

BSDMS Summary Report

28 Homochitto River at U.S. 84 at Eddiceton, MS

Site Location:

Site ID: 28

Site Name: Homochitto River at U.S. 84 at Eddiceton, MS

County: Franklin

Nearest City: Eddiceton

State: MS

Latitude: 313010

Longitude: 904635

USGS Station ID: 7291000

Route Number: 84

Route Class: US

Service Level: Mainline

Route Direction: NA

Highway Mile Point:

Stream Name: Homochitto River

River Mile:

Contact:
U.S. Geological Survey, WRD, MS.
District
100 W. Capitol Street, Suite 710
Jackson, MS. 39269
(601) 965-4600

Publication:
Hopkins, G.R., Vance, R.W., and
Kasraie, B., 1975, Scour around
bridge piers, Federal Highway
Administration Report No. FHWA-RD-
75-56,205 p.----, 1980, Scour
around bridge piers, Federal
Highway Administration Report No.
FHWA-RD-79-103, 141 p.

Site Description:

This is a 560-ft-long bridge crossing the Homochitto River about 0.8 mi east of Eddiceton. This bridge has six 8-ft-diameter interior pier bents supporting seven 80-ft-long spans. Three of the piers (Nos.3-5) are within the low-water channel. The bridge deck is flat. A 150-ft-long spur dike is located at the right (west) abutment. The bridge is skewed about 10 degrees from normal to the channel and about 20 degrees from normal to the flood plain.

Scour data were collected during high flows using a fathometer and during low flows by standard surveys. The bridge piers are inset about 12 ft from the upstream side of the bridge. During high-flow measurements, rubber balls (flotation devices) were used to float the transducer downstream to the upstream side of the pier. Channel sections were sounded on the upstream and downstream sides of the bridge and, in some cases, additional soundings were made close to the upstream side of the inset piers. Because a complete cross section could not usually be obtained along the face of the inset piers, the scour-hole top width and side slope are not defined in most cases.

The flow velocities approaching the bridge piers were determined from velocity soundings during discharge measurements obtained at the upstream side of the bridge.

On November 18, 1991, bed samples were collected from the main channel at selected intervals along three channel cross sections. Individual samples with similiar characteristics were combined for gradation analyses. The following is a brief description of the bed samples:

BSDMS Summary Report

28 Homochitto River at U.S. 84 at Eddiceton, MS

Cross Section	Distance Upstream	Sample	Comments
1	0 ft	1	Mostly gravel, some sand.
1	300 ft	2	Mostly gravel.
2	550 ft	3	Mostly sand.

From available bed samples, the bed material seems to be gap-graded, indicating a mixture of uniform sand and uniform gravel. Bed sample no.1 was considered most representative of the bed material at the base of pier Nos. 4-6.

On September 18, 1990, gravel bars and 2- to 3-ft-high dunes were visible downstream of the bridge on the right (west) part of the low-water channel. From observations of water surface during flood-discharge measurements, waves were visible. Therefore, a dune bed form seems likely at this site during high flows.

Elevation Reference

Datum: MSL

MSL (ft):

Description of Reference Elevation:

Chiseled square on top of downstream handrail near center of channel set on February 15, 1990. (Elev. 246.66 ft)
BM84V-5(1975)-- Bronze disk set in the the north end of the left (east) abutment of the main-channel bridge, about 4 ft lower than the highway. (Elev. 240.442 ft)

Stream Data

Drainage Area (sq mi):	181	Floodplain Width:	Wide
Slope in Vicinity(ft/ft):	0.000928	Natural Levees:	Little
Flow Impact:	Straight	Apparent Incision:	None
Channel Evolution	Restabilization	Channel Boundary:	Alluvial
Armoring:	Partial	Banks Tree Cover:	High
Debris Frequency:	Occasional	Sinuosity:	Straight
Debris Effect:	Local	Braiding:	Locally
Stream Size:	Medium	Anabranching:	None
Flow Habit:	Perennial	Bars:	Narrow
Bed Material:	Gravel	Stream Width Variability:	Equiwidth
Valley Setting:	Moderate		

BSDMS Summary Report

28 Homochitto River at U.S. 84 at Eddiceton, MS

Roughness Data

Manning's n Values

Left Overbank Channel Right Overbank

High:

Typical 0.21 0.037 0.21

Low:

Bed Material

Measurement Number	Yr	Mo	Dy	Sampler	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)	SP	Shape	Cohesion
1	1991	11	18	SHOVEL	27	23	7.51	0.49	2.65		Non-Cohesive
2	1991	11	18	SHOVEL	27	23	7.36	0.45	2.65		Non-Cohesive
3	1991	11	18	SHOVEL	25	19	2.29	0.38	2.65		Non-Cohesive

Bed Material Comments

Measurement No: 1

On November 18, 1991, bed samples were collected from the main channel at selected intervals along three channel cross sections. Individual samples with similar characteristics were combined for gradation analyses. The following is a brief description of the bed samples:

Cross Section	Distance Upstream	Sample	Comments
1	0 ft	1	Mostly gravel, some sand.
2	300 ft	2	Mostly gravel.
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From available bed samples, the bed material seems to be gap-graded, indicating a mixture of uniform sand and uniform gravel. Bed sample no.1 was considered most representative of the bed material at the base of pier Nos. 4-6.

BSDMS Summary Report

28 Homochitto River at U.S. 84 at Eddiceton, MS

Measurement No: 2

On November 18, 1991, bed samples were collected from the main channel at selected intervals along three channel cross sections. Individual samples with similar characteristics were combined for gradation analyses. The following is a brief description of the bed samples:

Section	Upstream	Sample	Comments
1	0 ft	1	Mostly gravel, some sand.
2	300 ft	2	Mostly gravel.
3	550 ft	3	Mostly sand.

From available bed samples, the bed material seems to be gap-graded, indicating a mixture of uniform sand and uniform gravel. Bed sample no.1 was considered most representative of the bed material at the base of pier Nos. 4-6.

Measurement No: 3

On November 18, 1991, bed samples were collected from the main channel at selected intervals along three channel cross sections. Individual samples with similar characteristics were combined for gradation analyses. The following is a brief description of the bed samples:

Section	Upstream	Sample	Comments
1	0 ft	1	Mostly gravel, some sand.
2	300 ft	2	Mostly gravel.
3	550 ft	3	Mostly sand.

From available bed samples, the bed material seems to be gap-graded, indicating a mixture of uniform sand and uniform gravel. Bed sample no.1 was considered most representative of the bed material at the base of pier Nos. 4-6.

Bridge Data

Structure No: 43.8

Length(ft): 560

Width(ft): 32

Number of Spans: 7

Vertical Configuration: Horizontal

Low Chord Elev (ft): 240.5

Upper Chord Elev (ft): 240.5

Overtopping Elev (ft): 244.5

Skew (degrees): 0

Guide Banks: Elliptical

Waterway Classification: Main

Year Built: 1959

Avg Daily Traffic: 2790

BSDMS Summary Report

28 Homochitto River at U.S. 84 at Eddiceton, MS

Plans on File: Yes

Parallel Bridges No

Upstream/Downstream: N/A

Continuous Abutment: No

Distance Between Centerlines:

Distance Between Pier Faces:

Bridge Description:

Abutment Data

Left Station: 26363

Right Station: 25803

Left Skew (deg): 0

Right Skew (deg) 0

Left Abutment Length (ft):

Right Abutment Length (ft)

Left Abutment to Channel Bank (ft): 195

Right Abutment to Channel Bank (ft): 120

Left Abutment Protection:

Right Abutment Protection

Contracted Opening Type: III

Embankment Skew (deg): 0

Embankment Slope (ft/ft): 2

Abutment Slope (ft/ft) 2

Wingwalls: No

Wingwall Angle (deg): 0

Pier Data

BSDMS Summary Report

28 Homochitto River at U.S. 84 at Eddiceton, MS

Pier ID	Bridge Station(ft)	Alignment	Highway Station	PierType	# Of Piles	Pile Spacing(ft)
3	25961	0	25961	Single	0	
4	26041	0	26041	Single	0	
5	26121	0	26121	Single	0	

Pier ID	Pier Width(ft)	Pier Shape	Shape Factor	Length(ft)	Protection	Foundation
3	8	Cylindrical		8	None	Poured
4	8	Cylindrical		8	None	Poured
5	8	Cylindrical		8	None	Poured

Pier ID	Top Elevation(ft)	Bottom Elevation(ft)	Foot or Pile Cap Width(ft)	Cap Shape	Pile Tip Elevation(ft)
3	213	205.5	15	Square	
4	213	205.5	15	Square	
5	213	205.5	15	Square	

Pier Description

Pier ID 3

Pier consists of an 8-ft-diameter concrete column on a 15-ft-wide by 15-ft-long by 7.5-ft-deep concrete footing supported by 20 14x14-inch concrete piles.

Pier ID 4

Pier consists of an 8-ft-diameter concrete column on a 15-ft-wide by 15-ft-long by 7.5-ft-deep concrete footing supported by 20 14x14-inch concrete piles.

Pier ID 5

Pier consists of an 8-ft-diameter concrete column on a 15-ft-wide by 15-ft-long by 7.5-ft-deep concrete footing supported by 20 14x14-inch concrete piles.

BSDMS Summary Report

28 Homochitto River at U.S. 84 at Eddiceton, MS

Pier Scour Data

Pier ID	Date	Time	USOrDS
3	1/25/90	9:00	Upstream
3	8/27/92	10:10	Downstream
4	12/21/72	6:00	Upstream
4	4/25/73	5:30	Upstream
4	1/25/90	9:00	Upstream
4	8/27/92	11:10	Upstream
5	1/25/90	9:00	Upstream
5	8/27/92	10:55	Upstream

Pier ID	Scour Depth	Accuracy (ft)	Side Slope (ft/ft)	TopWidth (ft)	Apprch Vel (ft/s)	Apprch Depth(ft)	Effective Pier Width	Skew to Flow(deg)
3	4.1	1			6.2	10	8	0
3	3.2	1	8	50	6.24	8.5	8	0
4	2.9	0.5			7	12.9	8	0
4	2.9	0.5			6.1	8.7	8	0
4	3.9	1			6.94	9.5	8	0
4	6.4	1			7.4	8.7	8	0
5	4.7	1			5.74	10	8	0
5	4.5	1			6.55	10.2	8	0

PierID	Sediment Transport	Bed Material	BedForm	Trough (ft)	Crest (ft)	Sigma	Debris Effects
3	Live-bed	Non-cohesive	Dune			6.9	Insignificant
3	Live-bed	Non-cohesive	Dune			6.9	Substantial
4	Live-bed	Non-cohesive	Dune			6.9	Unknown
4	Live-bed	Non-cohesive	Dune			6.9	Unknown
4	Live-bed	Non-cohesive	Dune			6.9	Insignificant
4	Live-bed	Non-cohesive	Dune			6.9	Insignificant
5	Live-bed	Non-cohesive	Dune			6.9	Insignificant
5	Live-bed	Non-cohesive	Dune			6.9	Insignificant

PierID	D95 (mm)	D84 (mm)	D50 (mm)	D16 (mm)
3	27	23.2	7.51	0.49
3	27	23.2	7.51	0.49
4	27	23.2	7.51	0.49

BSDMS Summary Report

28 Homochitto River at U.S. 84 at Eddiceton, MS

4	27	23.2	7.51	0.49
4	27	23.2	7.51	0.49
4	27	23.2	7.51	0.49
5	27	23.2	7.51	0.49
5	27	23.2	7.51	0.49

Pier Scour Comments

Pier ID 3 **Time:** 9:00 **US/DS:** Upstream

Reference bed is at elev. 218.2 ft.
Minimum bed is 3-4 ft upstream from pier at elev. 214.1 ft.
Scour-hole depth = 218.2 - 214.1 = 4.1 ft..

Pier ID 3 **Time:** 10:10 **US/DS:** Downstream

Reference bed is at downstream side at elev. 220.0 ft.
Minimum bed is at downstream side, 28 ft left of pier at elev. 216.8 ft.
Scour-hole depth = 220.0 - 216.8 = 3.2 ft.
Debris prevented soundings at the upstream side of pier.

Pier ID 4 **Time:** 6:00 **US/DS:** Upstream

Reference bed is at elev. 217.7 ft.
Minimum bed elev. recorded is at 214.8 ft.
Scour-hole depth = 217.7 - 214.8 = 2.9 ft.
Values were determined from FHWA reports and USGS discharge measurements.

Pier ID 4 **Time:** 5:30 **US/DS:** Upstream

Reference bed is at elev. 217.0 ft.
Minimum bed elev. recorded is at 214.1 ft.
Scour-hole depth = 217.0 - 214.1 = 2.9 ft.
Values were determined from FHWA reports and USGS discharge measurements.

Pier ID 4 **Time:** 9:00 **US/DS:** Upstream

Reference bed is at elev. 218.7 ft. Minimum bed elev. is at upstream side at 214.7 ft. Scour-hole depth = 218.7 - 214.7 = 4.0 ft. Minimum bed elevation at the pier was estimated from the measured scour-hole side slope and distance to the pier.

Pier ID 4 **Time:** 11:10 **US/DS:** Upstream

Reference bed is elev. 219.0 ft. Minimum bed at upstream side is 212.6 ft. The maximum scour is affected by the footing, at 213.0 ft. Scour is 219.0 - 212.6 = 6.4 ft. USSB section was supplemented with soundings at the pier (26037 213.4, 26041 212.6, 26045, 213.0) and 10 ft upstream from the pier.

BSDMS Summary Report

28 Homochitto River at U.S. 84 at Eddiceton, MS

Pier ID 5 Time: 9:00 US/DS: Upstream

Reference bed is at 218.2 ft. Minimum bed (213.5 ft) was estimated by projecting the measured scour-hole side slope downstream to pier. Minimum bed at the pier face is affected by the top of the pier footing (213.0 ft.).

Pier ID 5 Time: 10:55 US/DS: Upstream

Reference bed is at 217.5 ft. Minimum bed (213.0 ft) at pier face is affected by the top of the footing (213.0 ft). Cross section measured at upstream side of bridge was supplemented with soundings at pier (26117 213.0, 26125 214.8) and 5 ft upstream from pier (26111 214.6, 26121 215.2, 26131 214.5).

Abutment Scour

Contraction Scour

Stage and Discharge Data

Peak Discharge					Flow (cfs)	Qacc	Peak Stage					Stage (ft)	Water Temp (C)	Return Period(yr)
year	mo	dy	hr	mi			year	mo	dy	hr	mi			
1992	8	27		0	21800	5	1992	8	27		0	230.8		4

BSDMS Summary Report

28 Homochitto River at U.S. 84 at Eddiceton, MS

1990	1	25	3:45	45	21800	5	1990	1	25	3:45	45	230.8	4
1990	1	25	9:00	0	14900	5	1990	1	25	9:00	0	228.2	
1992	8	27	9:30	30	13400	5	1992	8	27	9:30	30	227.7	

Hydrograph

Hydrograph Number	Year	Month	Day	Hr	Min	Sec	Stage(ft)	Discharge (cfs)
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Supporting Files
