.714	18,189 —	
11-12	7	1.714	18,189 —	
12-13	10	1.200	25,385 —	Rounded by
13-14	12	1.000	30,000 —	Ben Weir
14-15	12	1.000	30,000 —	
15-16	15	.8000	36,667 —	
16-17	32	.3750	62,474 —	
17-18	45	.2667	90,000 —	
18-19	45	.2667	90,000 —	R. Bond 8-28-81
19-20	42	.2857	85,556 —	
20-21	35	.3429	74,516 —	
21-22	30	.4000	66,000 —	
22-23	30	.4000	66,000 —	
23-24	30	.4000	66,000 —	
24-25	36	.333	76,154 —	
25-26	68	.1765	119,362 —	

BR-2-75

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Pile No. 18 Fwd ~~Abut.~~ NO2 Pier

Lucas County

Br.No. 39-4.98

Date Driven 8-25-81

Location S. Branch Maumee River

Type of Pile 14" Cast-In-Place

Hammer: McKiernan Terry DE-30

WH or F = ~~42,000~~ 46500 Ft.lbs.

Capacity formula: "R" = $\frac{2WH}{S+0.1}$

Required "R" = 72000 Lbs.

Elev. of top of pile (cut-off elev.) 1044.46 —

Elev. of nominal point of zero penetration 1033.7 —

Elev. of pile point at final penetration 1012.46 —

Length of pile in leads ~~39~~ Feet

(Explanatory Notes and Instructions on Reverse Side) BF ~~52~~ 34

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile 39.00 —
5-6	—			Cut off 7.00 —
6-7	—			Pay 32.00 —
7-8	—			
8-9	—			
9-10	7	1.714	18,189 —	
10-11	6	2.000	15,714 —	
11-12	6	2.000	15,714 —	Recorded by
12-13	14	.8571	34,478 —	Ron Wise
13-14	17	.7059	40,949 —	
14-15	19	.6316	45,108 —	
15-16	23	.5217	53,077 —	
16-17	44	.2727	86,537 —	
17-18	40	.3000	82,500 —	
18-19	37	.3243	77,771 —	
19-20	30	.4000	66,000 —	
20-21	30	.4000	66,000 —	
21-22	30	.4000	66,000 —	
22-23	36	.3333	76,154 —	
23-24	40	.3000	82,500 —	
24-25	56	.2143	105,000 —	
25-26				

BR-2-75

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Pile No. 19

Fwd ~~Abut.~~ NO2 Pier

Logan County

Br. No. 39-4.98

Date Driven 8-28-81

Location S. Branch Miami River

Type of Pile 14" Cast In-Place

Hammer: McKiernan Terry DE-30

WH or F = ~~12000~~ 16,500 Ft.lbs.

Capacity formula: "R" = $\frac{12 WH}{S+0.1}$

Required "R" = 72000 Lbs.

Log Elev. 1038.21

Elev. of top of pile (cut-off elev.) 1044.46

Elev. of nominal point of zero penetration 1033.7 — 1013.36

Elev. of pile point at final penetration 1013.11

Length of pile in leads ~~40~~ 37'-6" Feet 24.85

(Explanatory Notes and Instructions on Reverse Side) 34 BP

Top Pile 1045.36

Bottom pier cap 1043.86

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	SET			Length of Pile 37.50
5-6	9			Cut off 6.15
6-7	55			Pay 31.35
7-8	55			
8-9	35 75 / 16 19	Pile split open. Removed pile from position		Pulled Pile - Exc. Rock. Reset new Pile
9-10	10	1.200	25,385	
10-11	16	.7500	38,824	
11-12	16	.7500	38,824	
12-13	15	.8000	36,667	Recorded By
13-14	13	.9231	32,256	Ron [illegible]
14-15	10	1.200	25,385	
15-16	17	.7059	40,849	
16-17	31	.3871	67,748	
17-18	35	.3429	74,516	
18-19	34	.3529	72,857	[illegible]
19-20	28	.4286	62,432	
20-21	28	.4286	62,432	
21-22	29	.4138	64,228	
22-23	33	.3636	71,176	
23-24	38	.3185	77,367	
24-~~24~~4"	44 / 3" (36)	.0469	224,642	
25-26				

Encountered stone 7 to 9 foot level & ruptured pile. Contractor removed same with clam bucket & proceeded with new pile.

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PILE DRIVING LOG

Pile No. 20

Fwd Abut. ~~Pier~~

Date Driven 8-27-81

Type of Pile 8 1/2" Cast-In-Place

Hammer: McKiernan-Terry DE-30 WH or F = 16500 Ft.lbs.

Capacity formula; "R" = 12WH / S+0.1

Required "R" = 44000 Lbs.

Logan County

Br.No. 39-498

Location S. Branch Miami River

Elev. of top of pile (cut-off elev.) 1041.71

Elev. of nominal point of zero penetration 1039.71

Elev. of pile point at final penetration 1020.89

Length of pile in leads 25'-0" Feet

(Explanatory Notes and Instructions on Reverse Side) BF19

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile 25.00
5-6	10	1.200	25385	Cut off 4.18
6-7	14	.8571	34478	Pay 20.82
7-8	20	.6000	47143	
8-9	16	.7500	38824	Near Boring # B-2
9-10	18	.6667	43043	
10-11	19	.6316	45108	
11-12	17	.7059	40949	Recorded by
12-13	16	.7500	38824	Ron Weisse
13-14	17	.7059	40949	
14-15	20	.6000	47143	
15-16	22	.5455	51127	
16-17	25	.4800	56897	
17-18	30	.4000	66000	
18-19	42	.2857	85556	[illegible]

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PILE DRIVING LOG

Pile No. 2　　　Logan County

Fwd Abut ~~Pier~~　　　Br.No. 39-4.98

Date Driven 8-27-81　　　Location S. Branch Miami River

Type of Pile 12" Cast In Place

Hammer: McKiernan Terry DE 30　WH or F = 16500 Ft.lbs.

Capacity formula: "R" = 2WH / S+0.1　Required "R" = 44300 Lbs.

Elev. of top of pile (cut-off elev.) 1041.71

Elev. of nominal point of zero penetration 1039.71 -

Elev. of pile point at final penetration 1019.61 -

Length of pile in leads 25'0" Feet

(Explanatory Notes and Instructions on Reverse Side) BF20

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile 25.00
5-6	22	.5455	51127 -	Cut off 2.90
6-7	16	.7500	38824 -	Pay 22.10 -
7-8	10	1.200	25384 -	
8-9	10	1.200	25384 -	
9-10	10	1.200	25384 -	Near Boring # B-2
10-11	19	.6316	45108 -	
11-12	24	.5000	55000 -	
12-13	22	.5455	51127 -	Logged by
13-14	18	.6667	43043 -	Ron Kluse
14-15	18	.6667	43043 -	
15-16	24	.5000	55060 -	
16-17	21	.5714	49149 -	
17-18	27	.4444	60612 -	[illegible]
18-19	27	.4444	60612 -	
19-20	42	.2857	85556 -	

BR-2-75

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PILE DRIVING LOG

Pile No. ~~23~~ 23 — Logan County

Fwd Abut. ~~Pier~~ — Br.No. 39-4.98

Date Driven 8-27-81 — Location S. Branch Indian River

Type of Pile 12" Cast In-Place

Hammer: McKiernan Terry DE-30 — WH or F = 16500 Ft.lbs.

Capacity formula: "R" = $\frac{2WH}{S+0.1}$ — Required "R" = 74000 lbs.

Elev. of top of pile (cut-off elev.) 1041.71 –

Elev. of nominal point of zero penetration 1039.71 –

Elev. of pile point at final penetration 1020.76 –

Length of pile in leads 25.0' Feet

18.4

(Explanatory Notes and Instructions on Reverse Side) 20 BF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile 25.00 –
5-6	12	1.000	39,000 –	Cut off 4.05 –
6-7	18	.6667	43043 –	Pay 20.95 =
7-8	23	.5217	53077 –	
8-9	25	.4800	56897 –	
9-10	22	.5455	51127 –	Logged by
10-11	26	.4615	58767 –	Ron Wise
11-12	25	.4800	56897 –	
12-13	23	.5217	53077 –	
13-14	26	.4615	58767 –	
14-15	26	.4615	58767 –	
15-16	26	.4615	58767 –	Ck. and 3-27-82
16-17	32	.3750	69474 –	
17-18	46	.2906	91446 –	
18-19	46	.2906	91446 –	
19-20				
20-21				

BR-2-75

Pile No. 2F24

Fwd Abut ~~Back~~

Date Driven 8-28-81

Type of Pile 12" Cast-In-Place

Hammer: McKiernan Terry DE-30 WH or F = 16500 Ft.lbs.

Capacity formula: "R" = $\frac{2WH}{S+0.1}$ Required "R" = 44000 Lbs.

Elev. of top of pile (cut-off elev.) 1041.71 –

Elev. of nominal point of zero penetration 1032.71 –

Elev. of pile point at final penetration 1019.91 –

Length of pile in leads 25.0' Feet 18.4

(Explanatory Notes and Instructions on Reverse Side) 20 BF

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PILE DRIVING LOG

Logan County

Br.No. 39-4.98

Location S. Branch Mingo River

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Pile			Length of Pile 25.00 –
5-6	5	2.400	13200 –	Cut off 3.20 –
6-7	6	2.000	15714 –	Pay 21.80 –
7-8	18	.4663	43043 –	
8-9	20	.6000	47143 –	
9-10	10	.6000	47143 –	Near Boring # B-1
10-11	28	.4286	62432 –	
11-12	33	~~.3750~~	64434 –	
12-13	30	.4000	66000 –	Logged by
13-14	21	.5714	49149 –	Ron Wain
14-15	19	.6316	45108 –	
15-16	19	.6316	45108 –	
16-17	23	.5217	53077 –	
17-18	26	.4615	58767 –	Ck. Wml 3-1982
18-19	29	.4138	64228 –	
19-20	37	.3243	77771 –	
20-21				

Pile No. ~~36~~ 25

Fwd Abut. ~~Pier~~

Date Driven 8-28-81

Type of Pile 12" Cast-In-Place

Hammer: McKiernan-Terry DE-30 WH or F = 16500 Ft.lbs.

Capacity formula: "R" = $\frac{2WH}{S+0.1}$ Required "R" = 44000 Lbs.

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PILE DRIVING LOG

Logan County

Br.No. 39-498

Location S. Branch Mac Rver

Elev. of top of pile (cut-off elev.) 1041.71 -

Elev. of nominal point of zero penetration 1039.71 -

Elev. of pile point at final penetration 1019.81 -

Length of pile in leads 22.0' Feet 18.4

(Explanatory Notes and Instructions on Reverse Side) 2013F

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	Set Rig			Length of Pile 25.00
5-6	10	1.200	25385 -	Cut off 3.29
6-7	30	.6000	47143 -	Pay 21.71 =
7-8	40	.3000	82500 -	
8-9	28	.4286	62432 -	
9-10	40	.3000	82500 -	New Batter #B-1
10-11	35	.2857	85556 -	
11-12	34	.2727	88537 -	
12-13	33	.2553	92874 -	Logged by
13-14	33	.3636	71176 -	Ron Wade
14-15	33	.3636	71176 -	
15-16	27	.4138	64228 -	
16-17	29	.4138	64228 -	
17-18	26	.4615	58767 -	
18-19	25	.4800	56897 -	
19-20	30	.4000	66000 -	
20-21				

Pile No. 26

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Log County

Fwd Abut. ~~Pier~~

Br.No. 39 4.98

PILE DRIVING LOG

Date Driven 2-25-81

Location S. Branch Mian River

Type of Pile 12" CAST in Place

Hammer: McKiernan Terry DE 35 WH or F = 16506 Ft.lbs.

Capacity formula: "R" = $\frac{2WH}{S+0.1}$ Required "R" = 44000 Lbs.

Elev. of top of pile (cut-off elev.) 1041.71 –

Elev. of nominal point of zero penetration 1039.71 –

Elev. of pile point at final penetration 1019.59 –

Length of pile in leads [illegible] Feet 18.4

(Explanatory Notes and Instructions on Reverse Side) 2 of F

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-5	SOT			Length of Pile [illegible]
5-6	12	1.000	30,000 –	Cut off [illegible]
6-7	12	1.000	30000 –	Pile [illegible]
7-8	23	.5217	53077 –	
8-9	32	.3750	69474 –	
9-10	30	.4000	66000 –	Logged by
10-11	44	.2563	92874 –	Pile Wave
11-12	48	.2500	94286 –	
12-13	60	.2000	110.000 –	
13-14	65	.1846	115946 –	
14-15	45	.2667	90000 –	
15-16	43	.2791	87055 –	
16-17	43	.2791	87055 –	
17-18	40	.3000	82500 –	
18-19	40	.3000	82500 –	
19-20	48	.2500	94286 –	
20-21				

BR-2-75

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PILE DRIVING LOG

Pile No. 1

Bent #2 ~~[illegible]~~

Date Driven 8-24-81

Type of Pile 8" to 12" Log Native Timber

Hammer: McKiernan Terry DE ~~20~~ 30

Capacity formula: "R" = ______

Log County

Br. No. 39 4.98

Location S Branch Miami River

WH or F = 16500 ~~[illegible]~~ Ft.lbs.

Required "R" = 30000 Lbs.

Elev. of top of pile (cut-off elev.) ______

Elev. of nominal point of zero penetration ______

Elev. of pile point at final penetration ______

Length of pile in leads ______ Feet

(Explanatory Notes and Instructions on Reverse Side) 12 ~~12~~ BF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 8	set			Recorded by
8 - 9	8			Ron [illegible]
9 - 10	8			
10 - 11	14			Log Point Elev
11 - 12	17			1137.00
12 - 13	30			
13 - 14				
14 - 15				
15 - 16				
16 - 17				
17 - 18				

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PILE DRIVING LOG

Pile No. 2 — Log County

Bent 2 [redacted] — Br.No. 39 4.98

Date Driven 8-24-81 — Location S Branch Miami River

Type of Pile 8" To 12" Log Native Timber

Hammer: McKiernan Terry DE20 — WH or F = 12000 Ft.lbs.

Capacity formula: "R" = _____ — Required "R" = 30,000 Lbs.

Elev. of top of pile (cut-off elev.) _____

Elev. of nominal point of zero penetration _____

Elev. of pile point at final penetration _____

Length of pile in leads _____ Feet

(Explanatory Notes and Instructions on Reverse Side)

188F

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 10	5 ST			Record by
10 - 11	8			Ron Weis
11 - 12	17			
12 - 13	21			Log Point Elev
13 - 14	18			1132.00
14 - 15	16			
15 - 16	15			
16 - 17	16			
17 - 18	22			

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PILE DRIVING LOG

Pile No. 3 — Log County

Bent 2 ~~Abut. 1 Pier~~ — Br.No. 39 4.98

Date Driven 8-24-81 — Location So. Branch Miami River

Type of Pile 8" to 12" Log Native Timber

Hammer: McKiernan Terry DE 20 — WH or F = 12000 Ft.lbs.

Capacity formula: "R" = _____ — Required "R" = 30,000 Lbs.

Elev. of top of pile (cut-off elev.) _____

Elev. of nominal point of zero penetration _____

Elev. of pile point at final penetration _____

Length of pile in leads _____ Feet

(Explanatory Notes and Instructions on Reverse Side)

1835

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 10	S-T			Recorded by
10 - 11	12			Ron Wise
11 - 12	15			
12 - 13	21			Log Point Elev.
13 - 14	24			113.00
14 - 15				

BR-2-75

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PILE DRIVING LOG

Pile No. 4

Bent 2 ~~Abutment~~ ~~Pier~~

Log County

Br. No. 39 4.98

Date Driven 8-24-81

Location So. Branch Miami River

Type of Pile 8" to 12" Log Native Timber

Hammer: Mc Kiernan Terry DE 30

WH or F = 12,000 Ft.lbs.

Capacity formula: "R" = ____

Required "R" = 30,000 Lbs.

Elev. of top of pile (cut-off elev.) ____

Elev. of nominal point of zero penetration ____

Elev. of pile point at final penetration ____

Length of pile in leads ____ Feet

(Explanatory Notes and Instructions on Reverse Side)

18BF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 6	Set			Recorded by R. White
6 - 7	10			
7 - 8	12			Log Point Elev.
8 - 9	12			1132.00
9 - 10	12			
10 - 11	14			
11 - 12	16			
12 - 13	21			
13 - ~~14~~ 6"	10/6" 20			

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PILE DRIVING LOG

Pile No. 5 — Log County

Bent 2 ~~Abutment~~ r — Br.No. 39 4.98

Date Driven 8-24-81 — Location SR Branch Miami River

Type of Pile 8" to 12" Log Native Timber

Hammer: McKiernan Terry DE20 — WH or F = 12,000 Ft.lbs.

Capacity formula: "R" = _____ — Required "R" = 30,000 Lbs.

Elev. of top of pile (cut-off elev.) _____

Elev. of nominal point of zero penetration _____

Elev. of pile point at final penetration _____

Length of pile in leads _____ Feet

(Explanatory Notes and Instructions on Reverse Side)

18BF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-6	SET			Preceded by
6-7	10			Ram blow
7-8	14			
8-9	11			Log Point Elev
9-10	15			1137.00
10-11	16			
11-12	20			
12-13	18			
13-14	20			
14-~~15~~ 4"	8/4" (33)			

BR-2-75

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PILE DRIVING LOG

Pile No. 6 — Log County

Bent 2 ~~Abut. Pier~~ — Br.No. 39 4.98

Date Driven 8-24-81 — Location SO. Bound Miami River

Type of Pile 8" To 12" Log Native Timber

Hammer: McKiernan Terry DE20 — WH or F = 12,000 Ft.lbs.

Capacity formula: "R" = _____ — Required "R" = 30,000 Lbs.

Elev. of top of pile (cut-off elev.) _____

Elev. of nominal point of zero penetration _____

Elev. of pile point at final penetration _____

Length of pile in leads _____ Feet

(Explanatory Notes and Instructions on Reverse Side)

1825

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0-8	SOT			Recorded by
8-9	8			Ron Wise
9-10	12			
10-11	14			Log Point Elev
11-12	14			113.00
12-13	15			
13-14	17			
14-15	20			
15-16	29			

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Pile No. 7

Bent 2 ~~Abut-Pier~~

Date Driven 8-24-81

Type of Pile 8" To 12" Log Native Timber

Hammer: McKiernan Terry DE30

Capacity formula: "R" = ______

Log County

Br.No. 39 4.98

Location St. Branch Miami River

WH or F = 15,000 Ft.lbs.

Required "R" = 30,000 Lbs.

PILE DRIVING LOG

Elev. of top of pile (cut-off elev.) ______

Elev. of nominal point of zero penetration ______

Elev. of pile point at final penetration ______

Length of pile in leads ______ Feet

(Explanatory Notes and Instructions on Reverse Side)

18BP

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 8	Set			Recorded by
8 - 9	10			Ron [illegible]
9 - 10	14			
10 - 11	20			Log Point Elev.
11 - 12	20			1137.06
12 - 13	20			
13 - 14	19			
14 - 15	18			
15 - 16	20			
16 - 17				

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PILE DRIVING LOG

Pile No. 8 — Log County

Bent 3 ~~Abut. Pier~~ — Br. No. 39 4.98

Date Driven 8-27-81 — Location So. Branch Miami River

Type of Pile 8" To 12" Log Native Timber

Hammer: McKiernan Terry DE 30 — WH or F = 16 500 Ft.lbs.

Capacity formula: "R" = _____ — Required "R" = 30.000 Lbs.

3rd MT Elev.

Elev. of top of pile (cut-off elev.) _____

Elev. of nominal point of zero penetration _____

Elev. of pile point at final penetration _____

Length of pile in leads _____ Feet

(Explanatory Notes and Instructions on Reverse Side)

12 BRF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 1				Recorded by
1 - 2				Ron Weir
2 - 3				
3 - 4	—			
4 - 5	8			
5 - 6	7			
6 - 7	7			
7 - 8	7			
8 - 9	7			
9 - 10	13			
10 - 11	15			
11 - 12	14			
12 - 13				
13 - 14				
14 - 15				

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PILE DRIVING LOG

Pile No. 10 — Log County

Bent 3 ~~Abut. Pier~~ — Br.No. 39 4.98

Date Driven 8-27-81 — Location SO. BRANCH MIAMI RIVER

Type of Pile 8" To 12" Log NATIVE TIMBER

Hammer: VULCAN IRON DE 30 — WH or F = 16,500 Ft.lbs.

Capacity formula: "R" = _____ — Required "R" = 30,000 Lbs.

Elev. of top of pile (cut-off elev.) _____

Elev. of nominal point of zero penetration _____

Elev. of pile point at final penetration _____

Length of pile in leads _____ Feet

(Explanatory Notes and Instructions on Reverse Side)

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 1				Recorded By
1 - 2				Ron Wise
2 - 3	—			
3 - 4	8			
4 - 5	9			
5 - 6	12			
6 - 7	20			
7 - 8	28			
8 - 9				
9 - 10				
10 - 11				
11 - 12				
12 - 13				
13 - 14				
14 - 15				

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PILE DRIVING LOG

Pile No. 11 — 409 County

Bent 3 ~~Abut. Pier~~ — Br.No. 39 4.98

Date Driven 8-27-81 — Location SR Branch Miami River

Type of Pile 8" To 12" Dia Native Timber

Hammer: McKiernan Terry DE 30 — WH or F = 16500 Ft.lbs.

Capacity formula: "R" = _____ — Required "R" = 30,000 Lbs.

Logged at CR Elev

Elev. of top of pile (cut-off elev.) _____

Elev. of nominal point of zero penetration _____

Elev. of pile point at final penetration _____

Length of pile in leads _____ Feet

(Explanatory Notes and Instructions on Reverse Side) 12 Pile

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 1				Recorded by
1 - 2				Ron Wiwi
2 - 3	—			
3 - 4	12			
4 - 5	18			
5 - 6	10			
6 - 7	17			
7 - 8	20			
8 - 9				
9 - 10				
10 - 11				
11 - 12				
12 - 13				
13 - 14				
14 - 15				

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PILE DRIVING LOG

Pile No. 12 — Bent 3 ~~Abutment~~ — Date Driven 8-27-81

Type of Pile 8" To 12" Native Timber

Hammer: McKiernan Terry DE 30 — WH or F = 15510 Ft.lbs.

Capacity formula: "R" = _____ — Required "R" = 30 000 Lbs.

Elev. of top of pile (cut-off elev.) _____

Elev. of nominal point of zero penetration _____

Elev. of pile point at final penetration _____

Length of pile in leads _____ Feet

(Explanatory Notes and Instructions on Reverse Side)

1985

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 1				Provided by
1 - 2				Ron Wise
2 - 3	—			
3 - 4	5			
4 - 5	5			
5 - 6	5			
6 - 7	4			
7 - 8	10			
8 - 9	30			
9 - 10				
10 - 11				
11 - 12				
12 - 13				
13 - 14				
14 - 15				

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PILE DRIVING LOG

Pile No. 13 — Log County

Bent 3 ~~Abut. Prior~~ — Br.No. 39 4.98

Date Driven 8-27-81 — Location So. Branch Miami River

Type of Pile 8" To 12" Native Timber

Hammer: McKiernan Terry DE30 — WH or F = 16,500 Ft.lbs.

Capacity formula: "R" = _____ — Required "R" = 30,000 Lbs.

Logged at Elev. of top of pile (cut-off elev.) _____

Elev. of nominal point of zero penetration _____

Elev. of pile point at final penetration _____

Length of pile in leads _____ Feet

(Explanatory Notes and Instructions on Reverse Side) 12 Inches

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 1				Recorded by
1 - 2				Tom Wise
2 - 3	—			
3 - 4	7			
4 - 5	10			
5 - 6	14			
6 - 7				
7 - 8				
8 - 9				
9 - 10				
10 - 11				
11 - 12				
12 - 13				
13 - 14				
14 - 15				

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PILE DRIVING LOG

Pile No. 14 — -08 County

Bent 1 ~~Abut. Pier~~ — Br.No. 39 4.98

Date Driven 8-28-81 — Location So. Branch Miami River

Type of Pile 8" to 12" Native Timber

Hammer: MC Kiernan Terry DE 20 — WH or F = 12,000 Ft.lbs.

Capacity formula: "R" = _____ — Required "R" = 30,000 Lbs.

Elev. of top of pile (cut-off elev.) _____

Elev. of nominal point of zero penetration _____

Elev. of pile point at final penetration _____

Length of pile in leads _____ Feet

(Explanatory Notes and Instructions on Reverse Side)

128.5

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 1	—			Records by
1 - 2	—			Ron Lewis
2 - 3	—			
3 - 4	—			
4 - 5	—			
5 - 6	6			
6 - 7	12			
7 - 8	14			
8 - 9	15			
9 - 10	15			
10 - 11	18			
11 - 12	21			
12 - 13				
13 - 14				
14 - 15				

BR-2-75

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Pile No. 15 — 109 County

Bent 1 ~~Abut. Pier~~ — Br.No. 39 4.98

Date Driven 8-25-81 — Location So. Branch Miami River

Type of Pile 8" To 12" Native Timber

Hammer: McKiernan Terry DE 20 — WH or F = 12 000 Ft.lbs.

Capacity formula: "R" = _____ — Required "R" = 30 000 Lbs.

Elev. of top of pile (cut-off elev.) _____

Elev. of nominal point of zero penetration _____

Elev. of pile point at final penetration _____

Length of pile in leads _____ Feet

(Explanatory Notes and Instructions on Reverse Side)

1 BF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 1	—			Recorded by
1 - 2	—			Ron Wise
2 - 3	—			
3 - 4	— 6			
4 - 5	— 18			
5 - 6	20			
6 - 7' 6"	10/6"			
7 - 8				
8 - 9				
9 - 10				
10 - 11				
11 - 12				
12 - 13				
13 - 14				
14 - 15				

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Pile No. 16 — Log County

BENT 1 ~~Abut. Pier~~ — Br.No. 39 4198

Date Driven 8-28-84 — Location SR Branch Miami River

Type of Pile 8" To 12" Native Timber

Hammer: McKiernan Terry DE30 — WH or F = 12 000 Ft.lbs.

Capacity formula: "R" = _____ — Required "R" = 30 000 Lbs.

Elev. of top of pile (cut-off elev.) _____

Elev. of nominal point of zero penetration _____

Elev. of pile point at final penetration _____

Length of pile in leads _____ Feet

(Explanatory Notes and Instructions on Reverse Side)

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 1	—			Recorded by
1 - 2	—			Ron Ware
2 - 3	— 5			
3 - 4	11			
4 - 5	14			
5 - 6	10			
6 - 7	8			
7 - 8	9			
8 - 9	18			
9 - 10	16			
10 - 11	20			
11 - 12	22			
12 - 13				
13 - 14				
14 - 15				

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Pile No. 17 — Log County

Bent 1 ~~Abutment~~ — Br.No. 39 4.98

Date Driven 8-28-81 — Location So. Branch Miami River

Type of Pile 8" To 12" Native Timber

Hammer: McKiernan Terry DE 30 — WH or F = 12 000 Ft.lbs.

Capacity formula: "R" = _____ — Required "R" = 30 000 Lbs.

Elev. of top of pile (cut-off elev.) _____

Elev. of nominal point of zero penetration _____

Elev. of pile point at final penetration _____

Length of pile in leads _____ Feet

(Explanatory Notes and Instructions on Reverse Side)

IRBF

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 1	—			Recorded by
1 - 2	—			Tim Lewis
2 - 3	10			
3 - 4	18			
4 - 5	20			
5 - 6				
6 - 7				
7 - 8				
8 - 9				
9 - 10				
10 - 11				
11 - 12				
12 - 13				
13 - 14				
14 - 15				

Pile No. 18

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Log County

Bent 1 Abutment

Br.No. 39 4.98

Date Driven

Location So. Branch Miami River

Type of Pile 8" To 12" Native Timber

Hammer: McKiernan Terry D-20 WH or F = 12 000 Ft.lbs.

Capacity formula: "R" = Required "R" = 30 000 Lbs.

Elev. of top of pile (cut-off elev.)

Elev. of nominal point of zero penetration

Elev. of pile point at final penetration

Length of pile in leads Feet

(Explanatory Notes and Instructions on Reverse Side)

1887

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 1				Recorded by
1 - 2				Ben Lewis
2 - 3				
3 - 4				
4 - 5				
5 - 6			This Piling to	be pulled to
6 - 7			good Stable	Rock
7 - 8				
8 - 9				
9 - 10				
10 - 11				
11 - 12				
12 - 13				
13 - 14				
14 - 15				
1				

Ohio Department of Transportation
Design and Construction
Bureau of Bridges

PILE DRIVING LOG

Pile No. 19

Log County

Rent 1 ~~Abut. Pier~~

Br.No. 39 4690

Date Driven 8-31-81

Location So. Branch Miami River

Type of Pile 8" To 12" Native Timber

Hammer: Mc Kiernan Terry DE20 WH or F = 12 000 Ft.lbs.

Capacity formula: "R" = _____ Required "R" = 30 000 Lbs.

Elev. of top of pile (cut-off elev.) _____

Elev. of nominal point of zero penetration _____

Elev. of pile point at final penetration _____

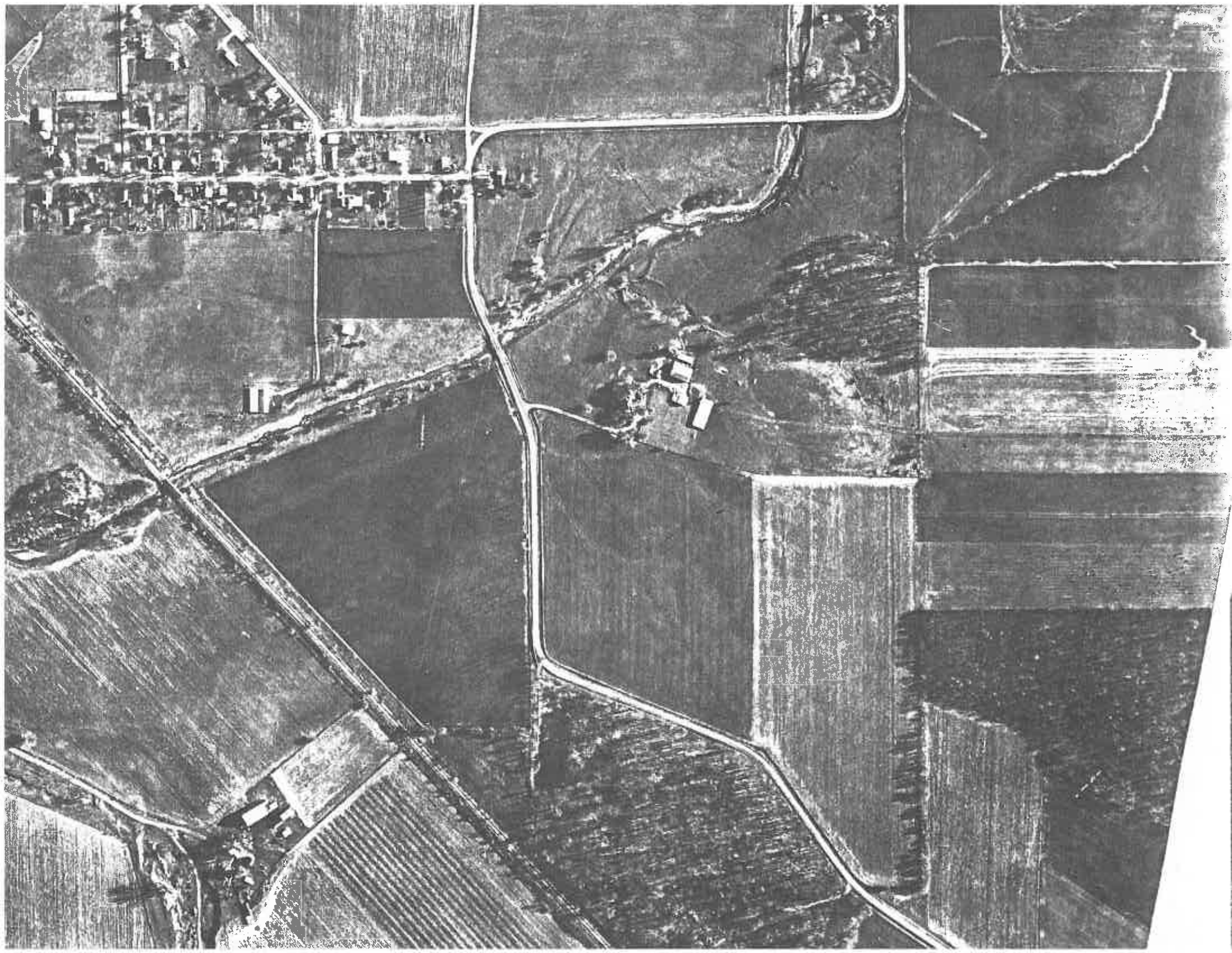
Length of pile in leads _____ Feet

(Explanatory Notes and Instructions on Reverse Side)

1985

Penetration (feet)	Blows	"S" (inches)	Indicated "R" (Pounds)	Remarks
0 - 1	—			Recorded by
1 - 2	9			Ron Wise
2 - 3	7			
3 - 4	9			
4 - 5	12			
5 - 6	27			
6 - 7	30			
7 - 8				
8 - 9				
9 - 10				
10 - 11				
11 - 12				
12 - 13				
13 - 14				
14 - 15				

BR-2-75



21-11-77

Rd. E 105 — F.C. 51 pg 46

79-60
91-55
88°-05'

91°55

Δ = 88°-05' (88.083°)

= 1,67

D = 50°

R = 114.592 — 5729.578 / 50 = 114.592

T = 110.842 — T = R tan ½ Δ

114.592 x tan 44.042° = 110.842

L = 176,167 88.082° / 360 x 2 (114.592) π =

= 44.820

~~221.6805~~

C = 159.321

.245 x 720.002 c.r.

L = .0174533 ΔR = 176.167

L / 2π 114.592 = 88.082 / 360

L / 720.002 = 360 = 176.167 L

C = 2R sin ½ Δ

2 x 114.592 x sin 88.082° / 2 = 159.321

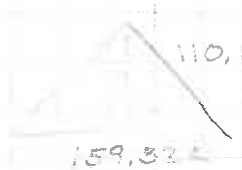
110.842

159.321

$M = E(1 - \cos \tfrac{1}{2}\Delta)$

$M = 32.219$

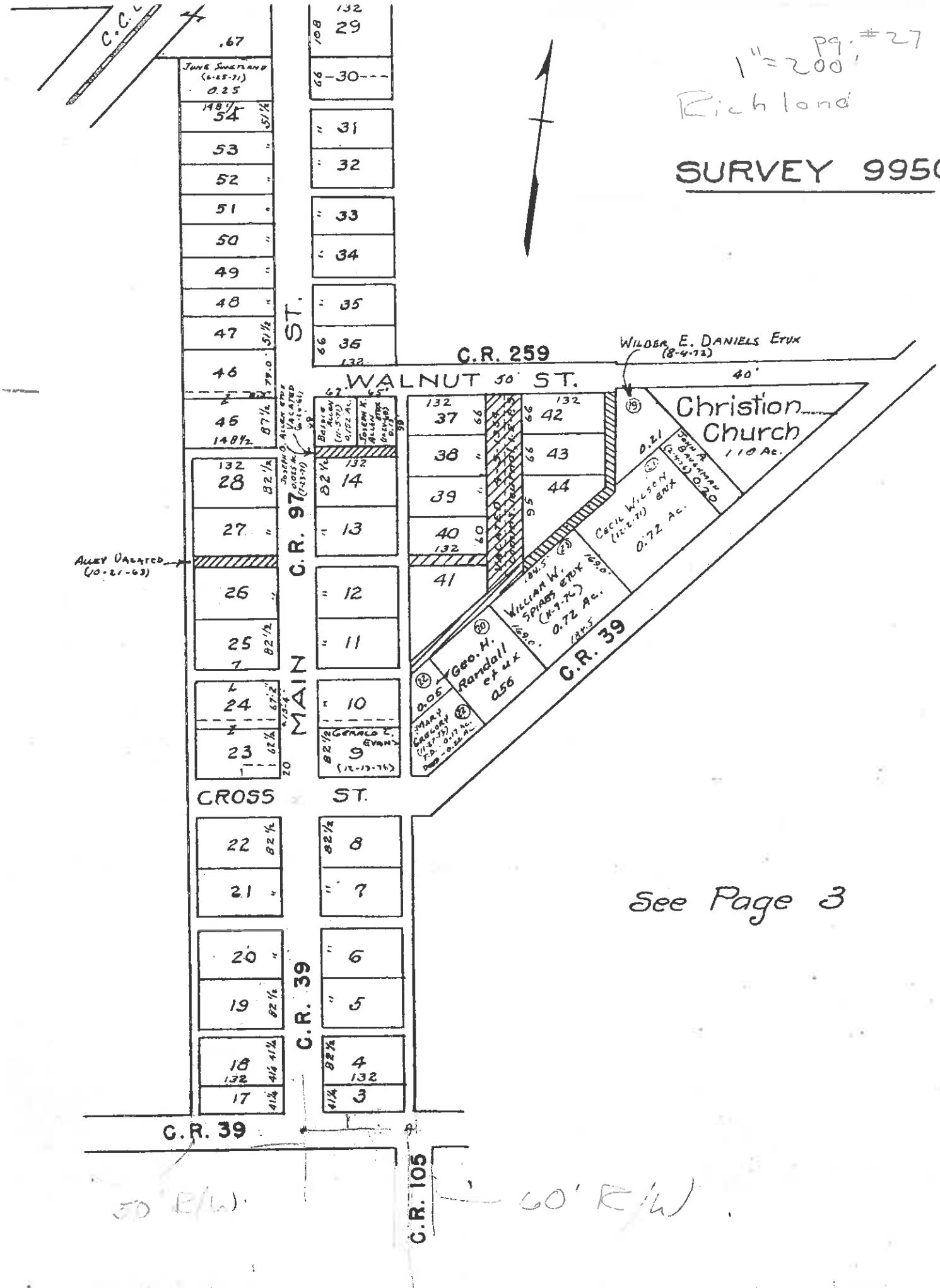
$14.69\left(1 - \cos \frac{38.083°}{2}\right) = 32.219$



$77.071 - 32.219 = 44.852 = E$

$E = T \tan \tfrac{1}{2}\Delta$

$110.852 \times \tan \frac{38.083}{2} = 44.850 = E$


1" = 200'
Pg. #27
Richland
SURVEY 9950
C.R. 259
WALNUT 50' ST.
WILDER E. DANIELS ETUX (8-4-72)
Christion Church 1.10 Ac.
C.R. 97
MAIN ST.
C.R. 39
CROSS ST.
C.R. 105
ALLEY VACATED (10-21-63)
JUNE SWEETLAND (6-25-71) 0.25
JOSEPH O. ALLEN ETUX (VACATED 6-1-41)
BAINES ALLEN (11-5-71) 0.152 Ac.
JOSEPH K. ALLEN ETUX (11-5-71) 0.152 Ac.
JOSEPH O. ALLEN ETUX (11-5-71) 0.152 Ac.
SETH A. BAUSHMAN (6-4-73) 0.20
CECIL WILSON (12-2-71) ETUX 0.72 Ac.
WILLIAM W. SPIARS ETUX (8-7-74) 0.72 Ac.
GEO. H. Randall et ux 456
0.05
MARY GREGORY (12-27-73) T.D. - 0.17 Ac. DEED - 0.24 Ac.
GERALD L. EVANS (12-13-74)
0.21
See Page 3
50' R/W
60' R/W

209131 k

Warranty Deed

Stanley R. Grigaliunas et ux

TO

Harry W. McCoy et ux
Route 1
Belle Center, Ohio 43310

Transferred _____ 19__

COUNTY AUDITOR

STATE OF OHIO
RECEIVED Aug 4 1972
9:31 A.M
RECORDED Aug 4 1972
VOL. 342 PAGE 164
RUTH RUSH
LOGAN COUNTY RECORDER
By 7-26-72

THOMPSON, DUNLAP & HEYDINGER
ATTORNEYS AT LAW
BELLEFONTAINE NATIONAL BANK BUILDING
BELLEFONTAINE, OHIO 43311

Form 621 — OHIO WARRANTY DEED

TUTHELANX REGISTERED U. S. PAT. OFFICE
TUTTLE LAW PRINT, PUBLISHERS, RUTLAND, VT. 05701

Know all Men by these Presents

That Stanley R. Grigaliunas and Janice A. Grigaliunas, his wife, GRANTORS
in consideration of ONE DOLLAR AND OTHER VALUABLE CONSIDERATIONS

to them *paid by* Harry W. McCoy and Margaret O. McCoy, his wife, GRANTEES

Whose address is:

the receipt whereof is hereby acknowledged, do *hereby* **Grant, Bargain, Sell and Convey** *to the said* grantees, Harry W. McCoy and Margaret O. McCoy, his wife, to them jointly, their heirs and assigns and to the survivor of them, his or her separate

heirs and assigns forever,

the following real estate situated in the County of Logan, State of Ohio, Township of Richland and being part of Virginia Military Survey No. 9950 and bounded and described as follows:

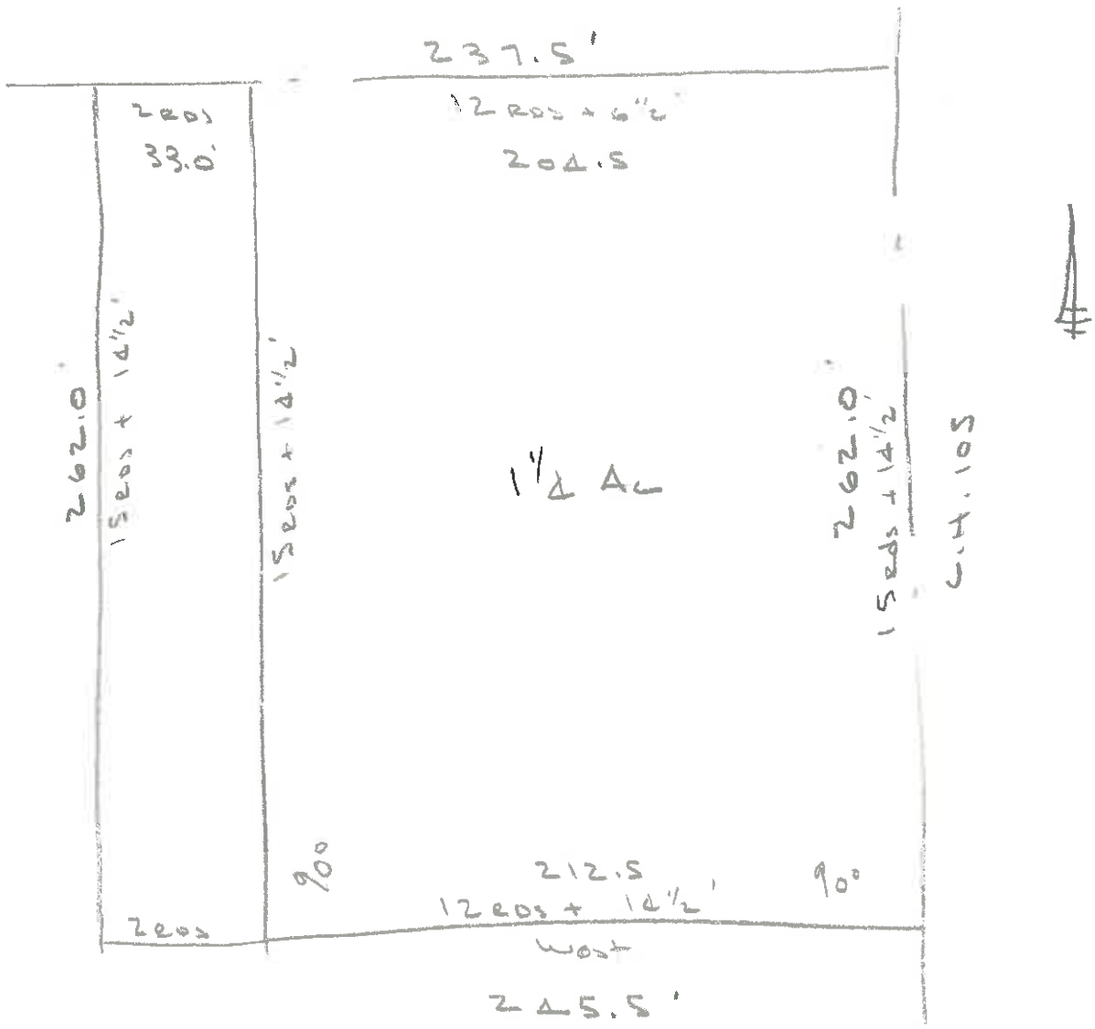
TRACT ONE:
Beginning at a stake in the center of a township road at the northeast corner of tract of land owned by said grantors, containing 86.61 acre; thence with the center of said township road, south 15 rods and 14-1/2 feet to the stake; thence at right angles to the center line of said road, west 12 rods and 14-1/2 feet to a stake; thence parallel with the center line of said township road, north 15 rods and 14-1/2 feet to a stake in the center of the Belle Center Pike; thence with the said pike, east 12 rods and 6-1/2 feet to the place of beginning, containing 1-1/4 acres of land, more or less.

TRACT TWO:
Being a strip of land 2 rods wide and 15 rods and 14-1/2 feet deep, joining the west side of the following described real estate: Beginning at a stake in the center of a township road at the northeast corner of a tract of land owned by the grantors containing 86.61 acres; thence with the center of said township road, south 15 rods and 14-1/2 feet to the stake; thence at right angles to the center line of said road, west 12 rods and 14-1/2 feet to a stake; thence parallel with the center line of said township road, north 15 rods and 14-1/2 feet to a stake in the center of the Belle Center Pike; thence with the said pike, east 12 rods and 6-1/2 feet to the place of beginning, containing 1-1/4 acres of land, more or less.
Said tract containing .20 of a acre, more or less.

Description checked
Logan Co. Engineer
By R.L.R. 8-4-72

Description checked
Logan Co. Engineer
By R.L.R. 8-4-72

VOL 342 PAGE 164


237.5'
12 Rods + 6½'
204.5
2 Rods
33.0'
262.0
15 Rods + 14½'
15 Rods + 14½'
1¼ Ac
262.0'
15 Rods + 14½'
C.H. 105
90°
212.5
12 Rods + 14½'
West
90°
2 Rods
245.5'

OHIO Department of TRANSPORTATION

James A. Rhodes/Governor
David L. Weir/Director
25 South Front Street
P. O. Box 899
Columbus, Ohio 43216

August 19, 1981

Chester R. Kurtz
Logan County Engineer
Tidewater Rd.
Bellefontaine, Ohio 43311

Attention: Rick Bruce

Re: Logan County
Project No. 405-81
Bridge No. CR39-4.98

Gentlemen:

Enclosed are three (3) prints of the Whitaker-Merrill Company's shop drawing No. 1 of 1 for approval.

Please review the above drawings returning two (2) prints to this office with your comments and or pproval.

Very truly yours,

R. B. Pfeifer, P.E.
Engineer of Bridges

J. D. Jones, P. E.
Structural Steel Engineer

RBP:JDJ:LMW:ow2

cc: File

August 28, 1981

O.D.O.T.
Robert B. Pfeifer, P.E.
Engineer of Bridges
25 South Front Street
P.O.Box 899
Columbus, Ohio 43216
Attention: J. D. Jones, P.E.

Re: Bridge No. LOG CR 39-4.98
Project No.405-81
Logan County

Gentlemen:

We are returning two prints of Whitaker-Merrill Company's shop drawing No.1 of 1 for the subject bridge.

Please note that the shop drawing is approved as submitted.

Very truly yours,

Chester R. Kurtz, P.E.,P.S.
Logan County Engineer
Rick Bruce
Rick Bruce, P.E.
Deputy County Engineer

RB/ed

BRIDGE NO. 39-4.98 SPAN (C TO C) 48.0
TWP. Richland ROADWAY 15'
TYPE Half-hip Pratt TYPE FLOOR 4" strip
DATE BUILT 1890 WEARING SURF. 2" bitumen

ANALYSIS OF BRIDGE FOR POSTING

CALCULATED BY SAS DATE 4-70
CHECKED J. Page 4-20-70

ROAD CR-39
STREAM Miami River

BEAM OR GIRDER (LONGITUDINAL) SPAN 12.0' SPACING 2.5' DEAD LOAD PER LIN. FT. OF BEAM 109#

SIZE OF BEAM	SECTION MODULUS	% AVAILABLE	SECTION MODULUS AVAILABLE	MOMENT RESIST. FOOT KIPS	D.L.M. 1000# P.L.F.	D.L.M. PER BEAM	MOMENT RESIST AVAILABLE FOR L.L.+IMP.	L.L.M. PER TRAFFIC LANE	EQUIV. NO. OF BEAMS	L.L.M. PER BEAM	IMPACT 30%	L.L.M. + IMPACT	% S-15-46 LOADING	% LEGAL LOAD 97%	% TOTAL & AXLE LOADS REDUCED	S- -46	
5I9.75	4.8	90	4.32	7.6	18.0	2.0	5.6	72.0	3.6	20.0	6.0	26.0	22	21	79		
				5.1			3.1					26.0				1.8	HS-18-44 Truck

FLOOR BEAMS CTR. TO CTR. SUPPORTS 17.0' DEAD LOAD PER LIN. FT. OF BEAM 565#

SIZE OR SECTION OF BEAM	SECTION MODULUS	% AVAILABLE	SECTION MODULUS AVAILABLE	MOMENT RESIST FOOT KIPS	D.L.M. 1000# P.L.F.	D.L.M. PER BEAM	MOMENT RESIST AVAILABLE FOR L.L.+IMP.	REACTION DUE TO TRAFFIC LANE LOAD	L.L.M. PER BEAM	IMPACT 30%	L.L.M. + IMPACT	% S-15-46 LOADING	% LEGAL LOAD 64%	% TOTAL & AXLE LOADS REDUCED	S- -46	
15I42	58.9	95	55.96	98.0	36.13	20.39	77.6	24.0	69.17	20.75	89.92	86.4	55.3	44.7		
				65.4			45.0				89.92				7.5	HS-7.5-44 Truck

TRUSSES SPAN (CTRS. END BEARINGS) 48.0' PANEL LENGTH 12.0' DEAD LOAD PER LIN. FT. (ONE TR) — D.L. PAN. 5760#

MEMBER	NET SECTION	% & SECTION AVAILABLE	UNIT STRESS USED	TOTAL STRESS AVAILABLE	MOMENT RESIST OR TOTAL STRESS	D.L. STRESS OR MOMENT	STRESS OR MOMENT FOR L.L.+IMP.	STRESS OR L.L.M. FOR ONE TRAFFIC LANE	% TO ONE TRUSS	STRESS OR L.L.M. TO ONE TRUSS	IMPACT	STRESS OR L.L.M. + IMPACT	% S-15-46 LOADING	% LEGAL LOAD 77%	% TOTAL & AXLE LOADS REDUCED	S- -46	
									70%		28.5%						
U_2U_3	7.78	95%	16.0	118.2		23.0	95.2	73.7				66.3	143	110	0		
L_0L_2	2.18	95	21	43.5		8.7	34.8	27.7		0.90		24.9	140	108	0		
L_2L_3	4.12	95	21	82.3		17.3	65.0	44.8				40.4	161	124	0		
U_1L_2	3.00	95	21	59.8		12.3	47.5	43.0				38.7	122.7	94.5	5.5		
U_2L_3	2.18	95	21	29.0 43.5		6.5	22.5 37.0	40.9			34.4	36.8	100.5	77.5	22.5	9.2	HS-9.8-44 truck
			other	members	not	critical					1.12						
									U_2L_3								

F = 34.4k

UNIT STRESSES (TENSION) FOR POSTING
STRUCTURES BUILT SINCE 1930 27000# P.S.I
STRUCTURES BUILT 1900 THRU 1930 24000# P.S.I
STRUCTURES BUILT BEFORE 1900 21000# P.S.I

TAN θ ____ SEC θ ____

STATE OF OHIO DEPT. OF HIGHWAYS
BUREAU OF BRIDGES

STEEL TRUSS BRIDGES

DATE 1962

OHIO-BR. 3CME 14800-8

TYPE OF BRIDGE: Pratt Truss | NO. OF SPANS: 1 | FABRICATOR | DATE BUILT: 1876 ?

APPROX. SAFE LOAD CAPACITY - OF TRUSS | OF FLOOR SYSTEM

CLEAR SPAN	LENGTH OUT TO OUT OF FLOOR	WIDTH BETWEEN CURBS OR FELLOE GUARDS	WIDTH OUT TO OUT OF TRUSSES	WIDTH OF SIDEWALKS	HEIGHT OF FLOOR ABOVE BRIDGE SEAT	CLEARANCE DIMENSIONS MAX. HEIGHT	CLEARANCE DIMENSIONS WIDTH	CLEARANCE DIMENSIONS MIN. HEIGHT	HEIGHT OF FLOOR ABOVE BOTTOM CHORD	EXPANSION PROVIS'NS ROLL- ERS	EXPANSION PROVIS'NS ROCK- ERS	EXPANSION PROVIS'NS SLID- ING
43'0"	49'0"	16'0"		None	1'0"				4"			

TYPE AND SIZE OF RAILING OR HUB GUARD: Lattice | TYPE AND SIZE OF CURB OR FELLOE GUARD: None

DESCRIPTION OF FLOOR DRAINAGE: OS

ALIGNMENT AND SKEW OF STRUCTURE: -0- | APPROACH SLABS: None | LENGTH

STREAM: Midmi River | HEIGHT FROM GRADE TO STREAM BED: 13' | HEIGHT FROM GRADE TO HIGH WATER

CHANNEL CHARACTERISTICS | APPROX. WIDTH BETWEEN BANKS: 60' | CHANNEL DEPTH: 7' | NATURE OF BOTTOM: Clay + Gravel

CONDITION OF BANKS: Sod | ALIGNMENT OF STREAM ABOVE AND BELOW STRUCTURE

SKEW OF NORMAL FLOW | SKEW OF FLOOD FLOW

SUPERSTRUCTURE

STD. DRAWING NO.

TYPE OF TRUSSES	LENGTH OF SPANS - C. TO C.	NO. PANELS	LENGTH OF PANELS
Pratt	48'0"	4	12'0"

FLOOR BEAMS AND CONNECTIONS

TYPE	NUMBER	SPACING	SECTION	HANGERS	SIZE-SHAPE-NET SECTION	RIVETED CONNECTIONS	NO. & SIZE RIVETS FLOOR BEAM TO CONN.	NO. & SIZE RIVETS CONN. TO TRUSS
INTERMEDIATE FLOOR BEAMS	3	12'0"	15" I @ 42#		U 1¼" □			
END FLOOR BEAMS								

FLOOR JOISTS

KIND	NO. LINES	SIZE	WIDTH OF FLANGE	THICKNESS OF WEB	SPACING
I BEAMS	6	5" I @ 9.75#			2'4"
CHANNELS	2	5" [@ 6.0#			
WOOD		SIZE, TREATMENT, SPECIES			

DO JOISTS REST ON TOP OF FLOOR BEAMS? YES | HOW FRAMED TO FLOOR BEAMS

ARE SHELF ANGLES USED? | END JOISTS - LENGTH | SUPPORTS: Rest on abutment

FLOOR

REINFORCED CONCRETE SLAB | INCHES THICK | CONCRETE | INCHES THICK ON CORRUGATED ARCHES OR BUCKLE PLATES

WEARING SURFACE TYPE: Bit | 4" THICKNESS | PLANK SIZE, TREATMENT, SPECIES

STRIP SIZE, TREATMENT, SPECIES: 2" X 4" Treated | HOW FASTENED TO JOISTS

SUB-STRUCTURE

STD. DRAWING NO.

ABUTMENTS AND PIERS	MATERIAL	TYPE	HEIGHT FOOTER TO BRIDGE SEAT	WIDTH OF BRIDGE SEAT	LENGTH OF BRIDGE SEAT	FOUNDATIONS (PILING)	WINGS (LENGTHS, ANGLES ETC.)
REAR	Stone	Gravity		2'	18'6"		
FORWARD	Stone+Concrete	"		2'	18'6"		
PIER							
PIER							
		39-4.98					
		12-39-4.95					

BRIDGE NO.	COUNTY	ROUTE NO.	S.H. NO.	SECTION	STRENGTH H10-	H12	H15	H20	ROADWAY 15-18	19-22	23+	CLEARANCE 12-	13-14	14+	OPEN	TYPE A	B	G	S	T
39-4.98	Logan	CR-39	Richland																	

STEEL TRUSS BRIDGES

DATE

800-A

TYPE OF BRIDGE: PRATT TRUSS | NO. OF SPANS: 1 | FABRICATOR | DATE BUILT: 1876

APPROX. SAFE LOAD CAPACITY - OF TRUSS | OF FLOOR SYSTEM

CLEAR SPAN	LENGTH OUT TO OUT OF FLOOR	WIDTH BETWEEN CURBS OR FELLOE GUARDS	WIDTH OUT TO OUT OF TRUSSES	WIDTH OF SIDEWALKS	HEIGHT OF FLOOR ABOVE BRIDGE SEAT	CLEARANCE DIMENSIONS MAX. HEIGHT / WIDTH / MIN. HEIGHT	HEIGHT OF FLOOR ABOVE BOTTOM CHORD	EXPANSION PROVISIONS ROLLERS / ROCKERS / SLIDING
43'-0"	49'-0"	16'-0"	18'-0"	NONE	1'-0"		4"	

TYPE AND SIZE OF RAILING OR HUB GUARD: LATTICE

TYPE AND SIZE OF CURB OR FELLOE GUARD: NONE

DESCRIPTION OF FLOOR DRAINAGE: OS

ALIGNMENT AND SKEW OF STRUCTURE: -0-

APPROACH SLABS: NONE | LENGTH

STREAM: MIAMI RIVER | HEIGHT FROM GRADE TO STREAM BED: 13' | HEIGHT FROM GRADE TO HIGH WATER

CHANNEL CHARACTERISTICS | APPROX. WIDTH BETWEEN BANKS: 60' | CHANNEL DEPTH: 7' | NATURE OF BOTTOM: CLAY & GRAVEL

CONDITION OF BANKS: SOD | ALIGNMENT OF STREAM ABOVE AND BELOW STRUCTURE

SKEW OF NORMAL FLOW | SKEW OF FLOOD FLOW

SUPERSTRUCTURE

STD. DRAWING NO.

TYPE OF TRUSSES	LENGTH OF SPANS - C. TO C.	NO. PANELS	LENGTH OF PANELS
PRATT	48'-0"	4	12'-0"

FLOOR BEAMS AND CONNECTIONS

	NUMBER	SPACING	SECTION	HANGERS	SIZE-SHAPE-NET SECTION	RIVETED CONNECTIONS	NO. & SIZE RIVETS FLOOR BEAM TO CONN.	NO. & SIZE RIVETS CONN. TO TRUSS
INTERMEDIATE FLOOR BEAMS	3	12'-0"	15 I 42		1¼" ■ ∩			
END FLOOR BEAMS								

FLOOR JOISTS

KIND	NO. LINES	SIZE	WIDTH OF FLANGE	THICKNESS OF WEB	SPACING
I BEAMS	6	5 I 9.75	3"		2'-4"
CHANNELS	2	5 C 6.50	1 3/4"		
WOOD		SIZE, TREATMENT, SPECIES			

DO JOISTS REST ON TOP OF FLOOR BEAMS? YES | HOW FRAMED TO FLOOR BEAMS

ARE SHELF ANGLES USED? | END JOISTS - LENGTH | SUPPORTS: REST ON ABUTMENT

FLOOR

REINFORCED CONCRETE SLAB | INCHES THICK: CONCRETE | INCHES THICK ON CORRUGATED ARCHES OR BUCKLE PLATES

WEARING SURFACE: TYPE SURFACE TREATED | THICKNESS | PLANK | SIZE, TREATMENT, SPECIES

STRIP | SIZE, TREATMENTS, SPECIES: 2"x4" TREATED | HOW FASTENED TO JOISTS

SUB-STRUCTURE

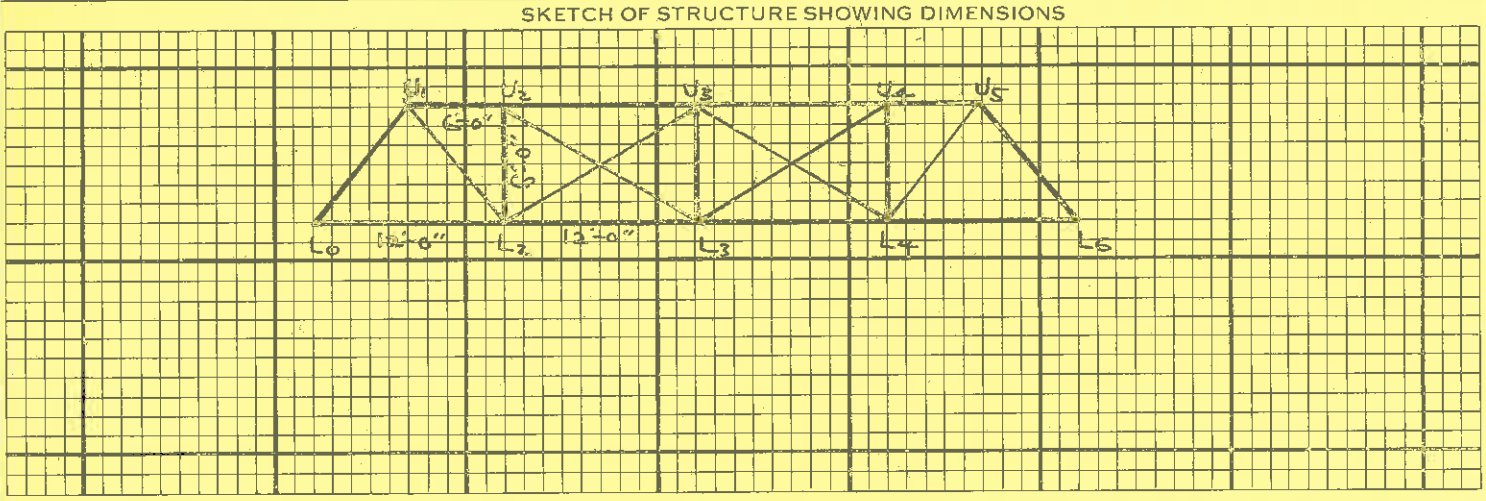
STD. DRAWING NO.

ABUTMENTS AND PIERS	MATERIAL	TYPE	HEIGHT FOOTER TO BRIDGE SEAT	WIDTH OF BRIDGE SEAT	LENGTH OF BRIDGE SEAT	FOUNDATIONS (PILING)	WINGS (LENGTHS, ANGLES ETC.)
REAR	STONE	GRAVITY		2'	18'-6"		
FORWARD	STONE & CONCRETE	"		"	"		
PIER							
PIER							

BRIDGE NO.	TOWNSHIP	ROAD NO.	SYSTEM	SECTION	STRENGTH (H10 / H12 / H15 / H20)	ROADWAY (15-18 / 19-22 / 23+)	CLEARANCE (12— / 12-14 / 14+ / OPEN)	TYPE (A / B / G / S / T)
39-498	RICHLAND	CR-39						

39-4.98	LOGAN	CR-39	RICHLAND		H10 H12 H15 H20	15-18 19-22 23 +	12- 12-14 14 + OPEN	A S G S T
BRIDGE NO.	COUNTY	ROUTE NO.	S.H. NO.	SECTION	STRENGTH	ROADWAY	CLEARANCE	TYPE

SKETCH OF STRUCTURE SHOWING DIMENSIONS



SECTION OF TRUSS MEMBERS

END POSTS 2 - 6" @ 8# [and 1 - 12" X 1/4" PLATE

TOP CHORDS SAME AS END POSTS

BOTTOM CHORDS L_0L_2, L_4L_6, - 2 - 13/4" X 5/8" LS , L_2L_4 - 2 - 2 3/4" X 3/4" LS

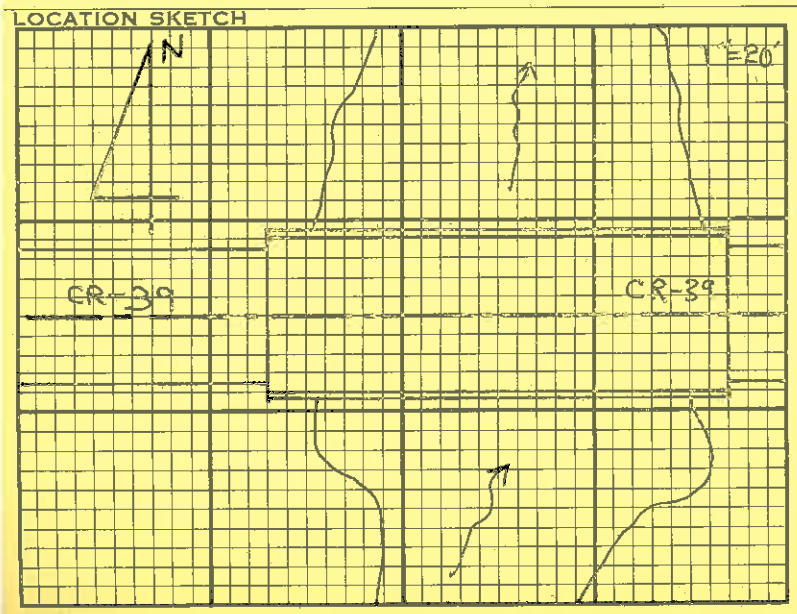
INTERMEDIATE POSTS 2 - 5" X 13/4" [8" B TO B

DIAGONALS U_1L_2, L_4U_5 - 2 - 2" X 3/4" LS , U_2L_3, L_3U_4, 2 - 5/8" X 13/4" LS, L_2U_3, U_3L_4 - 2 - 3/4" Ø

HIP VERTICALS

PINS

LOCATION SKETCH



REMARKS:-

PAINTED 1964, 1968
REPAIRED RIP RAP WALL L-6T
POST REDUCTION 80%

Aug. 1974 Rebuilt southeast shoe and bearing. Repaired top chord splice, both tweeners. Tightened nuts on all hangers. Welded all three floor beams to verticals. (Dick LAW)

HIGH WATER - 2-23-75 1:30
6.0' TO TOP OF WOOD DECK

C.R. 39 T.B.M. Established

4/29/80

Dill III

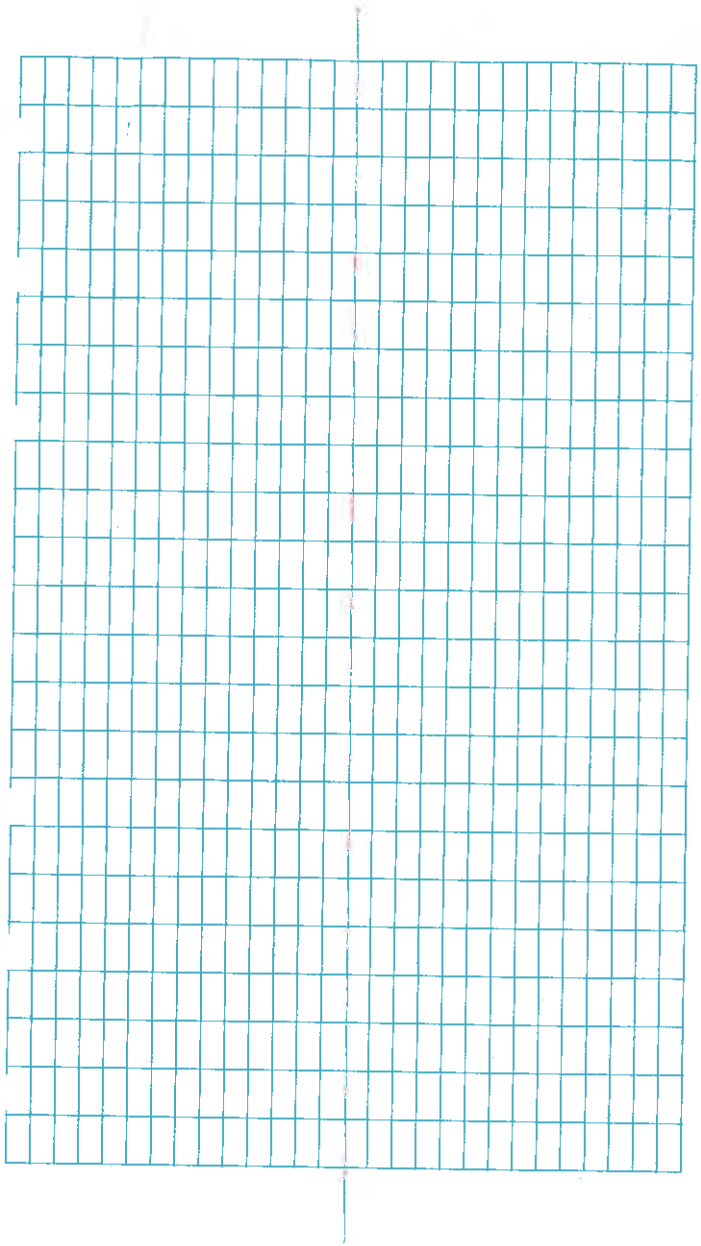
Pruett K

B.M. Top of R/W Mon.
Rt. of Sta. 179+10
T.B.M. - R.R. Spike in
8" on North side of C.R. 105

B.M. Top of R/W Mon., Rt.
of Sta. 179+10

T.B.M. - R.R. spike in
25" dia. Walnut on South
side C.R. 39

Sta	B.S.(+)	H.I.	F.S.(-)	Elev.	
T.P.				1046.62	
	3.77	1050.39			
B.M.			5.16	1045.23	V



Std.	B.S.(+)	H.I.	F.S.(-)	Elev.
B.M.	11.19	1056.41		1045.22
T.B.M.			1.92	1054.49
B.M.			11.19	1045.22 ✓
B.M.	6.07	1051.29		1045.22
T.P.			0.54	1050.75
	11.22	1061.97		
T.P.			0.39	1061.58
	6.56	1068.14		
T.B.M.			0.95	1067.19
T.P.			6.23	1061.91
	0.60	1062.51		
T.P.			9.40	1053.11
	0.60	1053.71		
T.P.			7.09	1046.62

C.R. 39 T.B.M. Established

[illegible]

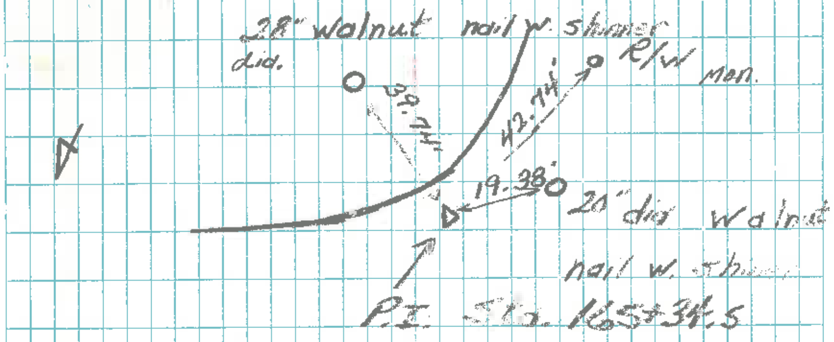
[illegible]

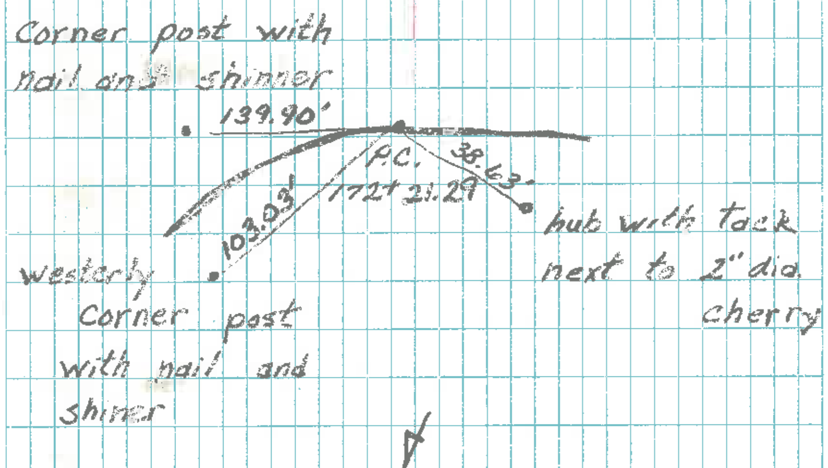
[illegible]

B.M. Top of R/W Mkr.
Rt. of Sta. 177+10

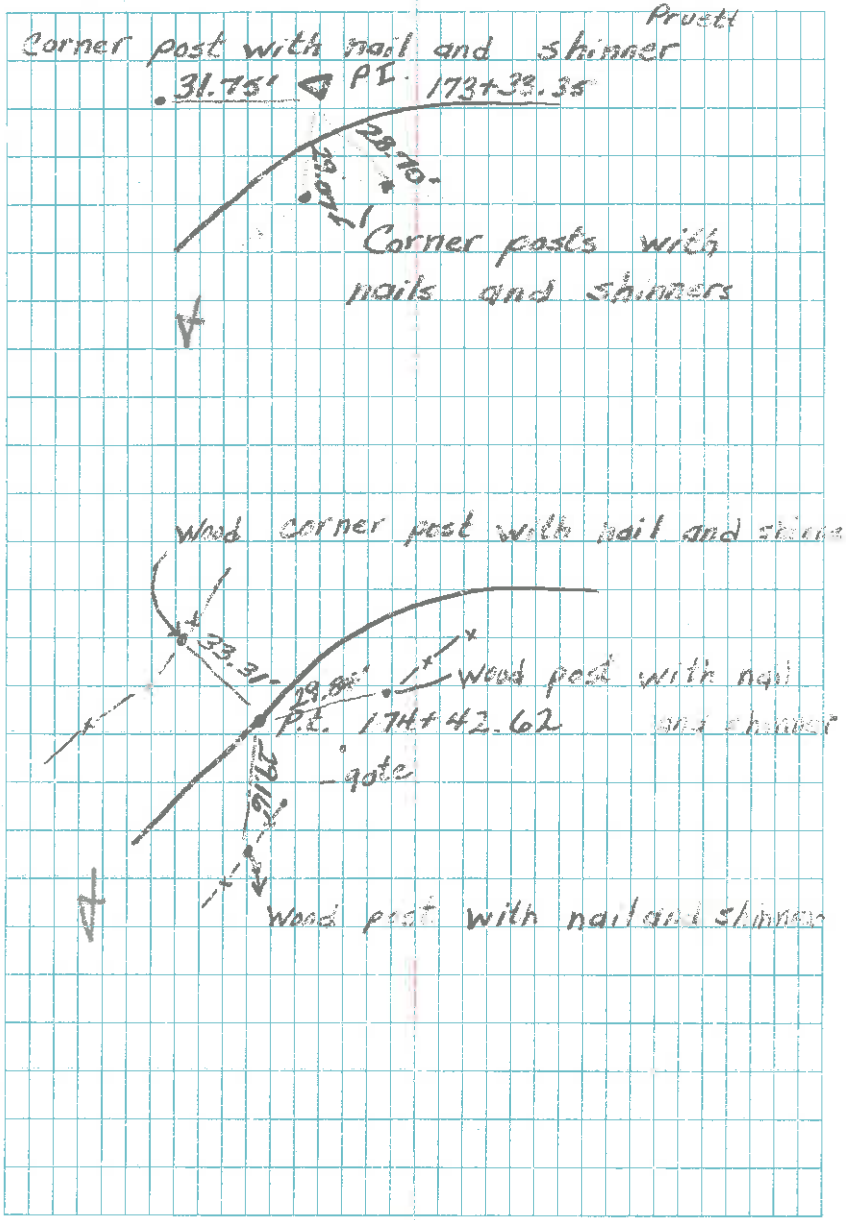
overcast [illegible]
Pic 56°
Pruett

C.R. #39 Point References

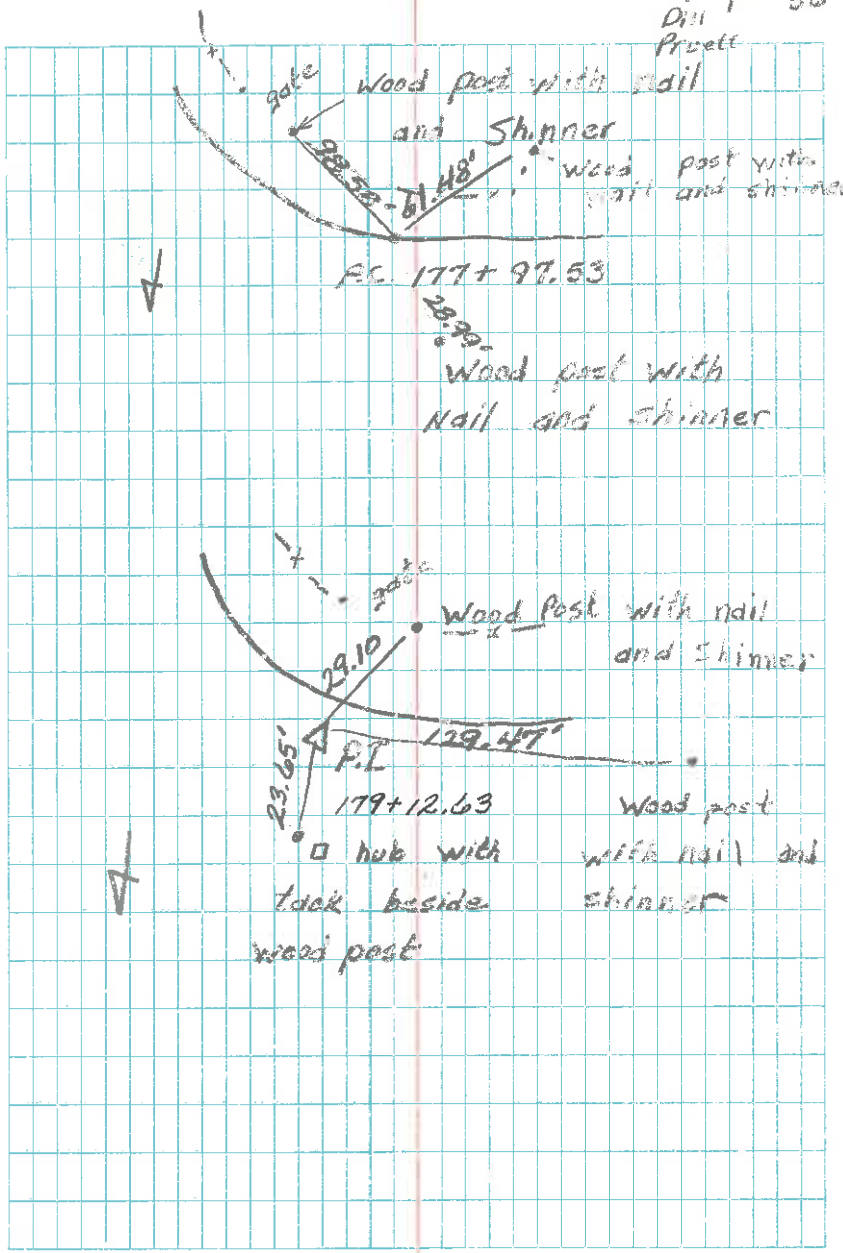




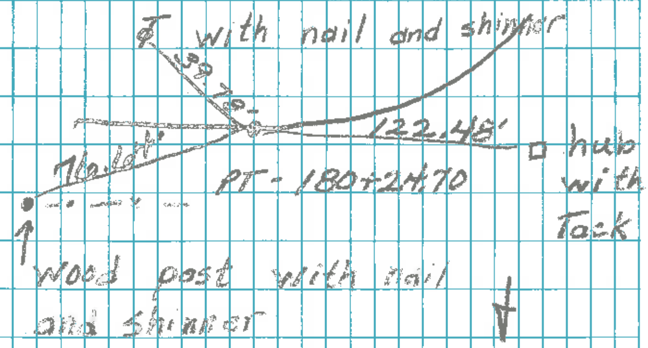
Overcast 4/25/80 56°
Dill
Pruett



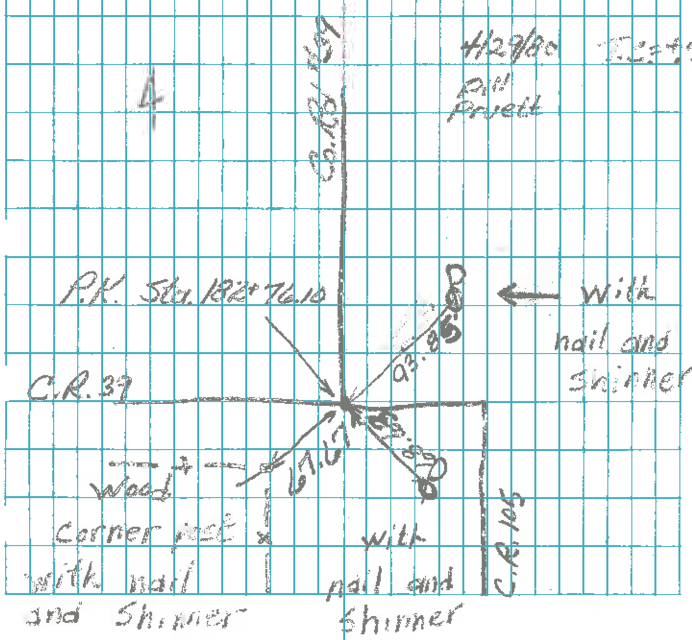
Overcast 4/25/80 56°
Dill
Privett

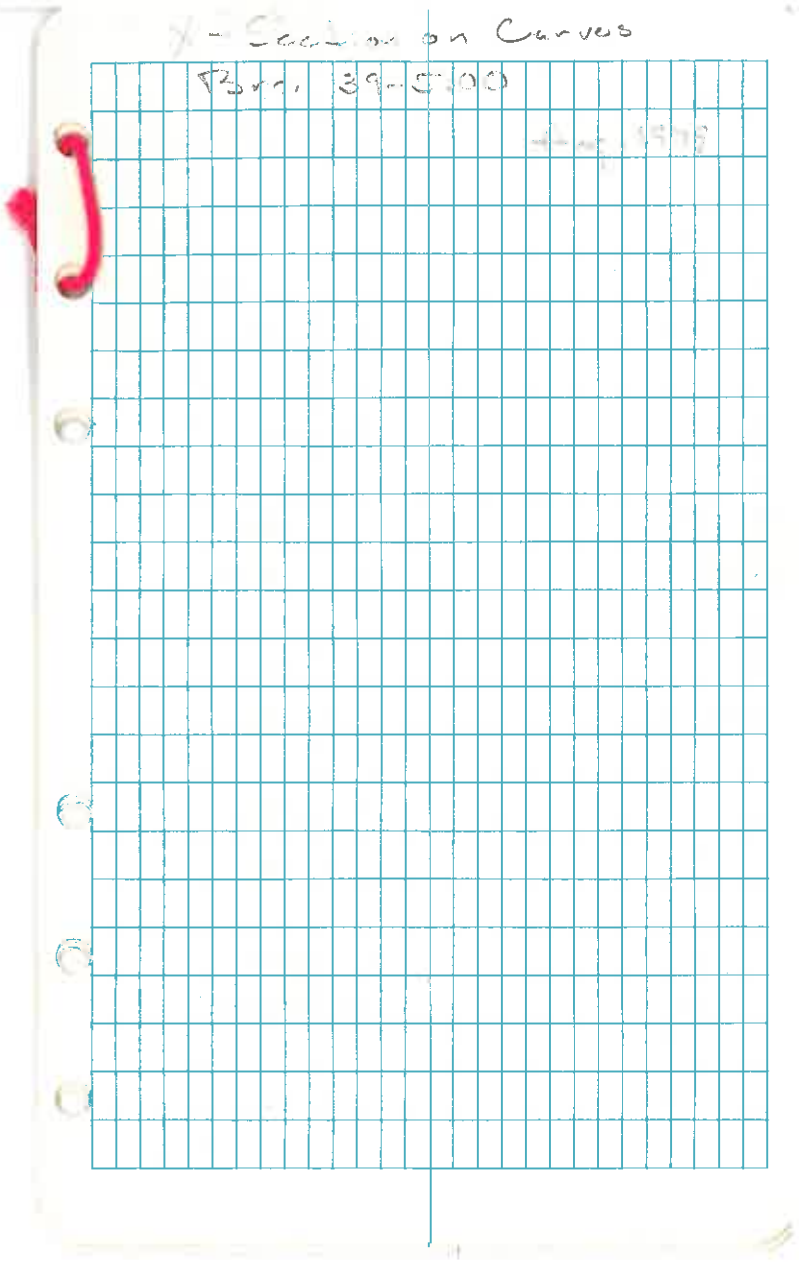


overcast 4/25/80
Bill 56
Pruett

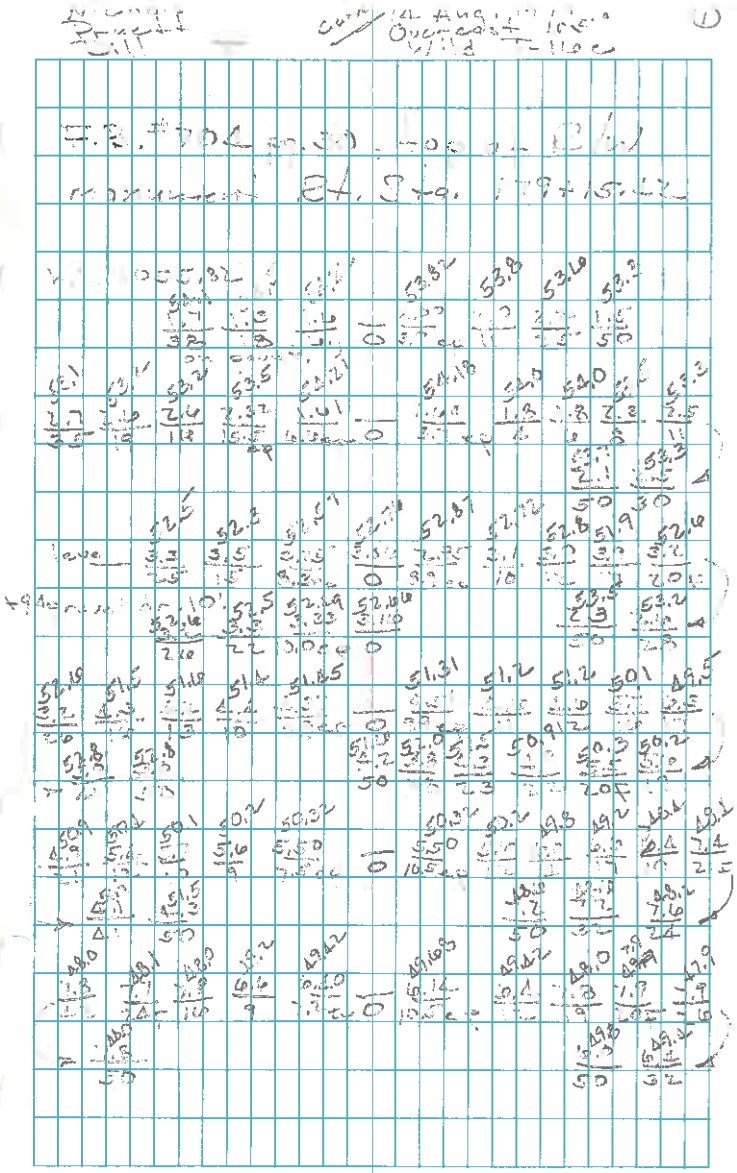


4/29/80
Bill
Pruett

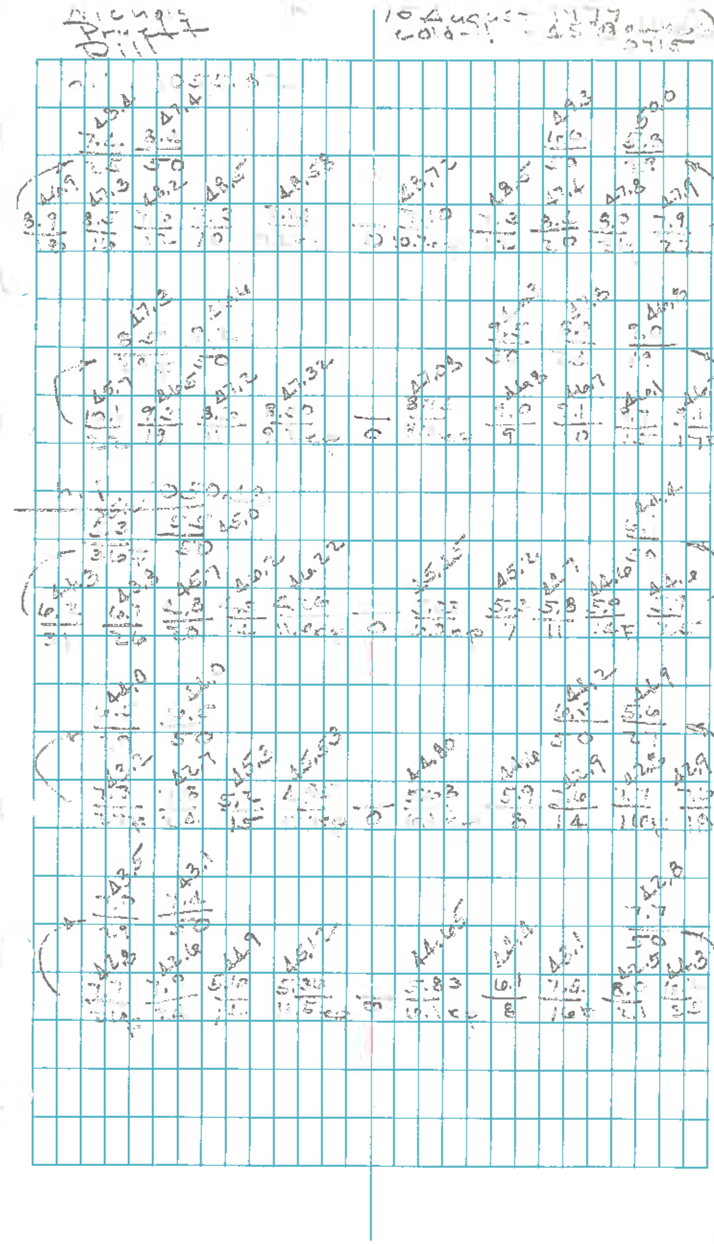



Part. 39-500

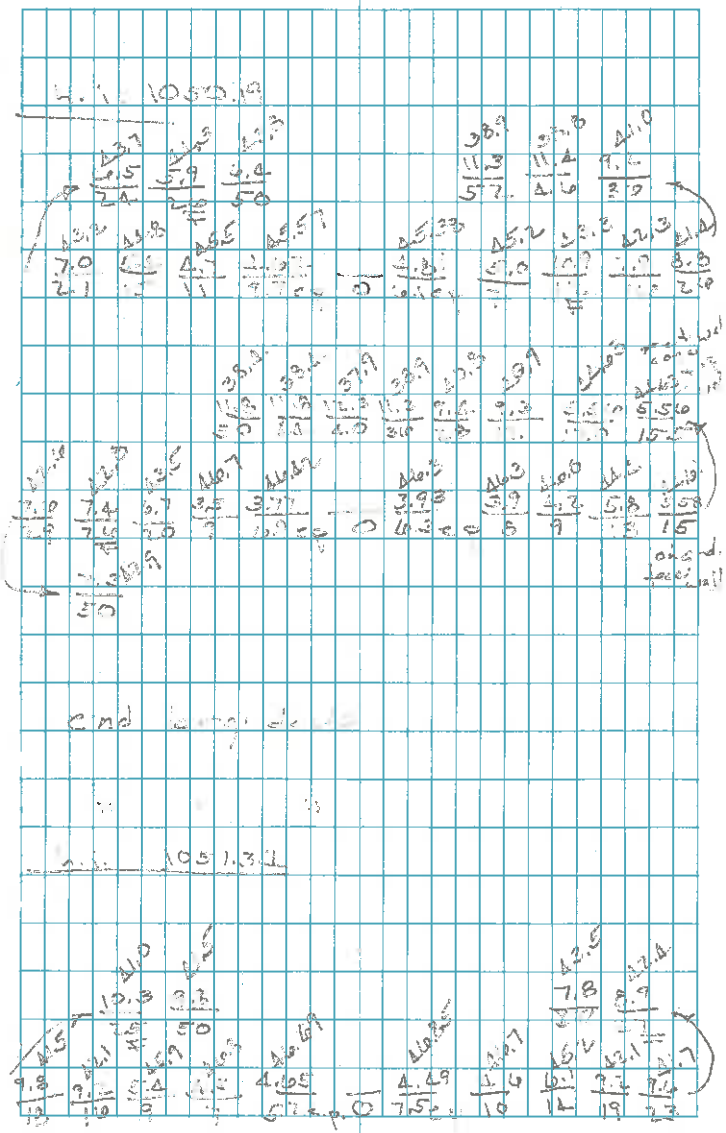
Brg 39				
B.S.	+		−	Elev.
B.M.				1016.22
Back (182+70.10)			3.3	1053.99
+75			1.80	1053.98
182+50			1.50	1054.28
182+25			2.75	1053.03
182+00			3.00	1052.78
181+75			3.55	1052.23
181+50			4.24	1051.54
181+25			4.[illegible]	1051.03
181+00			5.20	1050.58
180+75			5.71	1050.11
180+50			6.12	1049.70
180+25			6.53	1049.29



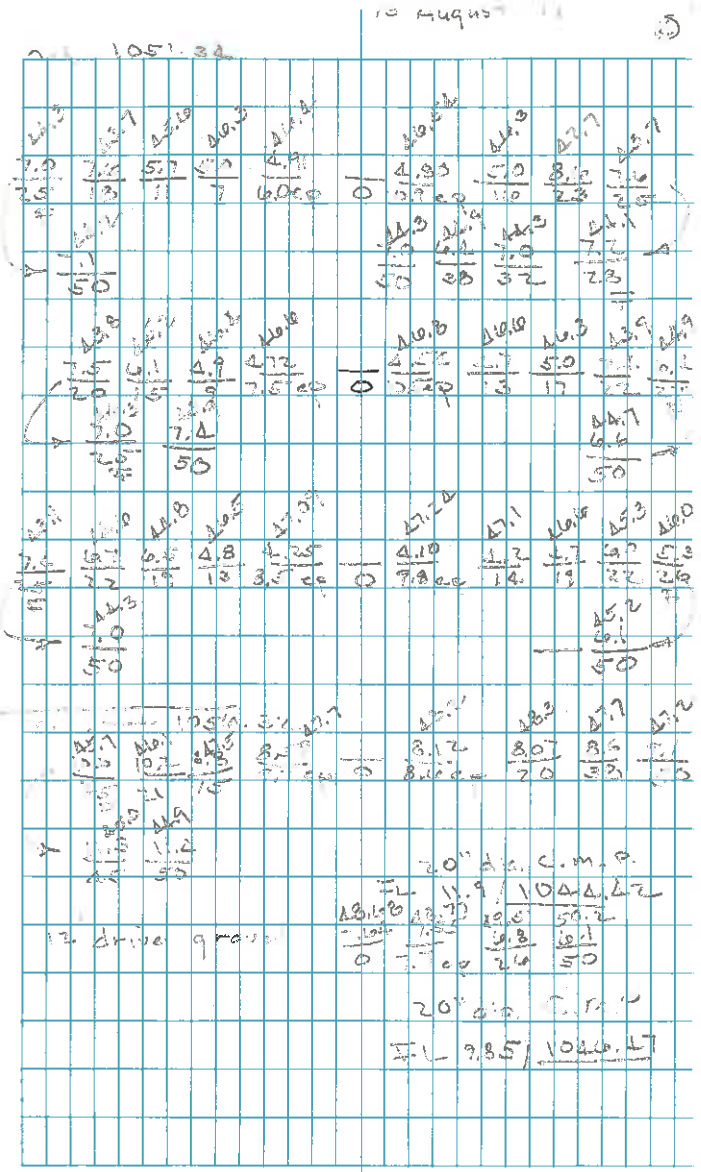
		1055.86		
Sta.	+	H.I.	−	Elev.
P.T. 180+24.70			6.53	1049.29
180+00			7.08	1048.74
179+75			7.76	1048.06
179+50			8.50	1047.32
179+25			9.31	1046.51
T.P.	5.26	1050.13	10.60	1045.2[illegible]
179+00			4.[illegible]	1045.8[illegible]
178+75			5.01	1045.47
178+50			5.2[illegible]	1045.2[illegible]
178+25			5.49	1044.7[illegible]
178+00			5.53	[illegible]
P.C. 177+97.52			5.53	[illegible].95



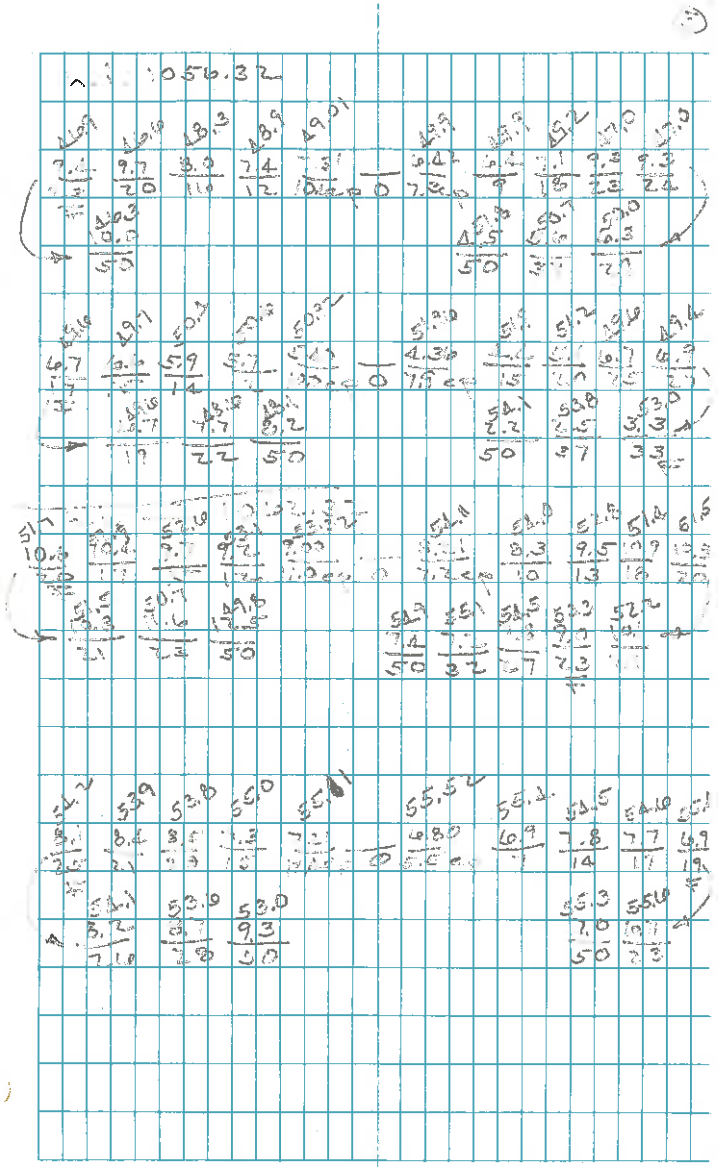
Sta.	—	—	—	Elev.
177+93.53	5.24	1050.19		1044.95
177+75			5.10	1045.09
177+50			4.61	1045.58
177+25			4.02	1046.17
177+15			3.85	1046.34
177+00			3.71	1046.48
176+98			3.67	1046.52
+50±			3.43	1046.76
176+00	4.76	1051.34	3.61	1047.58
+25±			4.61	1046.73
175+30			4.60	1046.74



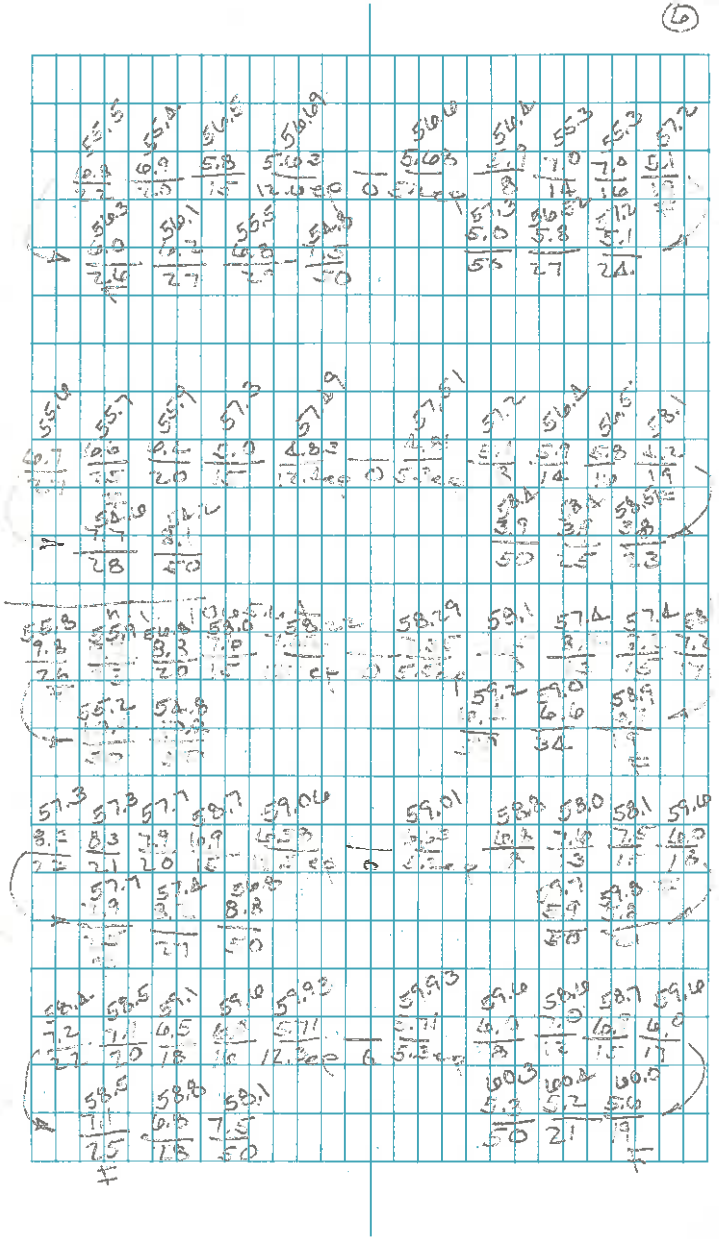
		1051.32		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
176+00			4.76	[illegible]
175+75			4.76	[illegible]
175+50			4.59	[illegible]
175+25			4.27	[illegible]
175+00	8.32	1050.32	3.92	1047.72
+75			3.95	1047.72
[illegible]			8.[illegible]	1048.15
[illegible]			7.91	1048.32
174+25			[illegible]	1049.03
174+00			[illegible]	1049.83



		1056.32		
Sta.	+	H.I.	−	Elev.
172+00			6.60	1049.72
173+75			5.58	1050.74
173+50			4.38	1051.94
173+25			3.23	1053.09
173+00	3.39	1056.32	2.39	1053.93
172+75			1.61	1054.71
172+50			0.36	1055.96
172+25			0.16	1056.16
172+21.29			0.06	1056.26



Sta.	+	−	Elev
		1062.52	
172+00		5.10	1057.42
171+75		5.12	1057.20
171+50		4.68	1057.64
171+25		2.25	1058.07
171+00	7.24	3.72	1059.24
170+75		6.93	1058.71
170+50		6.44	1059.20
170+25		6.00	1059.64
170+00		5.53	1060.11



X-section [illegible] 3[illegible] - 5.0[illegible]

Sta.	+	H.I.	—	Elev.	
171+00	[illegible]	1060.11	7.24	1058.40	
	2.45	1050.78	11.78	1048.33	
✓ on mon. B.M.			5.57	1045.21	-.01

1045.22

	Brg	39 –	5.00	
Sta.	+	H.I.	–	Elev.
174+00	4.59	1054.31		1049.72
174+40.7			5.94	1043.57
174+00			4.59	1049.72

Nichols Pruett

11 Sept. 1917